

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Let's Increase Production in Our Own Back Yard

WE HEAR a great deal of talk, and all of us contribute to the general pow-wow, about the other fellow's decreased production. We glibly cite from our friends' conversations examples of work which should be done in an hour, but which took a certain workman two hours; of laziness and refusal to work, etc. And what good does this do, this incrimination of the other fellow, usually unknown?

What we must do is to work ourselves and be sure that there can be no possible ground for a like criticism leveled at us.

Each man must feel his own responsibility and show that he realizes the situation by his production on the job in which he finds himself. This electric railway industry, for example, is a business vitally important to the whole community and to each and every individual in it. And the entire group of men in the industry can well begin their efforts at home. Each of us must realize his obligation to the industry, upon the success of which our own individual successes depend; to appeal our self-interest. If we all did that very thing, and acted upon that realization, *one hundred per cent* we would at least do no more than our duty to our own job, to ourselves, to the industry and through the industry to the country.

In some places this is being done, and the habit is contagious. Let's all commence in our own back yard and get to work on a production basis we've never attempted before. Give the message to the other fellow by example, by advertising, by encouragement.

Why It Was Proper for Mayor Peters to Protest

PROOF is growing of the more general acceptance of the modern conception of the function of a public utility. This is that the utility is not primarily an enterprise for private profit, but a necessary part of the life of the community in whose continuous service the public is vitally concerned. For reasons of policy it has been considered wise to allow this service to be supplied by private enterprise, and the private capital thus engaged must receive a fair return, otherwise the service will not expand with the needs of the community. But outside of this matter of the conduct of the enterprise, it closely resembles actual municipal service, like the police and fire departments, and the public should be as vitally interested as with them in seeing that efficiency and quality are maintained.

With this view in mind it is easy to understand the reason for the recent appeal of Mayor Peters of Boston to the Boston Elevated Railway to refuse the demands of its trainmen for increased wages. The reasons for similar public interest in the question of trainmen's wages in Pittsburgh are also clear. Once this principle

is admitted the responsibility of the public for reasonable operating conditions is clear. In a sense this condition is recognized and prevails wherever there is a public service commission. But the commission can do its best work when it is supported by public opinion, and correct thinking on this subject is a matter which all utility companies should do all they can to stimulate.

You Can Help Improve the Mail Service

WE REGRET very much indeed that there is one link in the chain of operation involved in the service of this paper to its readers over which we have no control. While we are endeavoring to keep the industry informed of all developments through a fairly comprehensive contact with the field, and our mechanical department is functioning properly in printing and binding the paper and getting it into the mails promptly on Saturday each week, yet we are frequently confronted with complaints that the paper reaches the subscriber several days after it normally should arrive.

We wish this were a fault of our own, for then we could promptly devise ways and means to correct it. But unfortunately the chief cause of the delay lies in the present lack of adequate postal facilities. We have taken the matter up with the postal authorities and are assured that everything physically possible is being done with the facilities now available and with the number of employees which can be obtained. It remains for you as well as ourselves to bring pressure to bear upon Congress to take such steps as are necessary to alleviate the present great congestion of the mails and to provide a satisfactory postal service.

One of the greatest needs in this connection is for additional employees in the mail service, but it seems to be practically impossible to secure them at the prevailing rates of wages, which nearly every one will admit are distinctly below the level of those prevailing in other comparable occupations. This means that Congress must be urged to arrange for better pay for post office employees.

The inferiority of the service due to labor shortage is a condition prevalent generally throughout the country. It is made worse at some points, notably Chicago, by a lamentable inadequacy of facilities to handle the great volume of matter entrusted to the mails. This could be relieved, it is believed, by an authorization to acquire by renting or otherwise a large amount of additional floor space in which to sort and handle the mail, particularly second-class matter, which seems to be suffering most. This could be done without awaiting the slow process of building new government buildings.

With the present important developments in the industry, with changes taking place daily, it is highly important that one be constantly and promptly advised of the latest developments, for these have such an important

bearing on local negotiations. You can help in eliminating the weak link in the JOURNAL service chain by enlisting the interest and active support of your Congressman.

The Electric Railway and the Equipment Trust

ROLLING STOCK purchasers are receiving consideration almost everywhere today as a part of the necessary reconstruction and rehabilitation after the war years. In many places rolling stock must be replaced or augmented, but the means of financing are not so evident as the needs of equipment in these days of new money values.

That the equipment trust as a method of financing these purchases is growing rapidly in favor with the electric railways is evident from the analysis of issues of this sort, presented on another page of this issue. A deferred payment plan, covered by security which is at once safe and salable, ought from its nature to appeal to the industry. That it has not done so to a greater extent in the past probably has been due to a very evident lack of standardization of rolling stock and also to the less stabilized or routine conditions of electric railway finances as compared with those of the trunk lines.

But present conditions have forced the industry to seek the very best methods of financing, and the fact that so many certificates of this kind have been issued recently seems to indicate the fundamental soundness of the equipment trust. It is so satisfactory to a company, so attractive to an investor and so useful to the broker as an additional type of security that it seems nothing but good can be said of it. We suggest a careful study of these issues by every company contemplating rolling stock purchases.

Local Confidence Promotes Local Financing

ONE of the fine features of these equipment trust securities is their adaptability and fitness for local sale. But while local financing engenders local interest and promotes local confidence there must be some local confidence first. Nothing can be done in local financing without the local confidence to start it.

As an evidence of the argument that it is chiefly confidence which is necessary a case in point may be cited.

Only a comparatively short time ago a certain street railway property was badly run down, its service was unsatisfactory and the attitude of the public militant. The people would not approve a fare increase and no one would invest new money in the property to rehabilitate it.

Then a change in management brought new ideas. New cars of a new type which materially reduced the operating expense and made possible a great improvement in service were purchased and installed—mostly on faith on what these cars could do. It goes without saying that this faith and the capital to build the cars did not come from local people, but the new ideas were put into effect.

Recently, to make the installation complete, ten more cars were needed. So transformed was the public opinion of the property that the financing of the new

cars was taken by three local banks. Now, one of these three bankers had made his promise to take his share of the paper conditional upon the approval of his investment committee. But one of the three members of this investment committee was very conservative, and after the banker had obtained the approval of two of the members of his committee he approached the third member with a feeling of trepidation because he feared that he would be against the proposition. After he had finished his outline of the situation he was surprised to have this third gentleman tell him that the proposition looked pretty good to him, that he was in favor of it, and that, if possible, he would like to have \$5,000 of it for his own personal investment.

The story illustrates the effect of the changing attitude of the people toward public utilities in general and the street railway in particular once confidence is restored in the soundness of the basis upon which the property is being operated.

Why the N. E. L. A. Favors Railroad Electrification

THE report of the National Electric Light Association committee on railroad electrification, presented at the Pasadena convention this week, was unusually significant because of the present coal situation. Much more than ever before the coal situation is focusing attention upon the railroads as great and wasteful fuel consumers, whereas the power companies are producing power with greater and greater economy of fuel. The rapid increase in consumption of the limited fuel resources of the country has long alarmed the conservationists, but only scarcity and resulting high cost have sufficed to cause the country as a whole to "sit up and take notice."

In the agitation for electrification it is natural that the power producers should take a leading part. The coming enormous field for the output of their power plants in furnishing electrical energy to the railroads is a prospect attractive in the highest degree. They can afford to make alluring rates because the added load from this source will not proportionately increase their investment and operating expense. Furthermore, as the costs of coal and fuel oil go up the possibilities of economical water-power development increase. Indeed, the utilization of water powers works in well with railroad electrification because in general there is plenty of this power where the railroads need it most, while industrial customers for the water power are apt to be far away. As a potent force in the conservation movement, therefore, the N. E. L. A. may well devote a share of its activities to stimulating interest in this line.

The report of the N. E. L. A. committee on railroad electrification this year consists of a group of papers by members of the committee who authoritatively represent the railroad, manufacturing and power points of view. From all three viewpoints judicious electrification of the railroads is desirable. We use the word "judicious" because none of these three interests prescribes this remedy as a panacea for railway ills. It is recognized as simply one thing that will help resuscitate the patient, now in a critical condition. The problem before the leaders in the three fields mentioned is to work

together toward the gradual substitution of the new motive power for the old, utilizing the savings made at one stage of the substitution for the financing of further improvements.

What Indirect Taxes in Chicago Mean

DURING the fiscal year ended Jan. 31, 1920, the Chicago Surface Lines had to pay to the city of Chicago \$348,480 for cleaning the right-of-way, which the street cars do not clutter up. This figure includes the cost to the company of snow removal, of which the greater part is done by the company. It also had to pay to the city \$1,488,848 as the latter's 55 per cent share of the net earnings, a benefit to the car riders of very doubtful reality, for while some \$25,000,000 has been thus paid into the traction fund, this has been used for other purposes to the benefit of the people in general, thus endangering the availability of the money for traction purposes. The railway company had to pay, also, \$418,625 for paving which the street cars do not wear out and the existence or condition of which is of no value or consequence to the car riders as such.

Taken together, these three items form an indirect tax upon the car riders of Chicago for the twelve months mentioned of \$2,215,953. Put another way, every revenue passenger during the year made a payment of three-tenths cent for something he did not receive or derive any benefit from—a contribution to the city treasury. If this amount could have been applied as dividends it would have paid 1.4 per cent additional on the city's agreed purchase price of \$158,538,423 for the system as of Feb. 1, 1920, thus improving the credit of the company and perhaps making possible the financing of needed improvements which had to be deferred. Or, this indirect tax would have supported an additional 6 per cent capital issue of \$36,932,550, which amount would have purchased all the rolling stock, made all the line extensions and everything else needed to meet all public requirements as to service.

Carry this one step further and assume that by some hokus pokus the city is justified in collecting 55 per cent of the net profit and that the car riders derive a benefit from that payment to the city. We cannot justify it in our own minds, for if the city did not have this great transportation system it would willingly pay ten times what it collects to get it. But, assuming this payment to be just, the two other indirect tax items, amounting to \$767,105, would have supported a 6 per cent capital issue of \$12,785,000. This sum would have purchased 880 new motor cars at \$14,500 each, whereas 400 new cars would considerably more than give all the additional rolling stock needed to overcome the overcrowding of cars, from which the riders are now suffering.

These few figures merely point out how inequitable is the practice of forcing the street railway company and therefore the car rider to pay for paving and other items which form no part of the cost of providing transportation. This is a burden for which there is no justification save the antiquated precedent of horse car days, and the sooner the car riders come to an appreciation of this and exert their influence for an adjustment the better it will be for the general public as well as themselves.

Increasing Fuel Shortage a Challenge to the Electric Railway

DIRECTOR MANNING of the United States Bureau of Mines is reported to have said, on May 16, that, with consumption exceeding production, in less than twenty years the supply of oil still underground in this country will be exhausted. At the Pasadena convention of the N. E. L. A. a speaker, on May 21, quoted the State Geologist of Pennsylvania to the effect that the easily mined coal in that State will be exhausted in thirty-five years. These statements serve to emphasize the importance, in the transportation field and elsewhere, of utilizing those means for producing power which do so with the least fuel expenditure. This applies not only to the steam railroads but also to the city and interurban railways. If they can demonstrate ability to give better service with less fuel than other transportation agencies they will ultimately win out.

To be sure, fuel is only one part of the cost of transportation service and other factors will often exercise a controlling influence in competition. However, as the cost of gasoline climbs cent by cent individual and collective bus owners are going to weigh debit and credit more and more carefully. It will not do, however, for the railway manager to sit back expecting time (and fuel scarcity) to solve his troubles. The tendencies in this direction merely favor him.

Good Offices Add Dignity to a Company

TIME was when the public might be fooled as to the financial status of an electric railway company. To this end, it has been the belief of some managements that it was highly desirable that the property should convey the impression, to all outward appearances, of being very poor, even though it might be otherwise. Consequently one finds the officials of a railway here and there housed in exceedingly poor quarters.

We believe this is a mistaken policy; at least it is not in keeping with the enlightened knowledge which the public has on the operation and management of public utilities. Information as to the exact financial condition of a railway is now quite generally public property. So there is not much to be gained by an effort to mislead through dingy, poorly furnished, unattractive offices in which the public must transact its business with the transportation company. And even if a company is poor, we are inclined to the opinion that the impression created by such surroundings is rather to the effect that the management is behind the times, unprogressive and unsuccessful and should give way to new talent, ambitious, aggressive and proud of its activities and environment. In other words, good offices lend dignity to the management and give prestige to the property. The railway is usually one of the big businesses in a community and it should be so taken and accepted in every sense of the word. To talk to an official who sits at a rolltop desk dating its service back to the '70s and surrounded by bare soft-wood floors and the clutter of ages does not tend to make the caller carry away the impression that that man is "on his toes." And since the public utility has come to be so much a business of the public, this public rightfully has an interest in being satisfied that the local management is efficient and progressive. Good offices, like well painted cars, have an important bearing on a patron's attitude.

This Is Number Three of a Series of Articles on Salient Phases of the Electric Railway Situation

Boston—and Her Trolley Cars

By Edward Hungerford

I must confess to a genuine warmth of feeling for the system of city traction in and about the metropolitan district of Boston. It seems to have measured at all times to the needs of the community to be served; not invariably, perhaps, but certainly making a very strong average. More than twenty years ago Boston was making a definite—and a successful—effort to solve her transport problem in advance of its becoming so acute as not to permit of intelligent, deliberate solution. In this she was at least a decade ahead of the other metropolitan cities of America physically, not alone in possessing the very first subway in the United States but, in a larger sense, in continuing to plan her traction facilities—intelligently and deliberately—well in advance of the city growth that eventually would make them acutely necessary.

Cambridge would need a subway, so would South Boston; East Boston too. Each was told that its needs would be foreseen—all in abundant good time. In the meantime, the most urgent need was for the relief of the original Tremont Street subway. Its success had been immediate—and overwhelming. Not only had it taken the surface cars completely away from what, in 1893, was perhaps the most congested street in

DESPITE the fact that Boston was among the first of the large cities in this country to equip its main lines with electricity, electric railway operation in that city has always had its complications because of the narrow streets, Beacon Hill in the center of the city, and other topographical conditions. In this article Mr. Hungerford tells first how these physical conditions and complications were overcome. He then explains how, when the rising tide of expenses threatened the financial embarrassment of the company, the State stepped in, took over the operation of the property, guaranteed a fixed return to the stockholders and raised the fare to 10 cents. The next article in this series will discuss the situation in a city in the Central States.

America, but its service of solid trains of multiple-unit cars, in connection with the elevated railway line along Atlantic Avenue and out to Roxbury and to Charlestown, had been Boston's very first introduction to genuine rapid transit. Yet this unique composite system had been in service but a comparatively short time before it was so taxed as to point toward need for its relief.

Some other communities would have waited until this need became acute—until overcrowding in the Tremont Street subway had become a nightly reproach and a disgrace. Not so with Boston. With long-headed New England foresight she set about, without a moment's delay, to enlarge and to relieve her orig-

inal rapid-transit plan. Washington Street was the logical path for such a relief route. And because the Tremont Street subway, originally planned, I believe, for exclusive trolley car operation, was extremely difficult, with its sharp curves and its stiff grades, for the operation of elevated trains it was planned in the reconstruction and rearrangement program to devote the four tracks of this original tunnel to surface cars alone. This was both simple and logical and involved the abandonment of only a few hundred feet of elevated structure where the south end of one of the arms of the Tremont Street subway had debouched into the elevated railway along Washington Street out toward its Dudley Street terminal.

In the original rapid-transit plan this same Dudley Street terminal had been designed as a focal transfer point. To put the thing more clearly, trolley cars which heretofore had found their way down into the crowded heart of the city now ran into the terminal structure upon its intricate but ingenious layout of ramps and inclines and there poured their passengers into the elevated trains before receiving a fresh cargo of outbound folk. There was no ticket taking of any sort involved. The fact that a man was upon the



Two views of Massachusetts Avenue transfer station. This station eliminates the street transfer at a busy intersection

station platforms was full enough indication that his fare had been paid and that he was entitled to continue his journey, in any direction he so wished. A very simple plan this, too. I am calling particular attention to it here because, years later, it has begun to be something of a physical problem in a scientific settlement of Boston's problem of rapid-transit fares.

At Sullivan Square, in Charlestown, and at the far end of the original elevated railway system from Dudley Street there was achieved a similar focal or passenger transfer point. The effect of these two upon the street traffic of the downtown sections of the Hub was hardly less than that of the completion of the Tremont Street subway itself, with its actual removal of the surface car tracks in that street—a good portion of Boylston Street as well—as an important and essential part of the program. A great civic benefit was achieved. Yet by the time that the Washington Street tunnel—one finds Boston meticulous in insisting that the Tremont Street line be called "subway" and the parallel one under Washington Street "tunnel"—had been completed, fifteen years later, there was need for an exactly similar civic benefit. The relief achieved by the first trolley car removals had been lost in the steady growth of the city and the street traffic in its heart. The trolley tracks were not removed from Washington Street. For a number of years after the completion of the rapid-transit tunnel under the important thoroughfare a few surface lines retained their routes within it. Recently these too have gone and the tracks it holds stand unused. Nor is it likely that even if they are permitted to remain for any length of time they will ever come into regular usage again.

I have made a point of this be-

cause it represents an essential difference in the rapid-transit plan for Boston as compared with those of New York or Philadelphia or Chicago. In these other cities elevated or subway rapid-transit lines have either supplemented or competed with the existing surface-car routes. In Boston they have supplanted them. Which is a distinction with a large difference. The Boston plan in its working out comes nearer rep-

elevated railway terminals into a combination of terminal and through station. In other words, the elevated shot out its long metallic arms south beyond Dudley Street a good two miles to Forest Hills and north over marshy meadows from Sullivan Square to ancient Everett. At each of these new terminals additional focal and transfer points were created and long-distance trolley operation curtailed, with great economy and efficiency. Similarly two other subways have been created in and through the heart of old Boston—one from Scollay Square under the harbor to East Boston and carrying and there distributing a nest of surface lines and the other from Harvard Square, Cambridge, through to South Boston, passing underneath Park Street and the great South Station and operating multiple-unit trains, whose cars far exceed in dimensions and in carrying capacity the original rapid-transit cars of the city. At Harvard Square, at the north end of this line, and at Andrew Square, at its south end, are two more Dudley Streets. The principle of these gatherings and focal points is firmly established in Boston by this time, and Boston likes it and says so, quite frankly and earnestly, as is her way. There is still another new stretch

of subway, from Charles Street close by Park Square on under Boylston Street for another mile and a half to a discharging point in Commonwealth Avenue well beyond the congested section of the city. But as this is, in reality, but an outstretching of the original main stem of the old Tremont Street subway and handles trolley cars exclusively it does not come so readily into the picture of the idealized Boston transport plan.

These later cross-cut subways not only intersect the older parallel rapid-transit routes physically but



Lines of the Boston Elevated Railway Company

resenting that of London than that of any other American city. Which, inasmuch as Boston closely resembles London in many, many ways, may be set down as being at least most consistent.

Enclosed Transfer Points Solve the Problem of Distribution

The construction of the Washington Street tunnel also involved the transformation of Dudley Street and Sullivan Square from exclusive



Andrew Square transfer station—surface to subway

interchange traffic with them freely at each point of intersection. There are no transfers issued, but more ingenious ramps and stairs and elevators and escalators. Until at a point like Park Street one sees what is a real civic heart—veins and arteries pulsing beneath the surface of the city with a traffic that is all but unending and yet showing but little of their activity upon the surface. The aviator flying over old Boston, with all of the sharpness of his well-trained eyes and the precision of his observation apparatus, could detect but little of the presence of her real civic heart—an occasional kiosk at a busy corner sucking in or emitting cross-currents of tiny black humans; that is all the outward evidence that he would find of her very scientific transport system in her oldest, and most sacred, precincts.

These Transit Facilities Have Been Costly to Construct

If I have dilated upon these purely physical features of the Boston transportation system it is because I believe an understanding of them to be essential to a thorough understanding of the difficulties of the companies which today operate it. There are two of these: the Boston Elevated Railway, which operates the lines in the more congested sections of the metropolitan district, old Boston, Charlestown, Brookline, Watertown and the like, and the Eastern Massachusetts system—until recently the Bay State Railway—



Everett Station—passengers boarding surface car

which operates suburban rapid-transit lines, but in a few cases out of the subway routes and stations. This last system has recently gone from its corporate troubles into the hands of a state trusteeship. But because this trusteeship is still very new we shall leave consideration of it until another time and concentrate our present attention upon the Boston Elevated—a road notable across the land in past few years for the energy and spirit with which it has moved to its problem. Its human equipment has more than kept pace with its mechanical. And, despite the memories of a particularly aggravating strike in the summer of 1919, I think I may fairly say that its operating force has generally been of a high character—clean, well uniformed, well paid, alert, interested.

To gain these things has cost money. Labor is never very cheap in the Massachusetts Bay regions. Around tightly unionized Boston it generally has been particularly high priced. Today the platform men of the Boston system's trolley cars are paid 60 cents an hour, the men on the elevated trains 2 cents an hour in addition, while, when I visited the system early in the present winter, the company's employes were secretly preparing fresh wage demands.

With wages well set in advance of many other communities, with fuel costs high and, because of the elaborate system of rapid-transit lines, overhead a particularly heavy factor in the reckoning, Boston was the very first of our large cities to reach the 10-cent fare. Inside of a year, beginning Aug. 1, 1918, the Boston Elevated advanced its fares by three successive stages from 5 cents to double that figure. And today at the high figure is doing somewhat better than making its operating and fixed costs, including the payment of a stipulated dividend return to its stockholders—of which, more in a moment.

How the State Took Control

For the present moment consider the method by which the Boston Elevated, controlling practically all the surface-car and rapid-transit routes in the heart of metropolitan Boston, was saved, in that same frenzied summer of 1918, from pending bankruptcy and utter ruin and placed on a firm basis so that Boston could be assured of a permanency of efficient city transport. At the risk of boring you with a twice-told tale, permit me to say that, under the Massachu-



Everett Station—elevated train unloading

setts system of trusteeship, very largely the work of Matthew C. Brush, the brilliant young president of the Boston Elevated of two years ago, five public representatives (trustees) are appointed by the Governor of that commonwealth to give that property a part of their time, each at an annual salary of \$5,000. The functions of these five men are supposed to correspond with those of the board of directors and the executive committee of the traction system. As a matter of fact the Boston Elevated actually retains these entities of its organization, but for corporate purposes alone. The actual direction and operation of the property are in the hands of the State's trustees.

These are told to operate the property at cost, and please remember that cost in this sense includes not only labor and material, depreciation, obsolescence, taxes and the construction and maintenance of additions and betterments, but interest upon the company's obligations and dividends; these last at the rate of 5 per cent for the next two years, 5½ per cent for the two years following and 6 per cent thereafter. In fact, it was this feature that restored the credit of the Boston Elevated, that brought its stock up from \$27 a share to the neighborhood of \$70 and made that scrip almost like a bond of the Commonwealth of Massachusetts. To meet this cost the trustees may—and eventually must—fix nine rates or scales of fare; a current rate and four successive steps below



Everett Station—ready for the afternoon rush

and four successive steps above it. If at the end of a certain period to be fixed by the trustees, but not to exceed twelve months, the current rates have produced a deficit, the succeeding higher step in fares is adopted, automatically. If, on the other hand, current rates are piling up a surplus, the move is made toward the next lower step.

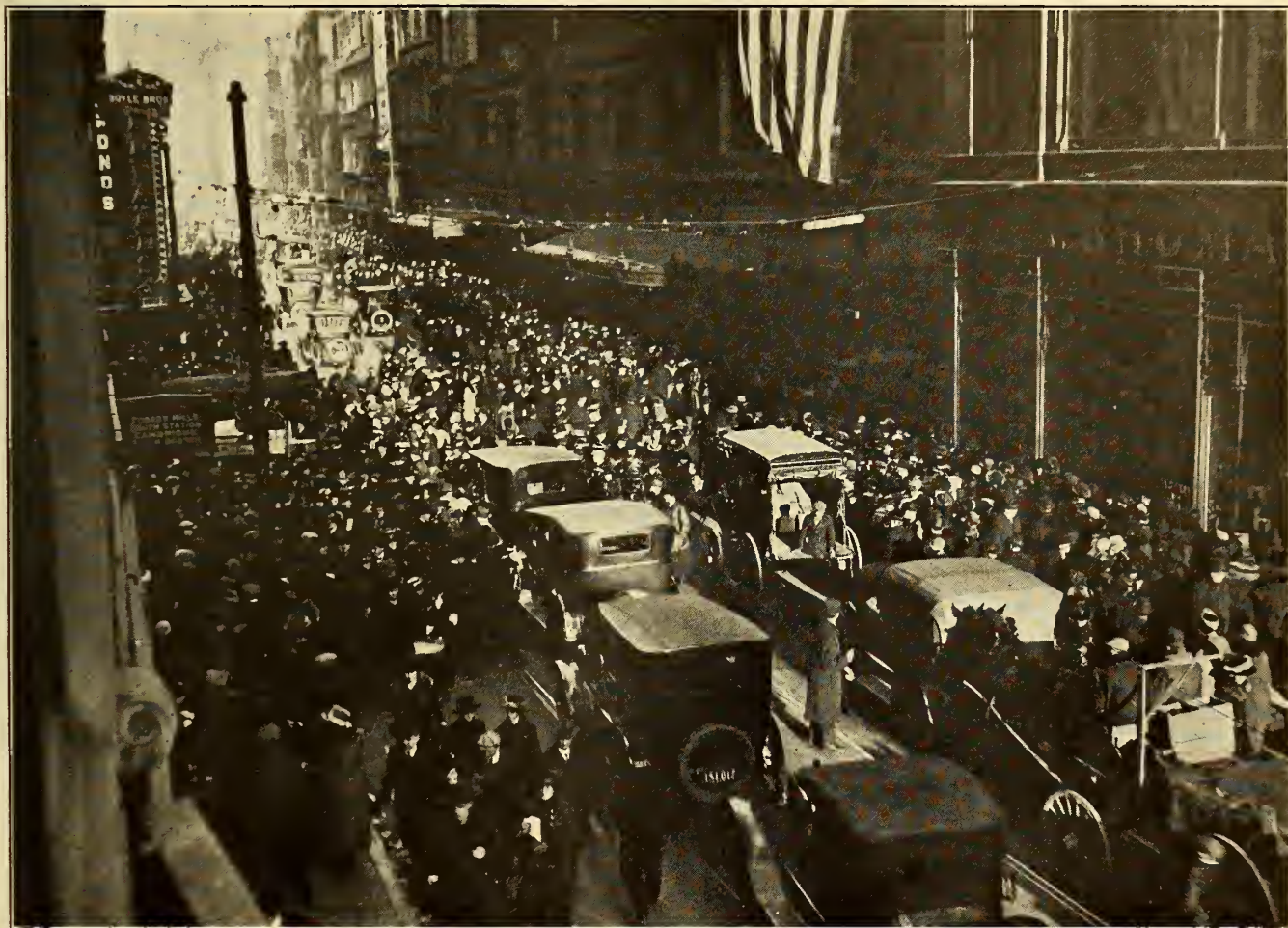
Now see what actually has happened: We have seen how inside of a twelvemonth the fares were raised

sider the raising of the fare beyond that extreme 10-cent limit even as a remote possibility.

For ten cents seems fixed in the public mind today as the ultimate city fare that is even possible of adoption, just as the nickel was the seeming ultimate ten or even five years ago. To board a city street car and pay a fare of more than 10 cents for a ride of but four or five ordinary-sized blocks—as from Scollay Square to North Station right

there. The men who have studied the transit conditions of the Hub have almost uniformly rejected it as a possible solution of reaching steadily mounting cost, without a further increase of a minimum fare, already high as compared with other metropolitan cities of America. And yet, again—

There was a hard-headed president of the Boston Elevated—who slipped into Matthew C. Brush's shoes as that energetic young man went down



Christmas crowds along Washington Street, the heart of the retail business district in Boston. Underneath is the Washington Street Tunnel. Only a few surface cars now run on this street

three times—from 5 cents to 10. And there came, with the incoming of this last scale, a decrease of 18 per cent in riding. Which to any thoughtful student of traction problems is most significant. You can raise the fare, in order to keep pace with the steady increase in operating costs of every sort, to the point where the short-haul rider, always the cream of the business, prefers to think twice, and then to walk. That is what began to happen in Boston; what still is happening there, although that 18 per cent has begun to be lowered, appreciably. But it was a factor that kept the trustees and the actual operators of the Boston Elevated most reluctant even to con-

there in Boston—would seem impossible of adoption. And yet—

“How about the zone system for Boston?” you interrupt. “Or even a charge for transfers?”

Let's answer the last question first. Because of the peculiar and distinctive arrangement of the interchange stations of the Boston transit plan, as we have already seen them, the issuance of transfers at them is not only impracticable but well-nigh impossible. And for the self-same reason the zone system is also seemingly impossible of adoption over

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to Hog Island to help build ships for his Uncle Sam—who told me, less than a year ago, that he felt that the zone system was not only possible but practical for the Boston Elevated. The hard-headed New Englander's name was J. Henry Neal, and as an accounting executive he knew the property of which he spoke thoroughly—“from the ground up,” as the Yankees would like to put it.

Mr. Neal understood the traditional objections of the Boston traction sharps to a zone-fare system; how extremely difficult it would be to graduate the fares in the perplexing although successful system of intensifying trolley car operation, comparatively slow moving in the

outer and open districts of the city, either to high-speed operation through the subways in its heart or else by transfer to multiple-unit trains, where the same thing is accomplished, although in a radically different way. He understood these things. And then discounted them and prepared a scheme in the rough for giving a 3-mile ride out from the very heart of the city for 6 cents, with 8 cents to be charged for the run to the far ends of the system, some 7 or 8 miles at the outermost. About half the population of metropolitan Boston lives within the limits of the 6-cent zone, as roughly set down; so the average fare ought not to be far from a flat 7 cents.

"But suppose that operating costs should keep climbing?" I asked Mr. Neal. "Would not the irrevocable 7 cents be equally as bad as the irrevocable nickel or the irrevocable dime?"

The former president of the Boston Elevated was quite ready for that reaction. He asserted quite vigorously that the first step in such a condition would be to relieve his company of its considerable rental of the tunnels in the downtown portions of the city—for remember that Boston, like New York, builds and owns most of her rapid-transit routes, but leases them to private operation—and that the next step would be the relief of the company's municipal taxes of every sort. If these very considerable helps should fail to halt increasing operating costs the next step quite obviously would be for Boston to be prepared to assume an operating deficit upon its tax budgets. Obviously the city could not be deprived of its street transportation facilities. The continuance of these is as vital to Boston, or for that matter any other large city, as a continuance of its water supply or its police protection. If you do not believe this ask the next citizen of Toledo that you chance to meet. Street-car service is certainly as important to the average city resident as his parks.

As a matter of actual fact, however, the trustees of the Boston Elevated believe that should the imminent necessity ever arise they or their successors would be permitted to run an operating deficit not to exceed 5 or 6 per cent of the gross receipts of the property. If in time this further margin should be reached and passed further relief would undoubtedly be automatic. For in order to keep within their income they would be forced to reduce service. The reac-

tion from such a situation would quickly fix any necessary readjustments of finances.

Company Working Out of Its Deficit

The imminent necessity today does not seem very close at hand, however, despite a certain growing uneasiness among the platform men of the system. For the management of the Boston Elevated—as personified by Edward Dana, the general manager and chief executive official of the system—has been gradually working the property out of the heavy operating deficit which it had amassed by the first day of October of last year. To the original operating deficit, which first faced the trustees when they took over the property for the commonwealth on July 1, 1918, was added an increasing loss through the twelvemonth, while the next three months added disaster upon disaster, the bitter strike of the elevated's employees, the boycott that followed in its wake, as well as a fear on the part of some Bostonians as to the safety of riding upon the cars. (All of this was prior to the great police strike and Governor Coolidge's firm action in bringing law and order once again in sturdy old Massachusetts.) It is enough to say that these conditions added a fresh deficit fund of \$928,694.85 to a deficit of \$435,348.46, which had been accruing because of back pay during the inaugural year of state trusteeship and which was not figured in the \$4,980,151.67 of loss which had accumulated during the first year of operation by the public trustees in a desperate effort to hold down the fare despite the steadily increasing operating costs of every sort. The loss under trusteeship was assessed on the commonwealth and it was known would have to be paid back before fares were allowed to go one penny back from the high figure of 10 cents as finally established. This last figure—the \$435,348.46 of deficit because of back pay for May and June, 1918, plus the \$928,694.85 extra deficit in the three strike and boycott-filled months that immediately followed, brought Dana's immediate deficit on Oct. 1 last to about \$1,364,043.31.

Talk about millstones! A man less energetic and less optimistic than the youthful manager of Boston Elevated might well have quailed before so stout a collar. But youth and energy—and the resources of a 10-cent fare—accomplished wonders in the final months of 1919 and the first thirty days of the present year. By

the first day of February, 1920, Dana had repaid not only all that \$928,694.85 of state-accumulated deficit but also a part of the back pay award.

Then things began to happen. The weather man must have borne him an especial grudge. For Boston went into the worst New England winter for thirty-five years—according to the weather man's own records—and the elevated system went into battle for the second time in a half year; but a fight of a far different sort. It did not give up. In a storm of far less magnitude and at the same time practically all the surface car lines of Manhattan Island gave up the ghost. Which of itself constituted something of an exposition as to the difference in the morale between a state-protected line and one which is state-neglected. The Boston Elevated kept all of its surface routes running as well as its elevated and subway ones. Some of the surface lines wavered a bit at times, but none of them gave up; not even the Mount Auburn Street line over in Cambridge, where a water main burst between the tracks and put twenty cars out of commission in one place. It took nine tons of salt to open that line, but it was opened, and stayed open. Altogether 2,000 tons of salt were used to keep tracks clear in Boston this past winter.

Moreover, despite constant and eternal delays—the trolley tracks of Boston were the only pathways for weeks through which the teamsters and the trucksters might drive—the company maintained its headways. What that meant only a seasoned traction operator can really appreciate. But even the layman, with pencil in hand, can figure out that to maintain a five-minute headway at 9 miles an hour on a line 5 miles in length will require ninety minutes for the round trip and eighteen cars to maintain the service. But if vehicular traffic keeps breaking down in the tracks and therefore your round trips begin to average two hours and one-half instead of one and one-half your pencil will show you equally well that you will need six more cars in order to maintain that five-minute headway. Which was precisely what was done in Boston. The older folk of the town saw cars come forth upon the city streets that they had not seen since the Stadium was built and the Boston Museum torn down. These venerables it was that saved the day—and saved the headways.

These things cost many, many

thousands of dollars. And set Dana back a considerable distance in his repayment of the deficit. By this time he has recovered and is back at it again—whittling down that overload. His labor troubles are perplexing but apparently not overwhelming. For one thing, and a most important thing, there is no labor shortage these days in Boston. The company has not hired a new man since February, 1919, and does not expect to go seeking for new material before August, 1920, at the earliest. Its ordinary needs of turn-over are

tulated. "Boston has progressed four times as fast in her solution of her transportation problems as that town, and yet in the past eight years traction revenues here have increased but \$5,000,000 as against \$12,000,000 over there. Yet in those same years \$35,000,000 has been spent here for increased traction facilities as against less than \$21,500,000 in Philadelphia in the same time. Reduced to the ratio of investment to revenue this shows \$6.90 for Boston as against \$1.76 for Philadelphia.

employment. Both the average day's service and the maximum span are appreciably longer over there by the Delaware, while the Philadelphia Rapid Transit is not bound down by any such elaborate agreement as was our heritage from the strike of last summer, with its varied expensive provisions. All these things cost money—and a lot of it."

Mr. Dana is right. Running trolley cars and rapid-transit trains in narrow-streeted and congested Boston, where pretty nearly one-third of the entire mileage of the elevated's



Tremont Street near corner of Park Street, Boston, Mass. There were formerly car tracks here. Now all cars run underground

being very nicely taken care of by its waiting lists of ex-service men, whom it has promised to re-employ at the earliest available opportunity.

One thing more: The 10-cent fare still sticks in my crop. It comes as a little shock to a stranger to the city's gates, particularly one who, like myself, has been in Philadelphia but a few days previous. I chanced to mention Mr. Mitten and his 5-cent fares to Mr. Dana. He came back at me—just as I knew he would:

"It is not fair to compare this town with Philadelphia," he expos-

"Now suppose that Philadelphia had increased her transit facilities as they have been increased here. Today she would find her fixed charges increased \$3,000,000 and her operating charges \$6,000,000. And assuming that her traction system had incurred no loss of riding she could hardly be operating at less than a 7½-cent fare. Moreover, we have the eight-hour day here for our platform men, with fourteen hours as the maximum outside span of their day's

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system is in curvature, is no child's play. The plant is both elaborate and expensive—in first cost, in maintenance and in operation. It has, as we said at the beginning, anticipated the growth of Boston, rather than dragged behind it. Which is a good thing for the community. But not quite so good a thing for the operating company. That the operating company has done even as well as it has done is due, in my opinion, to three things: New England conservatism, New England thrift and New England brains. That is a combination genuinely hard to beat.

N. E. L. A. Discusses Heavy Traction

At Pasadena Convention, Held May 18 to 22, Committee on Electrification of Steam Railroads Presented Symposium Covering Electrification from Several Angles

THE forty-third convention of the National Electric Light Association was held at the Hotel Huntington, Pasadena, Cal., from May 18 to 22. Of the many reports of committees and addresses several bear more or less directly on the electric railway field. This is conspicuously true of the report of the committee on electrification of steam railroads, of which F. M. Kerr, vice-president Montana Power Company, is chairman. This committee includes also in its membership A. H. Armstrong, chairman electrification committee General Electric Company; R. Beeuwkes, electrical engineer Chicago, Milwaukee & St. Paul Railway; H. H. Cochrane, chief engineer Montana Power Company; Peter Junkersfeld, engineering manager Stone & Webster; F. H. Shepard, director of heavy traction Westinghouse Electric & Manufacturing Company, and J. E. Woodbridge, resident engineer Ford, Bacon & Davis, San Francisco.

A part of this symposium is abstracted this week, and the abstract will be concluded in early issues of the ELECTRIC RAILWAY JOURNAL. Abstracts will also be given of the reports of the committees on prime movers, electrical apparatus, overhead systems, underground systems and other subjects.

THE HEAVY TRACTION SYMPOSIUM

In introducing the symposium, Mr. Kerr explained that the committee found it advisable to submit its report in this form rather than as a unified joint report and had arranged for papers presenting the case for electrification from the points of view of the purchaser and the seller of electrical energy for railway purposes. Papers were also secured from representatives of manufacturers and consulting and operating engineers. While most of the papers are from members of the committee, men prominent in the industry were invited to contribute pertinent comments and the committee presented abstracts from a number of letters received in response.

From his own point of view, Mr. Kerr stated that he considered the experimental stage of railway electrification to be past. The Chicago, Milwaukee & St. Paul Railway and the Montana Power Company have demonstrated, in Montana, the entire practicability and the great superiority of electric power for the operation of a heavy trunk-line railway by more than four years of 100 per cent operation. The demonstration has been so satisfactory that the question of applying electric operation to other roads is a matter only of securing the necessary capital.

The change from steam to electric operation means more than a mere change in type of locomotive used. It means a change in the entire conception of the art of railroad transportation. The old limitations of boiler capacity and the handicaps of low-grade fuel, impure water and zero weather are all swept away. The locomotive becomes a device for hauling trains and nothing more. By adopting electrification the railroad is relieved

entirely of the business of generating power and is enabled to concentrate on its main business of transportation.

Mr. Kerr said that the energy required for railroad electrification can best be supplied by the power companies of the country. The power companies have had years of experience in the application of electric power and understand its capabilities to a much greater extent than do the steam railroads. For this reason the power companies should take the initiative in bringing before the railroads the fact that electric power, which during the last quarter century has been gradually superseding other forms of power, now stands ready to take one more step and relieve the transportation systems of the burden of maintaining the obsolescent reciprocating locomotive steam engines.

Mr. Kerr pointed out the following items, which should not be lost sight of in discussing the operating economies of electric as against steam operation:

1. The cost of coal should be taken at its actual market value delivered at the point of use.
2. Comparisons of maintenance cost should include not only locomotives but also cars, for especially on mountain divisions where regenerative braking is used the rolling stock of a road is subjected to much less abuse with electric than with steam operation.
3. The cost of obtaining, and frequently of treating, water for boiler feed is an item of considerable importance chargeable to steam but not to electric operation.
4. The higher speed at which cars can be hauled over roads with electric operation allows the same amount of freight to be handled with considerably fewer cars.
5. With the size and speed of trains increased by electric operation the item of train labor is reduced. Roundhouse and shop labor is reduced even more.
6. The cost of purchasing electric energy is in some cases given undue prominence by roads considering electrification. That this is not necessarily a controlling item is indicated by the following figures: The total yearly cost of operation on the Chicago, Milwaukee & St. Paul Railway averages about \$11,000 per mile for the entire system of 10,000 miles. The cost of electric energy purchased for the Rocky Mountain division is \$1,600 per mile, or less than 15 per cent of the average total cost for the system.

THE ELECTRIFIED RAILROAD AS A POWER CONSUMER

Mr. Cochrane discussed the power end of the electrification problem on the basis of experience obtained in supplying power to the Butte, Anaconda & Pacific and the Chicago, Milwaukee & St. Paul Railways. He explained why he believed that the purchase of power from existing systems, either hydro-electric or steam, is more economical for the railroads than the generation and distribution of their own power.

For example, if the Chicago, Milwaukee & St. Paul Railway had undertaken to generate its own power for the 440 miles electrified in Montana by means of water-power development it would have had to make two 25,000-kw. developments to provide a reasonable reserve for future growth and to allow one spare generating unit in each power plant. It would also have had to build high-voltage feeders from its plant to feed points not more than 100 miles apart on the electrified division

in addition to its so-called bus line, paralleling the track and tapping in at each substation. This would have called for approximately 700 miles of high-voltage line.

By taking power from the Montana Power Company the railroad was able to deliver power to the substations on its two 220-mile divisions by building approximately 400 miles of high-voltage line, while the power company built 200 miles, which is used partly for transmitting power to the railroad and partly for other purposes. The plant required for this purpose is of approximately 30,000-kw. capacity.

The saving in plant capacity is due partly to the diversity factor between the railroad load and the balance of the power company's load and partly to the fact that it is unnecessary for the power company to provide any more spare capacity for growth and for other purposes with the railroad load than would be necessary without it. Furthermore, it would have been difficult for the railroad to find power sites suitable in size and location for its requirements.

In the case of the Butte, Anaconda & Pacific Railway the economic advantages of purchasing power are even more marked, because this road is so situated that the entire system could be supplied by two substations, one at Butte and the other at Anaconda. The power company already had large substations at these points and the railway requirements were taken care of by merely installing motor-generator sets in them.

Mr. Cochrane suggested that in future electrification projects the power company own all high-voltage lines, switches and transformers and deliver power to the railway at a suitable voltage for its converting apparatus. With this arrangement the power company would own all the equipment necessary to supply consumers other than the railroad along the electrified sections. All towns in which substations are located could be supplied with practically no additional investment except for the necessary local distribution systems. He sees no reason why the power company should not own and operate the railroad substations entirely, selling power to the railroad in the form required by it and delivering directly to its contact wire. This would cut the railroad's investment to that required to cover overhead construction and rail bonds.

Shifting a part of the investment from the railroad to the power company will, of course, necessitate a higher rate for power. It should be immaterial to the railroad whether the expense is met in the form of fixed and operating charges on equipment or in the form of an increased power bill.

POWER RATES FOR ELECTRIFIED RAILROAD

Mr. Cochrane pointed out that a rate should be flexible enough to allow quite a wide variation in the amount of power taken and in the load factor without penalizing the railroad to such an extent that it will restrict its operations in order to save on power.

The ideal rate from the railroad point of view is a straight kilowatt-hour rate. Such a rate is hardly feasible from a power company's standpoint, for a peak load can be taken without let, hindrance or compensation, and such a load at times might prove burdensome. A reasonable compromise can be reached by basing the major part of the charge on the small amount of energy taken, but with a small maximum-demand charge, just sufficient to offer an incentive to the railroad to keep its demand as low as good operation will permit.

Perhaps the most prominent characteristic of a railroad load, said Mr. Cochrane, is its lack of any outstanding characteristics. The two electrified divisions of the Chicago, Milwaukee & St. Paul Railway take peak loads of about 15,000 kw. each and the Butte, Anaconda & Pacific takes about 8,000 kw. These peak loads do not come at the same time, in general, and the fact that they exist is ascertained by referring to the records rather than by any physical effect which they have on the power system. The power factor is about unity and the load is so scattered that fluctuations in railroad loads have practically no effect on voltage regulation.

Mr. Cochrane showed a typical daily load curve of one of the St. Paul substations indicating a load factor of about 20 per cent. The load factor on the entire Rocky Mountain division was 50 per cent. The Missoula division takes a load very similar to the Butte, Anaconda & Pacific Railway, except that the latter "peaks" at about 8,000 kw. and has a load factor of 30 per cent. Taking the three loads together, however, the total load factor is higher than that of any constituent part. Combining a total railway load with that of the balance of the Montana Power Company's system makes a total with a daily load factor which frequently exceeds 90 per cent, typical figures at present being 144,000 kw. average and 160,000 kw. maximum.

THE POWER CONTRACT IN MORE DETAIL

Mr. Junkersfeld went into detail regarding the requisites of an equitable power contract in this field. He said that during the four years since the 1916 report of the committee was prepared the economic advantages of centralized production of electrical energy have become better understood by all parties interested. The 1916 report contained a section under the heading "Form of Equitable Contract for Energy in Bulk." The form suggested tended toward approximations of investment cost and of operating cost from time to time. The extraordinary experience in the meantime and the present outlook would indicate that this suggestion or tendency should now be given further consideration.

Mr. Junkersfeld pointed out that in the sale of power by a power company to a railroad both parties to the transaction are public service corporations. Each should share in the financial benefits resulting from the co-ordination of the power supply systems. The contract for power should provide automatically for wide fluctuations in cost of labor, fuel and other principal elements. This may take the form of a simple rate, perhaps a "block" rate, based upon both demand and consumption, with a provision for revision at suitable intervals at the option of either party to correct it for unforeseen conditions, for changes in the art, in the purchasing power of money, in the interest rates and in taxes, and for other factors which may affect the cost.

Additional provisions may be introduced, such as coal clauses, labor clauses, etc., to apply corrections for anticipated changes in cost, without the delay incident to periodical revision. It would appear wise to lay down clearly the intentions of the contracting parties and the principles upon which charges are to be based from time to time, keeping the relationship in a simple and easily understood form.

In order to minimize the effect of any uncertainty of termination of the contract, for which the seller must charge and the purchaser must pay, the contract

should be written for a long term of years, or some arrangement made whereby at termination the load is so removed that the power company will be reasonably sure of finding suitable use for the capacity as it is released.

In addition to the immediate benefits to be obtained by both the power company and the railroad by electrification of the latter, it is becoming increasingly apparent that the national interest in this is very great on account of the saving in fuel consumption.

Mr. Junkersfeld said that the State Geologist of Pennsylvania has reported that practically all of the thick, easily mined beds of coal in Pennsylvania, with veins 6 ft. and deeper, will be exhausted at the present rate within thirty-five years. Further, if the present rate of increase is maintained, the veins of the same thickness in Virginia and West Virginia will disappear within the same length of time. Every opportunity should, therefore, be taken to conserve this valuable natural resource.

Concluding, Mr. Junkersfeld said that great saving can be made by replacing steam locomotives with more efficient central steam stations. A further tremendous saving can be made where the electrified railroads can be supplied from otherwise unused water powers, as has been done, notably on the Chicago, Milwaukee & St. Paul Railway.

THE FUTURE OF OUR RAILWAYS

In his contribution to the symposium Mr. Armstrong emphasized the fact that with the return of the railroads on March 1 to their owners, the latter were confronted with general conditions never paralleled in history. The present gross income is insufficient to make any reasonable return on the capital invested after meeting the greatly increased demands of labor. No funds are available to buy locomotives and cars needed because the government failed to make such purchases during its period of control. The trouble with our railroads is perhaps fundamentally deeper than the issues raised by increased cost of labor and material and lack of ready funds. It is considered by many that it is an engineering rather than a strictly financial crisis that confronts us today and that our transportation needs have outgrown the possibilities of the steam engine.

The trying period of war transportation, said Mr. Armstrong, brought the steam engine failure sharply into the public view and served to emphasize its complete inability to meet overloads or operate successfully under adverse climatic conditions. Unlike the steam engine, with its restricting boilers, the electric locomotive taps an unlimited supply of power through its trolley connection and can thus be built of any tractive power and speed demanded to meet future transportation requirements.

The steam engine is consuming one-quarter of all the coal mined in this country, in addition to 6 per cent of the oil, whereas the electric locomotive can utilize water power where available or, if dependent upon coal-fired generating stations, can haul the railway tonnage of the country with an expenditure of one-third the coal now consumed by the railways. The safety of mountain railroading has also been much enhanced by the introduction of electric braking provided by electric locomotives on down grades, and the electric locomotive has established new levels for low maintenance cost and reliability, with greater flexibility

in meeting the varied requirements of general transportation service.

Continuing, Mr. Armstrong said that the fuel economy has become a necessity on account of the high cost of fuel. The reciprocating steam engine is a notable offender in wasting fuel. This type of prime mover has been driven from the stationary power field by the steam turbine. One-third of the coal now burned on our steam engines is wasted in "standby" losses. The steam engines demand continual stoking of coal to keep the boiler hot, requiring for this purpose 300 lb. or more per hour. There are some 63,000 steam engines in this country going through the same cycle of losses every day with no direct supervision of the vast army of firemen employed.

In addition to inefficient burning of coal under the steam locomotive boiler, the distribution of railway coal calls for a tonnage movement approximately 20 per cent of the total revenue freight ton-miles. All coal burned journeys over the road twice, first in the coal car from mine to coaling station, then back again on the engine tenders. A third journey is made by the returning empty coal cars. The hauling about of the engine tenders adds 11 per cent to the ton-mileage of the total revenue freight movement.

During 1918 our railways consumed 163,000,000 tons of coal and 45,700,000 bbl. of oil. On the basis of 3½ bbl. of oil being equal to one ton of coal, the equivalent total coal consumption during 1918 was 176,000,000 tons. It is estimated that the coal consumption is about 290 lb. per 1,000 ton-miles of gross tonnage moved. It is estimated further that 1,000 ton-miles can be hauled electrically with an expenditure of 40 kw-hr., which in a modern generating station can be produced with a consumption of 100 lb. of coal.

A total consumption of about 53,500,000 tons was estimated by Mr. Armstrong as a rough approximation of the coal required to produce the electric power to haul the tonnage of 1918 by electric locomotives. This indicates a possible saving of 122,500,000 tons of coal as the annual return on universal electrification of the country's railways. Many of the present steam engines, he said, are antiquated and most inefficient fuel burners, but the improvement resulting from their replacement by modern steam engines can never approach the fuel savings outlined above, while new steam engines will cost nearly as much as the equivalent capacity in electric locomotives. While fuel economy alone may hardly justify the expense of electrification, except in extreme instances, careful consideration of this subject is timely and important, as the war period has shown how vitally dependent every country is upon its coal supply.

ST. PAUL LOCOMOTIVES HAVE MADE GOOD

To illustrate points cited above Mr. Armstrong said that such a powerful and flexible type of motive power as the gearless electric locomotive just put into operation on the Cascade Division of the Chicago, Milwaukee & St. Paul Railway gives assurance that passenger trains will be run on schedule time, regardless of temperature changes, independent of rail conditions and free from the vagaries of firemen and steaming qualities of fuel. This locomotive requires no helper to assist in hauling twelve steel cars, weighing 1,000 tons, against the 2.2 per cent ruling grade at 25 m.p.h., and is equally capable of reaching 60 to 65 m.p.h. with the same train on level track. Electric operation practically

eliminates the dangers and costly features of mountain grades, so much dreaded by the steam engine operator.

It would appear to the casual observer, said Mr. Armstrong, that the requirements of mountain rail-roading have been reasonably well met by the steam engine available today were it not for the comparison afforded by the results of electric operation. While the Mallet compound steam locomotive is capable of giving great tractive power, this is done at sacrifice of speed; to reach the speed in freight service possible with a single electric locomotive operating under similar conditions would necessitate running two or more Mallet engines, with the prohibitive operating expense inseparable from such excess of engine power. No steam engine can be built and operated with a single crew that will provide such a combination of great tractive effort and speed as is entirely practicable in electric locomotive construction. The steam engine on heavy grades loses some 12 per cent of its effectiveness in revenue hauling capacity by being compelled to haul its own coal on tenders and coal cars. The equivalent of one train in every eight is required to haul its own fuel. In addition the rigid wheelbase of the more powerful steam engines may reach 21 ft., which is entirely too great for successful running on the 10 deg. curves so often necessary on mountain divisions. Electric locomotives of equal pulling power require but one-half this wheelbase. Finally, an electric locomotive can be maintained at materially less expense than a steam engine of equal capacity. Even under present high prices the St. Paul electric freight locomotives are being kept in repair for approximately 13 cents per mile, while Mallet engines are costing from 30 to 50 cents.

In conclusion Mr. Armstrong pointed out that electrification involves no experiment with novel and untried apparatus. On the contrary, universal electrification could well follow closely along the lines of installations now in successful operation. Future development will direct the adoption of detailed changes, but offers small opportunity to bring about any fundamental improvements that will call for the untimely retirement of such an efficient mechanism as the 300-ton locomotives now operating on the St. Paul railway. We are, he said, justly proud of the greatest railway system on earth, but in the coming competition for the world's markets we are threatened with serious disaster if our rail highways are not kept in the highest state of efficiency. The railways are suffering from physical stagnation, produced by the fact that the steam engine development has not kept pace with the needs of modern transportation. The most effective known remedy is the immediate electrification of the more difficult divisions, where the limitations of the steam engines are most keenly felt, and the future extension of the electrified zones to meet progressive needs.

A MOSES NEEDED IN THE TRANSPORTATION FIELD

Mr. Shepard, in his paper, viewed broadly the transportation requirements of the country, with reference to the fact that the success of all industry depends upon the free and expeditious movement of railroad traffic. The normal growth of transportation facilities has been arrested for the last dozen years. Now, with the resumption of private operation, the future of the railroads is perhaps the one problem of overwhelming importance.

Railroad operation in America is in a class by itself, said Mr. Shepard, for the American railroad operator has already developed methods of operation which are far superior in economy of traffic movement to the methods of other countries. He gave general data on the operations for the last year as reported by the United States Railroad Administration as of interest in this connection. These cover some 230,000 miles of railroad line. The gross revenue was more than \$5,000,000,000, of which about \$500,000,000 was saved for net income, while the standard return guaranteed to the roads by the Railroad Administration was about \$900,000,000. Of the total income, 80 per cent more or less was from freight traffic. About 50,000,000 freight train-miles were operated per month and nearly 45,000,000 passenger train-miles. There were roughly 2,500,000 freight cars, 30,000 freight locomotives, 15,000 switch engines and about the same number of passenger engines.

The actual service record of the engines was as follows: The freight engines were in service 35 per cent of the time, in the engine house 50 per cent; passenger engines were in road service about 25 per cent of the time, in the engine house 65 per cent; switch engines were in service about 55 per cent of the time, in the engine house 42 per cent; the remaining time of all classes was spent at terminals in readiness for service.

The average freight-car mileage per day was about twenty-two, the tonnage carried per loaded car was less than thirty, while one-third of the car mileage was run without lading. The average mileage per day for freight engines was about sixty, while that for passenger engines was about 105.

Of the cost of operating freight engines, which totals about 25 per cent of all operating expenses, 32 per cent was for locomotive maintenance, 30 per cent for locomotive fuel and 31 per cent for train service labor. The coal used per locomotive-mile for freight locomotives was about 250 lb. and for passenger locomotives 120.

WHY ELECTRIFICATION IS ESSENTIAL

Mr. Shepard stated that the traffic of the country doubles about each twelve years, so that unless facilities are increased the burden resulting from congestion and inability to move traffic expeditiously will be augmented each year. The solution of the railroad problems should, therefore, be based upon broad lines. Facilities must be provided in advance of needs without regard to the necessity for immediate financial return. This is, in fact, the way in which the major facilities of a railroad are provided, for no revision of lines, additional trackage or improved terminals reflect immediately a full return on the additional capital expended. On those roads whose financial position permitted the provision of facilities in excess of the immediate requirements the freedom of traffic flow has worked out to the ultimate financial advantage of the railroads and to the far greater advantage of the communities served. The country needs a Moses, said Mr. Shepard, or perhaps several of them in this important situation.

The physical means by which the most can be secured from the railroad plant, in Mr. Shepard's opinion, is electrification, the most important reason being that, due to the mobility of electric power, more power can be used to move a ton and more tons can be hauled in a single train than is possible with steam locomotives. While electric locomotives so far in use have in general

merely replaced steam locomotives, they have in a number of cases been of greater power than the steam locomotives replaced, and consequently their greater ability for service has invariably resulted in marked improvement over steam conditions. The possibilities of electrified operation have not as yet been visualized, due largely to the newness of the tool to those who are responsible for our railroad operation and to the method of operation which has been determined by the limitations surrounding the use of the steam locomotives.

The growth in the size of the trains has been the greatest single reason for the economy of traffic movement in America. The size of trains will inevitably be larger, and to handle the inevitable increase in traffic the trains of the future will have to be operated at greatly increased speed. The most recent equipment is vastly stronger than the early types of car. The life of a freight car is only about twenty-five years, so that the weak cars of the present will not determine the size of trains in the future. The present limit of speed is that due to the limit of power of a steam locomotive, but this will not obtain with electric locomotives.

HEAVIER TRACTION STILL IS TO COME

Mr. Shepard looks forward to the use of 10,000 kw. for the propulsion of single trains, and in some cases very much more than this. He said that the amount of power used on the lines of roads already electrified differs widely, depending upon the density of traffic and the measures for limiting power at times of maximum demand. Through regulation the maximum demand on the St. Paul railway is limited to about 70 kw. per mile of road, while the average was formerly 40 kw. On the Norfolk & Western Railway the maximum demand is more than 800 kw., while the average is about 280 kw. On the New York, New Haven & Hartford Railroad the maximum is about 400 kw., with an average of 150 kw. On the Pennsylvania Railroad at Philadelphia, for a portion of the suburban service only, the maximum is about the same as that for the New Haven, while the average is 100 kw. The method of use of power in every case properly should be that which makes the best use of the dollar, considering the factors involved; that is, the carrying charge for the cost of investment and the cost of operation.

Mr. Shepard concluded his paper by saying that the maintaining of efficient production and distribution of electric power is essentially a business and science by itself, and for the most economical production of power our power companies are undoubtedly best suited to secure this continuing result. The railroad load should be an important factor in the rounding out of every comprehensive scheme of power development and transmission. With the numerous points of contact which can be established with our power system, it is practicable for the railroads to take on power on a basis which should be acceptable and attractive to the power companies. The basis for establishing these conditions will, during the inauguration and the extension of railroad electrification, be determined analytically in each case. Ultimately, with the continued growth of railroad electrification, the supply of power will be more or less established on a uniform basis. In the meantime, common knowledge of the possibilities of electrification on the part of those responsible for our railroad operation, as well as greater familiarity with the needs of the railroad on the part of those directing our

power development, is manifestly desirable to the end that both these utilities will serve the purpose more economically, more universally and more extensively. It may well be that the advantages of electrification will be so great that the much mooted saving of fuel in the use of electric power over steam will be considered a by-product of railroad electrification.

COMMENTS FROM THE FIELD

In concluding its report the committee quoted from letters received from prominent men interested directly or indirectly in electrification. A. H. Smith, president New York Central Railroad, analyzed its technical aspects, and concluded by saying that the further extension of electric operation on steam railroads depends to a considerable extent on the cost of power. Extensions, however, cannot be expected unless the pending railroad legislation results in the restoration of railroad credit. H. E. Byram, president Chicago, Milwaukee & St. Paul Railway, wrote that the installation of electric operation on that road has been of distinct advantage from many standpoints, the principal one being the economy over steam operation.

Ralph Budd, president Great Northern Railway, stated that one of the things that would help in the coming extension of electrification would be an agreement among electrical engineers upon a type of electrification which could be considered as standard. Others who expressed interest included Walker D. Hines, Director-General of Railroads; Senator Henry L. Myers, Representative John J. Esch and Fairfax Harrison, president Southern Railway.

Chileans Tire of German Tramway

AN ACCOMPANYING illustration shows a street scene in Valparaiso, Chile, at the present time. This photograph, sent to the ELECTRIC RAILWAY JOURNAL, was accompanied by the explanation that the rea-

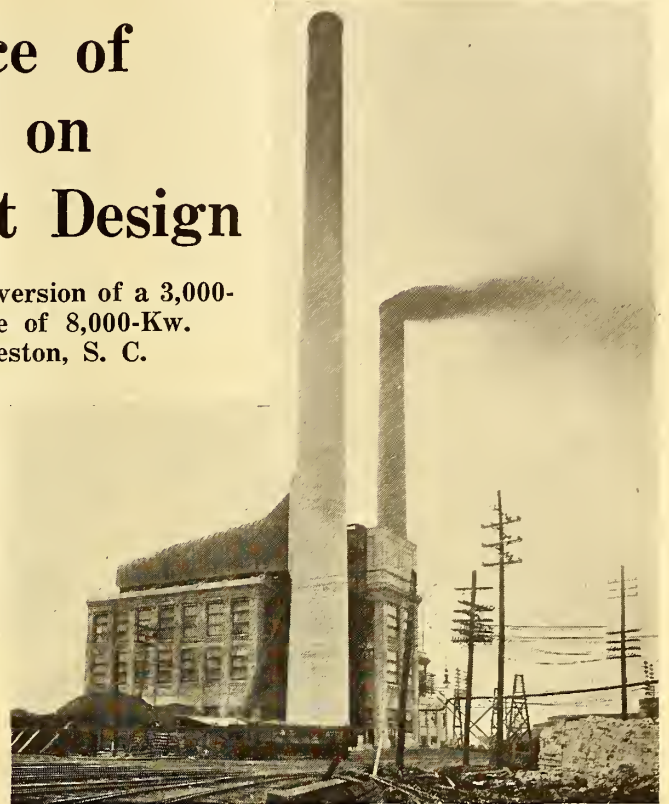
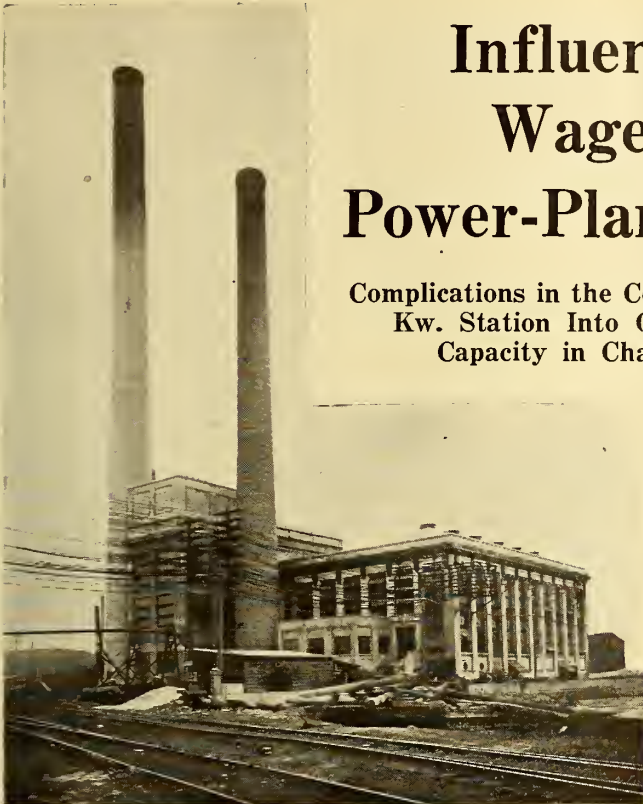


STREET SCENE IN VALPARAISO, CHILE, WITH STREET CARS DESTROYED

son for the absence of street cars on the tracks was that on March 10 the Chileans became tired of the German tramway and burned some twenty-seven cars. Since 1914 the company has been unable to do much in the way of extension or improvement because it could not import materials from Germany and the allies would not sell any to the company. Control in the company may be turned over to the British to help pay the German war indemnity.

Influence of Wages on Power-Plant Design

Complications in the Conversion of a 3,000-Kw. Station Into One of 8,000-Kw. Capacity in Charleston, S. C.



CHARLOTTE STREET POWER HOUSE, CHARLESTON, S. C.

At left, looking from the turbine room side toward the new boiler addition. At right, view from the boiler room side, showing boiler breeching and chain bucket coal conveyor between the new stack and the building

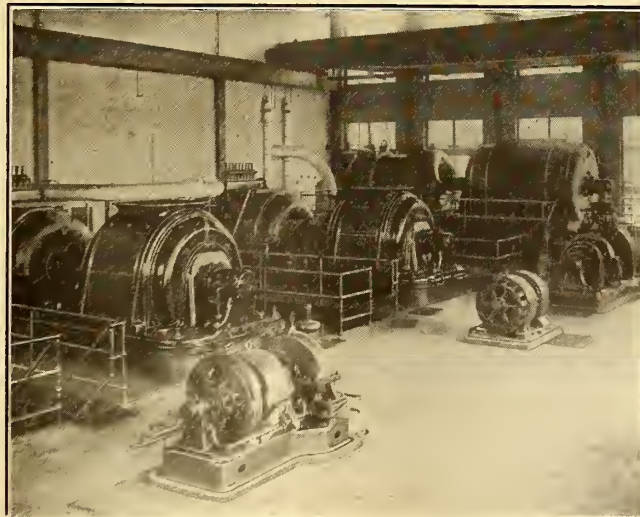
THE important influence of the rate of wages upon boiler-plant design is strikingly shown in connection with the enlargement of the Charlotte Street power plant of the Charleston (S. C.) Consolidated Railway & Lighting Company, recently completed. When this station was originally built, in 1912, colored firemen could be hired a-plenty for \$1 a day, and therefore the need for labor-saving stokers was not felt to anything like the degree that it is today. Nor was the better efficiency of stokers so potent a factor, for the price of coal was also low. Consequently, the boiler plant for the original station was laid out for hand firing.

But when the war brought on the necessity for a large expansion of the power-plant capacity colored firemen could be secured only with difficulty at \$4.50 a day. In the face of this, there could be no argument as to whether stokers should be employed for the new boilers needed to increase the station capacity from 3,000 to 8,000 kw., and this was easily justifiable even though it involved many complications in working a modern stoker-fired battery into the old layout, the plan of enlargement being to retain the hand-fired boilers until a later date. How some of these difficulties of design

were worked out is brought out in what follows:

The Charlotte Street station, prior to reconstruction, was laid out with a long boiler room parallel to the turbine room, the boilers being set in a single row backed up against the turbine-room wall and with the firing aisle along the outside building wall. The equipment of the boiler room comprised one 518-hp. Heine boiler and five 528-hp. Franklin boilers, all hand-fired. They were installed on a floor level several feet below that of the turbine room and supplied steam at 160-lb. pressure to two 2,000-kw. and one 1,000-kw., 2,300-volt, three-phase General Electric turbo-generator sets, equipped with jet condensers. The turbine room was originally designed for an ultimate installation of four

2,000-kw. units, so that there was ample space in which to place additional machines at the time enlargement became necessary in 1918. The pressing demand for a large increase in output, due to government operations and to an unprecedented growth of the city, however, made it advisable to install a 5,000-kw. unit instead of an additional 2,000-kw. machine as originally planned. The resulting installation of a Westinghouse-Parsons 5,000-kw., 13,200-volt, three-phase unit, operating at 200-lb. steam pressure and equipped with a surface



TURBINE ROOM OF CHARLOTTE STREET POWER HOUSE, SHOWING NEW 5,000-KW. UNIT IN THE BACKGROUND

condenser, did not involve any particular difficulties in so far as the turbine-room construction was concerned. The real problems lay in the boiler plant.

In the boiler room it was necessary to install three new Babcock & Wilcox 509-hp. boilers and Westinghouse underfeed stokers, generating steam at 220-lb. pressure and 125-deg. superheat to serve the new turbine. This necessitated a considerable enlargement and rearrangement of the boiler house.

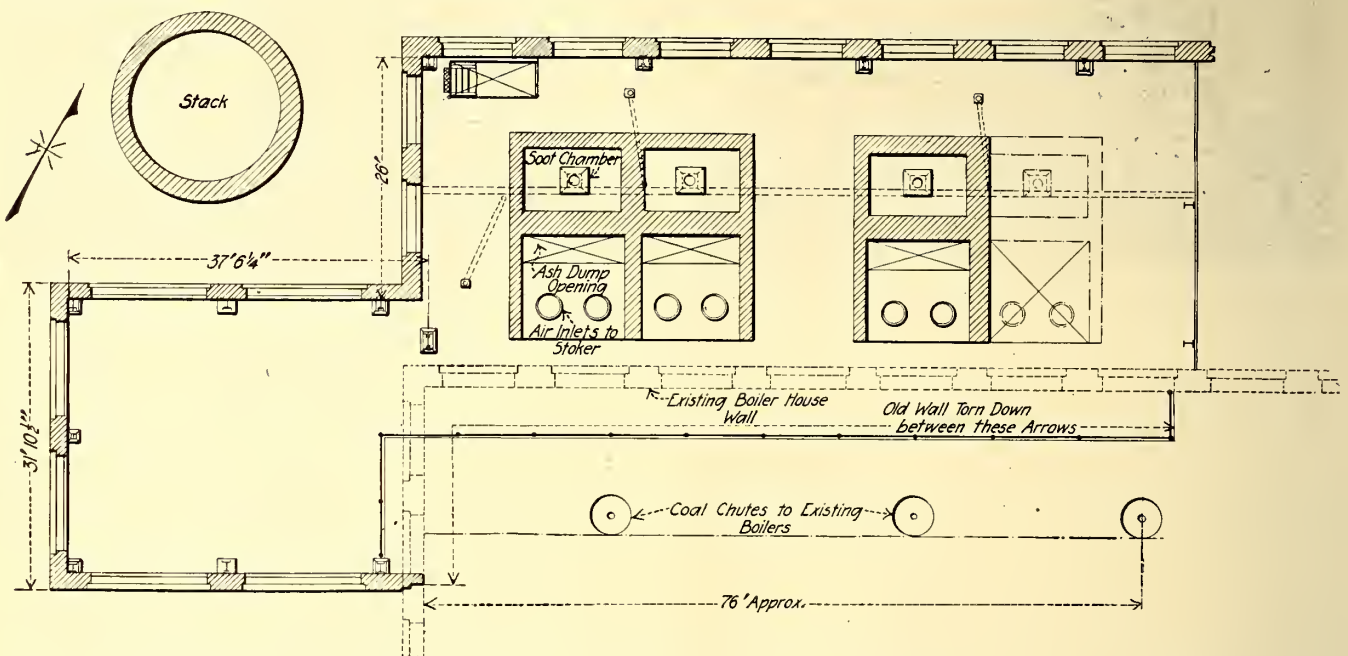
BOILER HOUSE RECONSTRUCTION

The side and part of the end wall of the boiler room were knocked out and the building extended sufficiently to provide space for the new boilers on the opposite side of the old firing aisle, the layout of new and old boilers being made symmetrical about the center line of the firing aisle. Taking out the old wall necessitated some special construction in order to support the old roof trusses, which were cut off to make way for the

ing the old and new boiler equipment into a single plant there must be two operating floor levels. However, the new boilers and their equipment were so installed as to be in proper location for the ultimate arrangement of stoker-fired boilers on both sides of the firing aisle, doing away with the lower operating floor.

The new battery of boilers made it necessary, also, to build a new brick smokestack, which is the higher of the two stacks seen in the accompanying halftones, and to install a new coal and ash handling system, etc. The steel breeching connecting the uptake flues from the three new boilers was mounted on top of the boiler house and connected to the chimney at a point some 60 ft. above the ground, as seen in one of the illustrations. The uptake flues were carried up nearly vertically within the building to connect to this overhead breeching. This arrangement gives ample space for the future installation of economizers if they are desired.

On the same consideration that determined the use



PLAN OF BOILER HOUSE EXTENSION, SHOWING STACK LOCATION, BOILER FOUNDATION AND MANNER OF JOINING EXTENSION TO OLD BUILDING

new skylight and roof construction. This was done by supporting these shortened existing trusses in a cantilever construction from the roof trusses of the new extension, which were at a considerably higher elevation. This construction may be seen in the accompanying cross-sectional drawing of the boiler room addition.

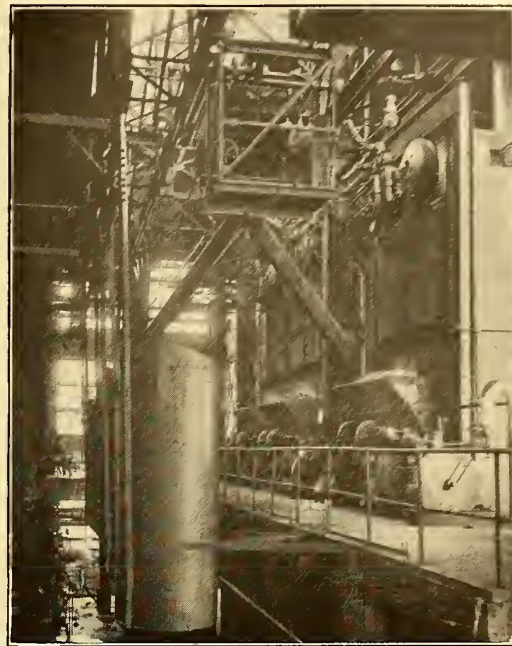
The present boiler room extension was made large enough for the present installation of three of the newer type boilers and one more. Later, by removing a temporary wall and extending the building longitudinally, two more boilers of the same size can be installed. When the capacity of this battery of six is exceeded the hand-fired boilers on the opposite side of the aisle will be replaced with six of the stoker-fired type, giving an ultimate total capacity of twelve boilers and 6,108 boiler horsepower.

The most interesting part of the boiler room construction was that the use of the underfeed stokers made it necessary to raise the operating floor for the new boilers to a height 18 ft. above the old boiler room floor, in order to provide sufficient space for the grates and blowers and ash chambers. This meant that in combin-

of hand-fired boilers in the original plant, coal was handled into the firing aisle, and ashes out, by wheelbarrow. Likewise, the same consideration which determined the installation of stokers in the new boiler plant dictated the installation of a modern labor-saving coal-handling plant.

Coal delivered in side or bottom dump cars is unloaded into a pit beside the boiler house. From here it passes through a crusher installed underneath the pit, discharging into a bucket conveyor. This, in turn, elevates the coal up to the top of the building and across over the roof, discharging into an overhead concrete bunker of 350 tons capacity. The size of this overhead bunker was made large enough to meet the requirements of the ultimate boiler plant for three days' supply. The bucket conveyor can be seen in one of the accompanying exterior views of the station, located between the stack and the building, and another view shows this conveyor as it passes over the top of the building to the discharge point over the concrete bunker.

From the overhead bunker coal is discharged by gravity into a Beaumont weighing lorry mounted on



AT LEFT, LOWER FLOOR LEVEL IN BOILER PLANT, SHOWING HAND-FIRED BOILERS AND TEMPORARY COAL BUNKERS. AT RIGHT, FIRING AISLE IN THE NEW BOILER PLANT, SHOWING THE NEW UPPER OPERATING FLOOR LEVEL AND THE COAL BUNKERS FOR THE HAND-FIRED BOILERS ON THE LOWER FLOOR LEVEL

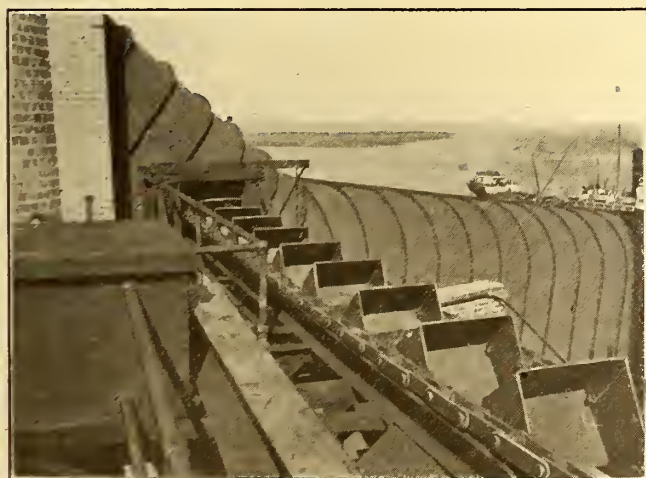
a runway over the center of the firing aisle. Then a spout from the lorry discharges the coal into the stokers of the new boilers.

An ingenious scheme was worked out with the installation of the coal-handling equipment to make it serve the hand-fired boilers also and thereby do away entirely with the wheelbarrow method of bringing coal into the plant. The lorry spout which will ultimately serve the row of stoker-fired boilers on the opposite side of the firing aisle from the present new boilers is used in this connection. Coal is discharged through it into three vertical cylindrical steel bunkers, each serving two of the hand-fired boilers. These bunkers were suspended from above on one side and supported by steel bracing from the lower operating floor on the opposite side and braced laterally by angle irons bolted to the upper concrete floor. A vertical spout was provided at the bottom of each of these bunkers and extended down to a level sufficiently low so that coal can be discharged by opening a valve, to the lower operating floor or

firing aisle. From here it is shoveled into the boilers by hand in the usual manner. These temporary bunkers may be clearly seen from both the upper and the lower operating floors in two of the accompanying illustrations.

For reserve coal supply an area adjacent to the track pit provides a storage capacity sufficient to operate the plant for seventy to eighty days. The coal is unloaded from cars and delivered to the storage pile by means of a Browning locomotive crane, steam driven, equipped with a one-ton bucket. This crane is also used to shift cars. When running normally all the storage coal needed is within reach of this crane so that it may be picked up from storage and dumped directly into the track pit.

The ashes from the stokers are dumped into quenching hoppers and discharged into small cars underneath, which run on a track on the ground level. Ashes from the hand-fired boilers are raked into the firing aisle and taken out in wheelbarrows, as heretofore.



AT LEFT, CHAIN BUCKET COAL CONVEYOR AS IT PASSES OVER THE TOP OF THE BOILER HOUSE TO DISCHARGE IN THE OVERHEAD BUNKER. AT RIGHT, NEW AND OLD SIPHON PIPE LINES EXTENDING OUT INTO THE COOPER RIVER

In connection with the supply of circulating water for the condensers, two new 500-gal. per minute turbine-driven pumps were installed, each of them being large enough to handle the supply for the entire station. Water is taken from the Cooper River, on which the station is located, by means of a long siphon which dips down into a concrete pit at the river end and discharges into a tunnel under the power house. The several condensers draw water from this tunnel. For the old plant a 36-in. pipe was used for the siphon lead into the tunnel, but with the installation of the new 5,000-kw. units a new 48-in. pipe was installed. While

Citizens Responsible

Mr. Gadsden Tells New Jersey Manufacturers Why They Are Concerned in Utility Prosperity and How They Can Help

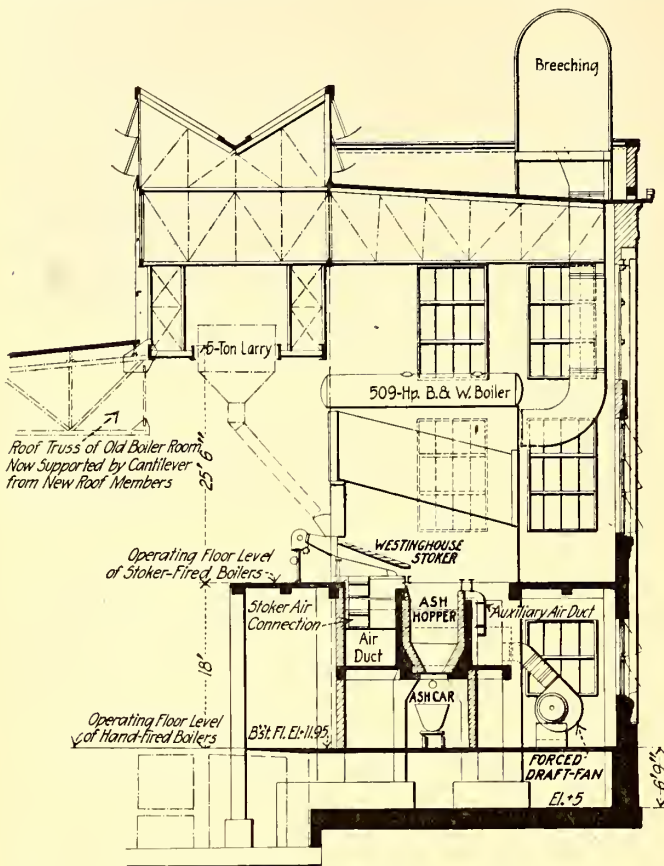
PHILIP H. GADSDEN, president Charleston Consolidated Railway & Lighting Company, Charleston, S. C., was the speaker on the subject "Public Utilities" at the convention of the Manufacturers' Association of New Jersey at Atlantic City on May 1. He expressed the belief that the principal difficulty with the public utilities question was that the manufacturers and business men in the different communities had not realized that this question is one which concerned them more than it did the utilities themselves. The fact that the most intimate relation exists between the service given by the utilities and industries in general, said Mr. Gadsden, was clearly shown during the war.

The speaker then pointed out that electric railways as a class are practically prostrate and that this condition is not confined to any particular part of the country. As the element of labor does not enter so largely into the manufacture of gas the gas companies were not so immediately affected by the extraordinary increase in the cost of labor that came about during the war, but they have been affected by increases in the cost of labor and material and most of them have obtained some measure of relief in the way of rates. A serious problem which is facing them is the reduced supply of oil with which they enrich their gas.

A common belief, Mr. Gadsden said, is that one cause for this trouble with the railway companies is "watered stock" and another is "poor management," but the speaker pointed out that in Massachusetts, where the records are available to show that there is no water in the railway stocks, the situation is no better than elsewhere, and this disposes largely of the first cause, while the universality of the trouble shows that there is little in the second reason. Railway companies could not have overlooked all the people in the United States who know how to run a street railway.

The fundamental difficulty is that the railways have been trying to give an indefinitely increasing service for a rigid price in a time of rising costs. The merchants whom the speaker was addressing, he thought, would understand that this could not be done in any line of business. Due to these conditions, the utilities have not been able to raise money for necessary extensions and improvements. Nevertheless the demands for transportation on the electric railways are greater than ever before, not only absolutely but per capita. This shows that the general use of automobiles, instead of cutting down the traffic, has at least not retarded it.

In conclusion, the speaker compared the returns from investment in industrial enterprises with those in utility enterprises. The promoter of a new manufacturing plant, who presumably expects to get transportation and power from his local utility company, can offer the prospective investor 20 per cent or more return, whereas the utility is often limited to 6 or 8 per cent. It is said that one reason the utility is so limited is that there is added security in the investment. If such is the case, the public should see that this added security is present. As market conditions increase the cost of operation rates should be advanced promptly, and the utility should not be obliged to wait before it can prove to a commission that it is losing money before rates are raised.



CROSS-SECTION THROUGH BOILER HOUSE EXTENSION

this is large enough to take care of the total requirements of the plant, the connection of the three jet condensers on the smaller turbines was continued, and these condensers were not connected with the 48-in. pipe in order to keep down the present cost of the installation. The condenser water supply, as well as the steam supply for the new unit, is therefore entirely separate from that provided for the older machines in the plant.

An interesting scheme was worked out in connection with the old siphon pipe in order to increase the capacity. When all three of the older units were running the siphon would not deliver water fast enough to meet the requirements, the tunnel from which the condensers draw being open to the atmosphere at the time this scheme was adopted. To increase the capacity, then, the tunnel was sealed off and a steam exhauster put on it to create a vacuum of about 5 in. The employment of this method increased the flow of water to such an extent that the supply was ample for the then full capacity of the plant.

The Equipment Trust Grows in Favor

Many Recent Purchases Made in This Manner—What the Investor, the Broker and the Trustee See in This Security—A Survey of Electric Railway Issues—The Coming Standard Method of Purchasing Rolling Stock

“DO YOU see that street car coming around the corner? And do you see that word ‘lessee’ on the car? That car is the property of this bank.’ The president of a leading bank had let a customer to the big glass window and in this manner directed his attention to the interest of the bank in the local electric railway property. ‘You see,’ he continued, ‘we own several cars, or at least part interest in a good many cars of the company, and lease them to the company. We are therefore interested in the company’s prosperity, not only from a civic standpoint but from a standpoint of the material welfare of the bank. You can’t expect us to be sympathetic toward any move which would squeeze the railway company financially and tend to impair its credit.’”

It was with some such words as these that the president of one of the larger electric railway properties of the country indicated one of the many advantages of financing rolling stock purchases for electric railways by means of equipment trust bonds and by marketing the certificates based on these bonds in the home community of the company. There is apparently a great difference in the attitude of the holder of these equipment trust certificates as compared with the attitude of a holder of the ordinary mortgage bond sold by a corporation. This is true whether the holder be an individual or a banking or insurance company. In fact the growing interest of the latter class of security buyer has aided materially in some cases in making easier the financial program of the railway. If the certificates are marketed locally and with the right background the holder of a security feels his actual ownership of the equipment and is continually reminded of this ownership every time he sees a unit of rolling stock with the word “lessee” painted on it. There is a greater sense of partnership impressed upon him and he is more constantly and more vitally interested in the continued successful operation of the company than if he merely owned a bond, or, in some cases, even stock of the company. In the case of bondholders, even though the bonds are held locally, about the only thought given to the company is when the holder goes to his safe deposit vault to clip his coupons. There is no particular and constant reminder of close relation to and vital interest in the company’s prosperity.

There are, of course, many other standpoints from which the railway benefits by the purchase of its rolling stock through equipment trust issues. And these are by no means confined to companies which are experiencing difficult financial situations. The equipment trust method of purchase is coming to be recognized as one of the best, if not the best, method of purchasing rolling stock, even by companies which are thoroughly able financially to use any method of purchase they wish. The reason for this is that it is a perfectly sound and legitimate financial operation which can be shown to the investor not to be tied to or mixed with the capitalization of the company, but is estab-

lished on the basis of an operating charge. No extensions of a general mortgage, no junior mortgages or debenture bonds have to be created, and the difficulties attendant upon such issues and the usual increased cost of money obtained by such methods, legitimate though they may be, are well appreciated.

ISSUES ARE INCREASINGLY POPULAR

That the above points are recognized by a good many companies is indicated by the increasing number of equipment trust bonds which are being issued today and have been issued in the past few years. This method of purchasing equipment originated, of course, with the steam railroads, the first record of such an issue being found in the early '70s of the last century. A history of the amounts invested in securities of this sort from 1888 to 1909, an analysis of the course of a ten-year equipment and an explanation of the usual trust provisions were presented in an article by W. B. Brockway in the *ELECTRIC RAILWAY JOURNAL*, Vol. 38, issue of July 8, page 82. Since that time, and as was predicted in that article, the electric railways have adopted this plan in many instances. In fact, the records today, as obtained from railway companies and trust companies themselves, indicate that in excess of \$45,000,000 worth of rolling stock has been purchased by electric railway properties in this manner.

From the information given by these various railways and trust companies the accompanying table was made up to indicate the issues of these equipment trust securities for the purchase of electric railway stock. The table is probably not complete, but it does contain most of the electric railway issues. It has been constructed in chronological order, as it appeared that this was perhaps the most useful interpretation of the utilization of these securities. It will be noted from this table that the number of companies using this method of financing has increased very materially within the last two or three years, but it is still doubted whether a very large number of companies appreciate the possibilities, and at times the advisability, of financing rolling stock purchases in this way.

Exactly what is an equipment trust bond? The answer to this question must vary considerably, depending upon the state under whose laws the security is issued. Fundamentally it is a means by which the company purchases rolling stock and pays for the same in a certain number of equal installments so that the total price is paid within 50 per cent to 60 per cent of the estimated minimum life of the equipment purchased. Technically the company leases the equipment from a trustee, in whom the title to the equipment rests, or from the manufacturer directly, who retains the title, in either case title in fee being transferred to the railway company only upon satisfactory payment of the last serial installment. These fundamental conceptions are present in all of the various types of contract arranged to meet the legal requirements of the various states.

In addition to the legal requirements as to form of contract which is possible in the various states, another governing factor during the last few years has been the exact technical method of issuing the security.

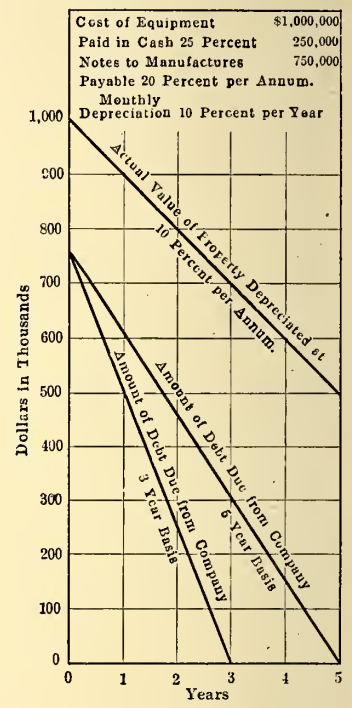
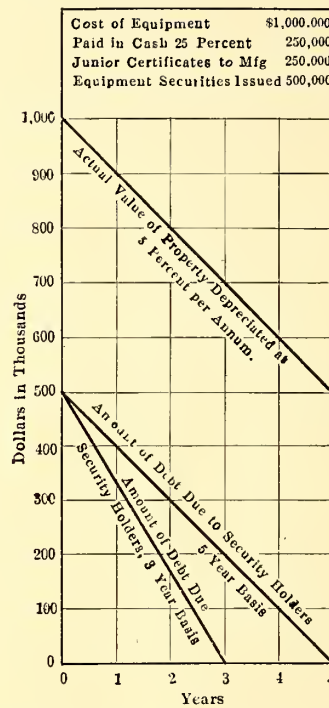
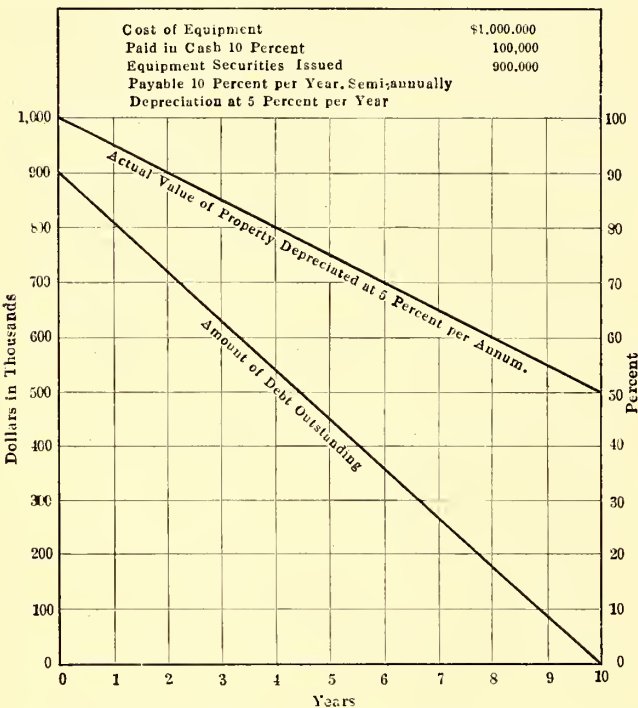
In Connecticut a lease and conditional sale is legal, but is not sanctioned by the laws of some other states. In Pennsylvania the so-called "Philadelphia plan" has been evolved, which is similar in its working but differs some in provisions.

HOW TRUST PROVISIONS DIFFER

A typical provision of a Connecticut issue states:

Whereas the railway company is desirous of securing the use, upon or in connection with its lines of railway, of the following described equipment, to wit:

Whereas the trustee is willing to purchase and provide said equipment for the use of and according to specifications to be furnished by the railway company upon the terms and conditions hereinafter expressed;



AT LEFT, THE COURSE OF A TEN-YEAR TRUST WITH A 10 PER CENT FIRST PAYMENT. AT RIGHT, THE COMPANY'S SIDE OF A THREE OR FIVE YEAR TRUST. IN CENTER, THE INVESTOR'S SIDE OF A THREE OR FIVE YEAR TRUST, THE MANUFACTURER TAKING 25 PER CENT IN JUNIOR CERTIFICATES

Now, therefore, in consideration of the premises and of the mutual agreements hereinafter contained, it is agreed by the parties hereto as follows:

First, the trustee agrees to lease for the term of five years from and after Sept. 15, 1916, and to deliver into the possession of the railway company with the right of the lessee to purchase all of said equipment upon the terms and conditions of this agreement, said equipment to be delivered to the railway company as and when received by the trustee from the builders.

Second, the railway company agrees to take such a lease of and to purchase and receive from the trustee all of said equipment as aforesaid upon and subject to all the terms and conditions of this agreement and agrees faithfully to carry out, perform and observe all the said terms and conditions.

Third, until the payment by the railway company to the trustee of the entire rental and purchase price of said equipment . . . the title to the said equipment aforesaid shall not pass to nor vest in the railway company.

Fourth, the railway company agrees to pay, at the office of the trustees, for the aforesaid equipment, as a rental and conditional purchase price therefor, the sum of \$. . . , of which amount \$. . . shall be paid in cash to the trustee upon the execution hereof or prior to the certification of any notes by the trustee hereunder.

Under the Philadelphia plan an agreement is first made between the vendors of the equipment, a trust company and a railroad company, which sets forth:

That the railway company desires equipment, the vendors have acquired or contracted to acquire the necessary equipment and that subscriptions have been obtained to establish a fund known as the . . . railway equipment trust. A three-part agreement is made which sets forth that "the vendors hereby agree to sell, assign, transfer and set over unto the trustee, as trustee for the holders of the certificates hereinafter described, the aforesaid equipment, and all the right, title and interest of said vendors therein. The vendors will deliver said equipment to any one or more of the officers and agents of the railway company designated by the trustee as its agent or agents to receive such delivery, and the certificate of any and every agent so designated shall be conclusive evidence of such delivery. The trustee will, upon or before receipt by him of said equipment or any thereof, execute a lease of all of said equipment in the form of the copy of such lease prefixed hereto and upon the transfer and delivery to it of any such equipment will issue to the vendors or on their order, for distribution to

the several subscribers to the said . . . railway equipment trust, certificates to be known as . . . railway equipment trust certificates, . . . to a principal amount equal to . . per cent of the cost of said equipment so delivered."

Subsequent to this agreement a lease of the equipment is arranged between the trust company and the railway company, worded as follows:

"that the . . . trust company trustee as aforesaid party of the first part for and consideration as well of the sum of \$1 to it, paid by the . . . railway company, party of the second part, . . . has let and leased . . . to the . . . railway company all the railway equipment of the . . . railway equipment trust, the interests in which are represented by the trust certificates aggregating \$. . ."

It is further provided that the railway company does accept this lease, and "will pay to the trustee or its assign a rent hereunder which shall be sufficient to pay and discharge the following items when and as the same shall become due and payable." The items referred to are expenses of the trust connected with the equipment, taxes upon the income or property of the trust, the dividend warrants attached to the certificates, and finally the principal of the certificates when and as they shall become payable.

It is then provided that the lease shall continue in force until the rent so paid shall furnish moneys sufficient to meet

and cancel all interests in the trust. At the termination of the lease, the equipment thereby leased shall be released by the trustee and shall become the absolute property of the railway company.

Under the Illinois provision an agreement is drawn up between three parties, the vendor, the railway company and the trustee, under which:

First, the vendor agrees to have manufactured and delivered to the trustee such equipment as is specified by the railway.

Second, "the trustee shall sell and does hereby sell, upon the terms of this agreement, to the railway all of the above described equipment, which the trustee may receive from the vendor . . . The railway agrees to purchase and to receive and accept all said equipment upon and subject to the terms and conditions of this agreement."

Third, the railroad agrees to comply with the provisions of the agreement and also to pay certain amounts of principal and interest and a first cash payment upon the execution and delivery of the agreement and the balance to be paid to the holders of notes, serially, as specified in detail.

TAX EXEMPTION FEATURES DESIRABLE

Equipment trust certificates issued on leases under the Philadelphia plan, where the trustee is a Pennsylvania person or corporation, are free from the normal federal income taxes, whereas if the trustee were outside of Pennsylvania this exemption would not exist. In Indiana the dividends on preferred stock are exempt from the income tax and a method used there is to form a new corporation for each equipment purchase and issue preferred stock, which is marketed. The company has the right to purchase, and agrees to purchase, this preferred stock serially at stated intervals.

But while various means are used to comply with the legal and tax regulations of the various states, the ultimate result is the same, namely, the title to the rolling stock rests technically and actually with some corporation or person other than the railway company and the railway company leases this equipment and obtains complete title to the equipment upon the payment of the last of a series of rental installments.

On a system of any appreciable size it can easily be shown to be practicable to make rolling stock purchases at regular intervals, on the equipment trust basis, and adjust the amount of rolling stock included in each purchase and the time spacing of the purchases so that the actual money outlay to retire the equipment trust certificates is very nearly equal to the annual amount which should be charged off due to depreciation or abandonment of rolling stock. In other words, it appears feasible practically to eliminate bookkeeping on depreciation of rolling stock because each year the cost of the wearing out or using up of rolling stock is paid in actual cash. So rolling stock becomes an operating item like coal.

Naturally, the value of the cars as security is not usually accepted as being equal to 100 per cent of the face value of the certificates. The company, that is, is required to make an initial cash payment upon the receipt of the rolling stock. This initial cash payment has sometimes been absent, as indicated in one or two cases below, but usually is required and varies from 10 to 30 per cent of the cost of the equipment. Present practice seems to be about 20 or 25 per cent of the purchase price. The life of these leases varies from three to ten years in most cases, although there have been a few issues of twelve and one-half years. The life of the lease is, of course, a function of the estimated life of the equipment, it generally being assumed that the lease should be paid up before the equipment has depreciated more than 50 per cent. The older leases

of ten years were all for standard double-truck cars and were based upon steam railroad practice. The newer leases, many of which are on one-man safety cars, are made for three years or occasionally five years. In practically all cases payment of the certificates is arranged by equal installments over the life of the lease, and these installments are usually semi-annual or annual. In some of the leases direct from manufacturer to company these payments are arranged on a monthly basis to the trustee, but the certificates themselves are paid on semi-annual or annual installments.

ELECTRICAL EQUIPMENT USUALLY INCLUDED

The equipment purchased and covered by the trust agreements usually include not only the trucks and car bodies but also the complete electrical and control equipment. There have been instances where the equipment was put on the car by the company, a notable example being in the case of the Pittsburgh Railway and the Consolidated Traction Company, operated by the Pittsburgh Company. In this case the cost of equipment given in the table is the cost of the total equipment. Payments back and forth between the trustee and the company account for the apparent discrepancy between the amount of issue plus the first cash payment and total cost of equipment in the issues of the two companies.

Space does not permit at this time to give a comparison of the requirements placed upon the company as to the care of rolling stock in the various issues, nor yet to give a complete comparison of the methods of protection of the investor in the various issues, but this will probably be handled in a later article. Suffice to say at this time that in general the railway company assumes entire responsibility for the maintenance of the rolling stock, the company pays all taxes and it insures all of the equipment with provision that insurance benefits shall be paid to the trustee. It is always provided that the cars are to be plainly marked showing the trustee to be the owner and the lessor of the equipment. Naturally there are terms which relate to the contingency of default and consequent right of the trustee to seize and sell the equipment, if necessary, the company accepting responsibility for any deficiency which may occur as the result of such sale.

Provisions as to the time when the trustee may seize the equipment vary somewhat. In some cases it is provided that the trustee may act upon written notice mailed immediately after there is a default in payment and deposit of notice in the United States mail is a sufficient act on the part of the trustee. Other agreements provide that such action cannot be taken until there has been a default in interest of thirty days or a default in principal payment of thirty days. Other provisions allow ninety days' default in principal before the trustee may act. Still other provisions make it necessary for the trustee to give written notice of the default, after which the railway company is allowed thirty days before the trustee may act in the seizure of the equipment.

ADVANTAGES TO THE INVESTOR

From the standpoint of the investor securities of this sort are very attractive in several ways. They are, on account of the very nature of the form of agreement, covered by rentals and are thus treated from the

(Continued on page 1057)

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, in so far as Information Has Been Obtainable. Issues Are Arranged Chronologically by Years.

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
June 2, 1902	Chicago & Oak Park Elevated Railroad, Chicago, Ill.	Illinois Trust & Savings Bank, Chicago, Ill.	8 motor cars and 20 trailer cars	\$145,000.00	\$15,000.00	\$130,000.00	5%	.....	.....	.....	\$40,000 past due; outstanding.
**\$Dec. 1, 1905	Pittsburgh Railways, Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	100 double-truck closed motors	\$530,940.59	\$100,000.00	400,000.00	5%	10 yrs.	\$40,000.00	Annual	.....
**\$Feb. 1, 1908	Consolidated Traction Co. (Pittsburgh Railways), Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	50 double-truck closed motors	325,054.85	None	280,000.00	6%	10 yrs.	28,000.00	Annual	Series "A".
\$April 1, 1908	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	50 double-truck closed motors	260,000.00	60,000.00	200,000.00	6%	10 yrs.	10,000.00	Semi-annual	Series "A".
1908	Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.	Cleveland Trust Company, Cleveland, Ohio	.....	.....	.....	.....	6%	.....	.....	.....	\$50,000 past due. All securities reported owned by a syndicate.
\$Jan. 2, 1908	Public Service Railway, New Jersey	Fidelity Trust Company, Philadelphia, Pa.	150 P. A. Y. E. motor cars and 50 semi-convertible motors	1,066,284.00	266,284.00	800,000.00	6%	10 yrs.	40,000.00	Semi-annual	Series "A".
\$Sept. 1, 1909	Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.	Fidelity Trust Company, Philadelphia, Pa.	26 single-truck motor cars; 2 double-truck freight motor cars; 4 double-truck trailer express cars; 4 combination interurban passenger cars	.....	.....	.....	.....	.....	.....	.....	.....
\$Mar. 1, 1909	Hudson & Manhattan Railroad, New York	Guaranty Trust Company, New York	.....	135,800.00	35,800.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "A".
\$May 1, 1909	Indianapolis Street Railway, Indianapolis, Ind.	Fidelity Trust Company, Philadelphia, Pa.	.....	.....	322,220.00	920,000.00	5%	10 yrs.	46,000.00	Semi-annual	Series "A".
July 1, 1910	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	10 open and 44 closed motor cars	266,666.66	66,666.66	200,000.00	5%	10 yrs.	10,000.00	Semi-annual	Series "A".
Feb. 1, 1910	Chicago & Oak Park Elevated Railroad, Chicago, Ill.	Fidelity Trust Company, Philadelphia, Pa.	50 double-truck closed motors 50 single-truck open motors	480,000.00	120,000.00	360,000.00	5%	10 yrs.	18,000.00	Semi-annual	Series "B".
Oct. 1, 1910	Hudson & Manhattan Railroad, New York	Guaranty Trust Company, New York	.....	.....	35,000.00	165,000.00	6%	10 yrs.	.....	.....	\$111,000 past due and \$13,000 due Aug. 1, 1920.
July 1, 1910	Ohio Electric Railway, Columbus, Ohio	Fidelity Trust Company, Philadelphia, Pa.	.....	.....	162,500.00	500,000.00	5%	10 yrs.	25,000.00	Semi-annual	Series "B".
July 2, 1910	Philadelphia Rapid Transit Co., Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	14 single-truck semi-convertible; 6 double-truck motor express; 8 double-truck trailer express, and 10 interurban combination cars	217,230.00	57,230.00	160,000.00	5%	10 yrs.	8,000.00	Semi-annual	Series "A".
July 1, 1910	Public Service Railway, Newark, N. J.	Fidelity Trust Company, Philadelphia, Pa.	17 elevated passenger cars; 445 surface passenger cars; 94 utility cars	.....	Not known	1,500,000.00	5%	10 yrs.	75,000.00	Semi-annual	Series "A".
June 15, 1910	United Railroads of San Francisco, San Francisco, Cal.	Union Trust Company, New York	100 double-truck cars	600,000.00	150,000.00	450,000.00	5%	10 yrs.	22,000.00 23,000.00	Semi-annual	Series "B".
July 1, 1911	Cincinnati Traction Company, Cincinnati, Ohio	Fidelity Trust Company, Philadelphia, Pa.	80 P. A. Y. E. double-truck cars	547,651.00	147,651.00	400,000.00	6%	8 yrs.	50,000.00	Annual	.....
Aug. 1, 1911	Hudson & Manhattan Railroad, New York	Guaranty Trust Company, New York	50 double-truck closed motors	300,000.00	80,000.00	220,000.00	5%	10 yrs.	11,000.00	Semi-annual	Series "O".
Jan. 2, 1911	Indianapolis Street Railway, Indianapolis, Ind.	Fidelity Trust Company, Philadelphia, Pa.	36 multiple - control steel coaches	510,000.00	90,000.00	420,000.00	5%	10 yrs.	21,000.00	Semi-annual	Series "C".
			25 closed cars	132,500.00	32,500.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "B".

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Jan. 3, 1911	Market Street Elevated Passenger Railway, Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	35 passenger cars.	\$420,000.00	\$95,000.00	\$325,000.00	5%	10 yrs.	\$ 16,000.00 17,000.00}	Semi-annual	Series "A".
June 15, 1911	Ohio Electric Railway, Columbus, Ohio.	Fidelity Trust Company, Philadelphia, Pa.	9 interurban combination motors; 3 excursion motors; 2 excursion trailers; 12 freight trailers.	178,990.00	48,990.00	130,000.00	5%	10 yrs.	6,000.00 7,000.00}	Semi-annual	Series "B".
Sept. 1, 1911	Oakland Traction Company, Oakland, Cal.	1st Federal Trust Company, San Francisco, Cal.	60 P. A. Y. E. cars.	250,000.00	None	250,000.00	6%	8 yrs.	31,000.00	Semi-annual	Series "A".
Sept. 1, 1911	Pittsburgh Railways, Pittsburgh, Pa.	Fidelity Title & Trust Company, Pittsburgh, Pa.	50 double-truck closed motor cars.	295,542.00	None	270,000.00	5%	10 yrs.	27,000.00	Annual	Series "A".
Oct. 1, 1912	Cincinnati Traction Company, Cincinnati, Ohio.	Fidelity Trust Company, Philadelphia, Pa.	76 double-truck closed motors	456,000.00	116,000.00	340,000.00	5%	10 yrs.	17,000.00	Semi-annual	Series "D".
1912	Ohio Electric Railway, Columbus, Ohio.	Fidelity Trust Company, Philadelphia, Pa.	43 cars.	161,800.00	41,800.00	120,000.00	5%	10 yrs.	8,000.00	Semi-annual	Series "C".
Aug. 31, 1912	Public Service Railway, Newark, N. J.	Pennsylvania Company, F. I. L. G. A., Philadelphia, Pa.	100 double-truck motor cars.	669,946.00	169,946.00	500,000.00	5%	10 yrs.	25,000.00	Semi-annual	Series "C".
Jan. 1, 1912	Reading Transit Company, Reading, Pa.	Girard Trust Company, Philadelphia, Pa.	26 cars.	221,276.00	71,276.00	150,000.00	5%	10 yrs.	7,500.00	Semi-annual	Series "A".
July 1, 1912	United Railroads of San Francisco, San Francisco, Cal.	Anglo-California Trust Company, San Francisco, Cal.	65 P. A. Y. E. cars.	392,816.00	92,816.00	300,000.00	6%	10 yrs.	30,000.00	Annual	Series "A".
Aug. 1, 1913	American Railways, Philadelphia, Pa.	Logan Trust Company, Philadelphia, Pa.	5 double-truck city cars; 10 double-truck city cars;	187,000.00	37,000.00	150,000.00	6%	10 yrs.	15,000.00	Annual	Series "A".
Feb. 1, 1913	Ft. Wayne & Northern Indiana Traction Co., Ft. Wayne, Ind.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	19 near side cars.	66,831.00	16,831.00	50,000.00	5%	10 yrs.	2,000.00 3,000.00}	Semi-annual	Series "A".
Mar. 15, 1913	Ft. Wayne & Northern Indiana Traction Company, Lafayette, Ind.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	7 near side cars.	27,832.00	7,832.00	20,000.00	5%	10 yrs.	1,000.00	Semi-annual	Series "B".
Mar. 1, 1913	Indianapolis Street Railway, Indianapolis, Ind.	Fidelity Trust Company, Philadelphia, Pa.	25 closed cars.	133,225.00	33,225.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "C".
Dec. 1, 1913	Indianapolis Street Railway, Indianapolis, Ind.	Commercial Trust Company, Philadelphia, Pa.	25 closed cars.	134,375.00	34,375.00	100,000.00	6%	10 yrs.	5,000.00	Semi-annual	Series "D".
Sept. 1, 1913	Pittsburgh Railways, Pittsburgh, Pa.	Fidelity Title & Trust Company, Pittsburgh, Pa.	50 double-truck closed motor cars; 50 double-truck trailer cars; 5 double-deck motor cars.	513,813.00	None	450,000.00	6%	12 yrs.	18,000.00 19,000.00 21,000.00 22,000.00}	Semi-annual Last two installments	Series "A".
Mar. 1, 1913	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Fidelity Trust Company, Philadelphia, Pa.	950 double-truck near side cars; 80 steel elevated cars.	5,254,137.00	1,054,137.00	4,200,000.00	5%	12 yrs.	175,000.00	Semi-annual	Series "B".
May 1, 1913	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Fidelity Trust Company, Philadelphia, Pa.	500 double-truck near side cars	2,451,732.00	507,732.00	1,944,000.00	5%	12 yrs.	81,000.00	Semi-annual	Series "C".
Nov. 19, 1913	Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.	First National Bank, Chicago, Ill.	40 gondola cars; 50 box cars; 20 stock cars.	110,194.00	8,820.00	101,374.00	.....	.....	2,535.00	Quarterly	Series "A".

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
†Aug. 1, 1914	American Railways, Philadelphia, Pa. for Scranton Railways, Scranton, Pa. Altoona & Logan Valley Electric Railway, Altoona, Pa.	Logan Trust Company, Philadelphia, Pa.	10 double-truck city cars; 5 double-truck city cars; 4 double-truck interurban cars; 4 double-truck trail cars.	\$175,000.00	\$39,000.00	\$136,000.00	6%	12 yrs	\$11,000.00 (13,000.00)	Annual Last	Series "B".
**April 1, 1914	Consolidated Traction Company (Pittsburgh Railways), Pittsburgh, Pa.	Union Trust Company, Pittsburgh, Pa.	100 double-truck closed motor cars.	581,945.00	70,000.00	500,000.00	5%	10½ yrs.	25,000.00	Semi-annual	Series "B".
†Aug. 1, 1914	Chicago Elevated Railroads, Chicago, Ill., comprising Metropolitan Elevated Railroad; Northwestern Elevated Railroad; South Side Elevated Railroad.	Commercial Trust Company, Philadelphia, Pa.	184 passenger motor cars; 66 passenger trailer cars.	2,600,000.00	.....	2,050,000.00 55,000.00	5%	10 yrs. To 2/1/29	102,500.00 110,000.00	Semi-annual Semi-annual	Series "A"; Series "B"; this takes place of 2/1/27-2/1/29 usual first payment.
Mar. 2, 1914	Cincinnati Traction Company, Cincinnati, Ohio.	Fidelity Trust Company, Philadelphia, Pa.	60 double-truck trail cars.	253,500.00	53,500.00	200,000.00	5%	10 yrs.	10,000.00	Semi-annual	Series "E".
Aug. 1, 1914	Morris County Traction Company, Morristown, N. J.	Peoples Savings & Trust Company, Pittsburgh, Pa.	10 steel double-truck motor cars.	62,000.00	18,000.00	44,000.00	6%	9 yrs. 10 yrs.	4,888.00	Annual	Series "A", \$72,000 now outstanding.
Oct. 1, 1914	New Orleans Railway & Light Company, New Orleans, La.	Fidelity Trust Company, Philadelphia, Pa.	50 double-truck cars.	254,275.00	64,275.00	199,000.00	6%	10 yrs.	20,000.00	Annual	.....
Mar. 2, 1914	Ohio Electric Railway, Columbus, Ohio.	Fidelity Trust Company, Philadelphia, Pa.	5 interurban steel cars; 4 motor express cars; 14 freight trailers.	.....	25,800.00	125,800.00	5%	10 yrs.	5,000.00	Semi-annual	Series "D".
Oct. 5, 1915	Binghamton Railway, Binghamton, N. Y.; The Connecticut Company, New Haven, Conn.	Fidelity Trust Company, Philadelphia, Pa.	20 double-truck cars.	118,303.00	.....	90,000.00	6%	.....	.....	.....	.....
1915	Lehigh Traction Company (Lehigh Valley Transit Company), Hazleton, Pa.	Security Trust Company, Hartford, Conn.	92 convertible P. A. Y. E. cars	521,000.00	110,000.00	410,000.00	5%	5 yrs.	41,000.00	Semi-annual	Series "A".
July 1, 1915	Staten Island Midland Railway, Staten Island, N. Y.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa. Bankers Trust Company, New York	10 closed steel cars.	81,775.00	21,775.00	60,000.00	5%	10 yrs.	3,000.00	Semi-annual	Series "A".
1915	Westmoreland County Railway, Derry, Pa.; Wilkes-Barre & Hazleton Railway, Hazleton, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa. Logan Trust Company, Philadelphia, Pa.	32 double-truck closed cars.	.....	.....	135,000.00 12,000.00	6% .....	.....	.....	.....	.....
†Aug. 1, 1916	American Railways, Philadelphia, Pa. for Scranton Railways, Scranton, Pa. Altoona & Logan Valley Electric Railway, Altoona, Pa. Peoples' Railway, Dayton, Ohio.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa. Logan Trust Company, Philadelphia, Pa.	10 steel interurban cars. 10 double-truck city cars; 5 double-truck city cars; 10 double-truck city cars.	117,000.00	35,000.00	140,000.00	5%	10 yrs. 12 yrs.	4,000.00 11,000.00 (1917-20) 12,000.00 (1921-28)	Semi-annual Annual	Series "A". Series "C".
**April 1, 1916	Consolidated Traction Company (Pittsburgh Railways), Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	25 single end motor cars; 25 single end trailer cars.	221,863.00	27,000.00	200,000.00	5%	10½ yrs.	20,000.00	Semi-annual	Series "C".
**April 1, 1916	Consolidated Traction Company (Pittsburgh Railways), Pittsburgh, Pa.	Union Trust Company, Pittsburgh, Pa.	125 double-truck motor cars; 30 double-truck trailers.	891,258.00	132,000.00	800,000.00	5%	10½ yrs.	40,000.00	Semi-annual	Series "D".

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Sept. 15, 1916	The Connecticut Company, New Haven, Conn.	Security Trust Company, Hartford, Conn.	60 double end 4-motor P. A. Y. E. cars; 30 double end 2-motor P. A. Y. E. cars; 10 single end 4-motor P. A. Y. E. cars.	\$580,000.00	\$120,000.00	\$460,000.00	4½%	5 yrs.	\$46,000.00	Semi-annual	Series "B".
Dec. 1, 1916	Indianapolis Street Railway, Indianapolis, Ind.	Pennsylvania Company F. I. L. C. A., Philadelphia, Pa.	25 closed cars.	157,275.00	32,275.00	125,000.00	5%	10 yrs.	6,250.00	Semi-annual	Series "E".
July 1, 1916	Lehigh Valley Transit Company, Allentown, Pa.	Pennsylvania Company F. I. L. C. A., Philadelphia, Pa.	12 steel center entrance; double end cars.	120,000.00	20,000.00	100,000.00	5%	10 yrs.	5,000.00	Semi-annual	Series "B".
May 1, 1916	Morris County Traction Company, Morristown, N. J.	Peoples Savings and Trust Company, Pittsburgh, Pa.	5 double-truck steel cars.	31,000.00	7,000.00	24,000.00	6%	8 yrs.	3,000.00	Annual	Series "B".
**April 1, 1916	Pittsburgh Railways, Pittsburgh, Pa.	Colonial Trust Company, Pittsburgh, Pa.	15 single-end motor cars, interurban.	130,666.00	10,000.00	110,000.00	5%	10 yrs.	11,000.00	Annual	.....
June 30, 1916	Reading Transit & Light Company, Reading, Pa.	Pennsylvania Company F. I. L. C. A., Philadelphia, Pa.	25 cars.	135,611.00	35,611.00	100,000.00	5%	10 yrs.	10,000.00	Annual	Series "A".
Sept. 1, 1916	Toledo Railways & Light Company, Toledo, Ohio.	Girard Trust Company, Philadelphia, Pa.	60 semi-steel front entrance center exit.	397,350.00	67,350.00	330,000.00	6%	10 yrs.	16,000.00 } 17,000.00 }	Semi-annual	.....
June 1, 1916	San Francisco & Oakland Terminal Railway, Oakland, Cal.	Anglo-California Trust Company, San Francisco, Cal.	32 steel cars.	234,000.00	.....	180,000.00	.....	9 yrs.	10,000.00	Semi-annual	.....
Dec. 1, 1916	Wheeling Traction Company, Wheeling, W. Va.	Logan Trust Company, Philadelphia, Pa.	8 P. A. Y. E. steel cars.	43,698.00	.....	40,000.00	5½%	5 yrs.	4,000.00	Semi-annual	.....
July 1, 1917	American Railways, Philadelphia, Pa.	Logan Trust Company, Philadelphia, Pa.	10 double-truck city cars; 10 trailer cars;	265,000.00	53,000.00	212,000.00	6%	10 yrs.	21,000.00	Annual	Series "D".
Jan. 1, 1917	Wilmington & Philadelphia Traction Company, Wilmington, Del.	Fidelity Title and Trust Company, Pittsburgh, Pa.	15 double-truck cars; 6 double-truck cars;	.....	.....	.....	.....	.....	.....	.....	.....
Jan. 1, 1917	Beaver Valley Traction Company, Pittsburgh, Pa.	Fidelity Title and Trust Company, Pittsburgh, Pa.	12 double-truck steel motor cars.	76,524.00	4,524.00	72,000.00	5%	12 yrs.	6,000.00	Annual	.....
Jan. 1, 1917	Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.	Northern Trust Company, Chicago, Ill.	3 steel combination dining and parlor cars; 7 steel passenger cars with baggage compartment; 5 steel passenger cars	200,000.00	30,000.00	170,000.00	6%	10 yrs.	8,500.00	Semi-annual	.....
**Nov. 1, 1917	Consolidated Traction Company (Pittsburgh Railway), Pittsburgh, Pa.	Fidelity Title & Trust Company, Pittsburgh, Pa.	50 single-end trailer cars.	223,215.00	25,000.00	200,000.00	5%	12 yrs.	17,000.00 } 16,000.00 }	Annual	Series "E".
June 1917	Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.	Guardian Savings & Trust Co., Cleveland, Ohio.	8 cars.	.....	.....	75,000.00	6%	.....	10,000.00	Annual	.....
Aug. 1, 1917	Cincinnati Traction Company, Cincinnati, Ohio.	Fidelity Trust Company, Philadelphia, Pa.	100 double-truck closed cars.	719,000.00	169,000.00	550,000.00	5%	10 yrs.	27,000.00 } 25,000.00 }	Semi-annual	Series "F".
Aug. 29, 1917	The Bay State St. Ry. (now Eastern Massachusetts St. Ry.), Boston, Mass.	Old Colony Trust Company, Boston, Mass.	200 semi-convertible passenger cars.	1,631,000.00	323,000.00	1,308,000.00	6%	10 yrs.	131,000.00	Annual	.....
Sept. 1, 1917	Fort Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.	Tri-State Loan & Trust Company, Ft. Wayne, Ind.	10 double-truck city cars.	73,968.00	23,968.00	50,000.00	6%	6¼ yrs.	2,000.00	Quarterly	Series "C".
1917	Lake Shore Electric Railway, Sandusky, Ohio	Guardian Savings & Trust Company.	10 cars.	.....	.....	176,000.00	6%	.....	.....	.....	.....

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
July 1, 1917	Lehigh Valley Transit Company, Allentown, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	24 steel center entrance cars	\$240,000.00	\$40,000.00	\$200,000.00	5%	10 yrs.	\$10,000.00	Semi-annual	Series "C".
Aug. 1, 1917	Northwestern Pennsylvania Railway Company, Erie, Pa.	Erie Trust Company, Erie, Pa.	6 one-man safety cars; 5 inter-urban passenger cars; 2 motor freight cars; 2 trailer box freight cars	95,200.00	35,200.00	60,000.00	6%	6 yrs.	10,000.00	Annual	
June 25, 1917	Ohio Electric Railway Company, Columbus, Ohio	Fidelity Trust Company, Philadelphia, Pa.	4 motor express cars; 16 freight trailer box cars; 10 freight trailer flat cars	130,000.00	None	100,000.00 30,000.00	6% 6%	10 yrs. To 1928	5,000.00 15,000.00	Semi-annual Dec. 31, 1927 June 30, 1928	Series "E-1" Series "E-2"
June 1, 1917	Public Service Railway, Newark, N. J.	Philadelphia Trust Company, Philadelphia, Pa.	75 double-truck 4-motor closed cars; 25 double-truck 2-motor closed cars; 50 double-truck 4-motor open cars	1,128,500.00	248,500.00	880,000.00	5%	10 yrs.	44,000.00	Semi-annual	Series "D".
Nov. 15, 1917	Reading Transit & Light Company, Reading, Pa.	Pennsylvania Company F. I. L. G. A., Philadelphia, Pa.	9 cars	67,605.00	17,605.00	50,000.00	5%	10 yrs.	5,000.00	Annual	Series "B".
1917	Schuylkill Railway, Girardville, Pa.	Thomas Evans		40,000.00	None	40,000.00		5 yrs.	4,000.00	Semi-annual	
June 1, 1917	Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa	First Trust & Savings Bank	4 combination cars; 3 observation cars; 5 electric locomotives	160,000.00	40,000.00	120,000.00	6%	3 yrs.	3,333.00	Monthly	Series "B".
Oct. 1, 1918	Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute Ind.	Car Trust Equipment Company, Indianapolis, Ind. J.F. Wild & Co., Fiscal Agts.	30 one-man safety cars	180,892.00	10,892.00	170,000.00	6%	10 yrs.	8,500.00	Semi-annual	A preferred stock issue, retired serially.
1918	Wheeling Traction Company, Wheeling, W. Va.					125,000.00	6%	5 yrs.	12,000.00 13,000.00	Semi-annual	
Aug. 1, 1919	Chicago, North Shore & Milwaukee Railroad, Chicago, Ill.	Northern Trust Company, Chicago, Ill.	13 steel interurban motor passenger cars; 2 steel inter-urban motor parlor and dining cars; 15 steel interurban trailer passenger cars; 12 parcel dispatch motor cars; 10 one-man safety cars			800,000.00	6%	10 yrs.	55,000.00 27,500.00	Aug., 1920 Semi-annual	
April 1, 1919	Cincinnati Traction Company, Cincinnati, Ohio	53rd National Bank, Cincinnati, Ohio	105 double-truck closed cars	1,250,000.00	None	1,000,000.00 250,000.00	6% 6%	10 yrs. 5 yrs.	50,000.00 25,000.00	Semi-annual Semi-annual	Series "G-1" Series "G-2", junior to "G-1"
Dec. 1, 1919	Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.	Tri-State Loan & Trust Co., Ft. Wayne, Ind.	35 one-man safety cars	221,000.00	56,000.00	165,000.00	6%	8 1/4 yrs.	5,000.00	Quarterly	
Oct. 11, 1919	Indianapolis Street Railway, Indianapolis, Ind.	Indianapolis Car Equipment Company, Indianapolis, Ind. Breed, Elliott & Harrison, Fiscal Agents	25 closed cars	255,802.00	55,802.00	200,000.00	6%	10 yrs.	10,000.00	Semi-annual	A preferred stock issue, retired serially.
Mar. 1, 1919	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	25 double end safety cars	152,075.00	64,075.00	88,000.00	6%	10 yrs.	9,000.00	Semi-annual	Series "D".
Nov. 1, 1919	Morris County Traction Company, Morristown, N. J.	People's Savings & Trust Co., Pittsburgh, Pa.	14 one-man safety cars	80,000.00	22,000.00	58,000.00	6%	5 yrs.	1,000.00	Monthly	Series "C".
Oct. 15, 1919	Philadelphia Rapid Transit Company, Philadelphia, Pa.	Commercial Trust Company, Philadelphia, Pa.	30 double-end, double-truck cars	423,471.00	135,471.00	288,000.00	6%	10 yrs.	29,000.00	Semi-annual	Series "E".
1919	Schuylkill Railway, Girardville, Pa.	Thomas Evans		50,000.00	None	50,000.00		5 yrs.	5,000.00	Semi-annual	

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc. (Continued)

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Dec. 31, 1919	Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.	Car Trust Equipment Company, Indianapolis, Ind. J.F. Wild & Co., Fiscal Agts.	25 one-man safety cars.	\$137,650.00	\$37,650.00	\$110,000.00	6%	10 yrs.	\$5,500.00	Semi-annual	A preferred stock issue retired serially.
Oct. 1, 1919	Issued on leases to seven companies, as follows, under J. G. Brill Equipment Trust No. 1.	Fidelity Trust Company, Philadelphia, Pa.	47 one-man safety cars, distributed as follows:			130,000.00	6%	3 yrs.	40,000.00 35,000.00 20,000.00 5,500.00 4,000.00	Apr. 1, 1921 Oct. 1, '21-Apr. 1, '22 Aug. 1, 1922 Monthly, except last month	Series "A". Series "B", Jun-ior to "A".
	Bangor Railway & Electric Company, Bangor, Me.		12 one-man safety cars.	70,356.00	17,589.00	52,767.00	6%	3 yrs.	1,465.00	Monthly	5 payments before trust was formed.
	*Cumberland County Power & Light Company, Portland, Me.		5 one-man safety cars.	29,315.00	7,329.00	21,986.00	6%	3 yrs.	611.00	Monthly	5 payments before trust was formed.
	*Jackson Railway & Light Company, Jackson, Miss.		3 one-man safety cars.	14,000.00	3,500.00	10,500.00	6%	3 yrs.	275.00	Monthly	4 payments before trust was formed.
	*Nashville Railway & Light Company, Nashville, Tenn.		10 one-man safety cars.	58,272.00	14,568.00	43,704.00	6%	3 yrs.	1,214.00	Monthly	3 payments before trust was formed.
	*Marshall Traction Company, Marshall, Tex.		2 one-man safety cars.	11,800.00	2,950.00	8,850.00	6%	3 yrs.	246.00	Monthly	2 payments before trust was formed.
	*Wichita Railroad & Light Company, Wichita, Kan.		6 one-man safety cars.	29,792.00	7,448.00	22,344.00	6%	3 yrs.	624.00	Monthly	2 payments before trust was formed.
	*Decatur Railway & Light Company, Decatur, Ill.		9 one-man safety cars.	48,374.00	12,093.00	36,281.00	6%	3 yrs.	1,008.00	Monthly	2 payments before trust was formed.
Nov. 1, 1919	Issued on leases to six companies, as follows, under J. G. Brill Equipment Trust No. 2.	Fidelity Trust Company, Philadelphia, Pa.	64 one-man safety cars, distributed as follows:			167,000.00	6%	3 yrs.	52,000.00 40,000.00 35,000.00 7,500.00 2,500.00	May 1, 1921 Nov. 1, '21-May 1, '22 Oct. 1, 1922 Monthly, except last month	Series "A". Series "B", Jun-ior to "A".
	*Quincy Railway, Quincy, Ill.		25 one-man safety cars.	124,800.00	31,200.00	93,600.00	6%	3 yrs.	2,600.00	Monthly	1 payment before trust was formed.
	*Kansas City Railways, Kansas City, Mo.		5 one-man safety cars.	27,264.00	6,816.00	20,448.00	6%	3 yrs.	568.00	Monthly	1 payment before trust was formed.
	*Aberdeen Railroad, Aberdeen, S. D.		4 one-man safety cars.	20,188.00	5,047.00	15,141.00	6%	3 yrs.	420.00	Monthly	2 payments before trust was formed.
	*Wichita Railroad & Light Company, Wichita, Kan.		10 one-man safety cars.	49,920.00	12,480.00	37,440.00	6%	3 yrs.	1,040.00	Monthly	1 payment before trust was formed.
	*Lincoln Traction Company, Lincoln, Neb.		10 one-man safety cars.	53,280.00	13,320.00	39,960.00	6%	3 yrs.	1,110.00	Monthly	2 payments before trust was formed.
	*Cumberland County Power & Light Company, Portland, Me.		10 one-man safety cars.	58,704.00	14,676.00	44,028.00	6%	3 yrs.	1,223.00	Monthly	1 payment before trust was formed.

See page 1056 for footnotes.

Table Showing All Equipment Trust Issues for the Purchase of Electric Railway Rolling Stock, etc.

Date of Issue	Electric Railway Using Equipment	Trustee	Equipment Purchased	Total Purchase Price	First Cash Payment	Amount of Issue	Rate of Interest	Length of Trust	Amount of Installments	Period of Installments	Remarks
Dec. 1, 1919	Issued on leases to four companies, as follows, under J. G. Brill Equipment Trust No. 3.	Fidelity Trust Company, Philadelphia, Pa.	41 one-man safety cars, distributed as follows.....	.....	.....	\$121,000.00	6%	3 yrs.	\$35,000.00 30,000.00 29,000.00 27,000.00	June 1, 1921 Dec. 1, 1921 June 1, 1922 Dec. 1, 1922	Series "A".
	*Springfield Street Railway, Springfield, Mass.		10 one-man safety cars.....	\$59,808.00	\$14,952.00	56,500.00	None	1 yr.	1,000.00 9,000.00	Monthly	Series "B," Jun-ior to "A," payment before trust was formed.
	*Nashua Street Railway, Nashua, N. H.		4 one-man safety cars.....	24,000.00	6,000.00	18,000.00	6%	3 yrs.	500.00	Monthly	.....
	*Kansas City Railways, Kansas City, Mo.		15 one-man safety cars.....	86,304.00	21,376.00	64,728.00	6%	3 yrs.	1,798.00	Monthly	.....
Jan. 1, 1920	*The Connecticut Company, New Haven, Conn. Issued on a lease as follows, under J. G. Brill Equipment Trust No. 4.....	Fidelity Trust Company, Philadelphia, Pa.	12 one-man safety cars.....	72,000.00	18,000.00	54,000.00	6%	3 yrs.	4,500.00	Quarterly	.....
	*The Nassau Electric Railroad, Brooklyn, N. Y., through Lindley M. Garrison, Receiver.....		73 one-man safety cars, all for one company, as follows.....	.....	.....	208,000.00	6%	3 1/2 yrs.	52,000.00	Semi-annual 1/1/22-6/1/23	Series "A".
Jan. 15, 1920	Issued on a lease as follows, under J. G. Brill Equipment Trust No. 3.....	Fidelity Trust Company, Philadelphia, Pa.	73 one-man safety cars.....	444,960.00	111,240.00	333,720.00	6%	3 1/2 yrs.	9,270.00	Monthly	Series "B," Jun-ior to "A," Starting June 13, 1920.
Feb. 16, 1920	*Kansas City Railways, Kansas City, Mo. Issued on leases to three companies, as follows, under J. G. Brill Equipment Trust No. 6	Fidelity Trust Company, Philadelphia, Pa.	40 one-man safety cars, all for one company, as follows.....	.....	.....	114,000.00	6%	3 yrs.	29,000.00	Semi-annual July 1, '12-Dec. 1, '22	Series "A".
	*Brooklyn Heights Railroad, Brooklyn, N. Y.		40 one-man safety cars.....	235,392.00	58,848.00	176,544.00	6%	3 yrs.	4,904.00	Monthly	Series "B," Jun-ior to "A," before trust was formed.
	*Coney Island & Brooklyn Railroad, Brooklyn, N. Y.		127 one-man safety cars, dis-tributed as follows.....	.....	.....	362,000.00	6%	3 1/2 yrs.	90,000.00	Semi-annual Feb. 15, '22-July 15, '23	Series "A".
	*Brooklyn, Queens County & Suburban Railroad, Brooklyn, N. Y.		108 one-man safety cars.....	658,272.00	164,568.00	493,704.00	6%	3 1/2 yrs.	225,000.00	Monthly from July 15, '20 for to 'A,' Starting June 19, 1920.	Series "B," Jun-ior to "A," before trust was formed.
Jan. 15, 1920	The Connecticut Company, New Haven, Conn.....	Bankers' Trust Company, New York.....	40 one-man safety cars.....	235,390.00	55,390.00	180,000.00	6%	5 yrs.	9,000.00	Quarterly	Series "C".
Feb. 1, 1920	Interstate Public Service Company, Indianapolis, Ind.....	Interstate Car Trust Equip-ment Company, Indian-apolis, Ind. J. F. Wild & Company, Fiscal Agents..	8 steel interurban cars.....	195,000.00	45,000.00	150,000.00	6%	10 yrs.	10,000.00	Semi-annual to Aug. 1, 1925	Series "A" preferred stock issue, retired serial-ly. First payment covers com-mon stock ownership in Equipment Co. by Rail-way.
1920	Schuylkill Railway, Girardville, Pa.....	MacGovern & Co.....	.....	18,000.00	7,500.00	10,500.00	6%	10 mos.	1,050.00	Monthly	Starting May 1, 1920.

* Complete figures on total cost and first payment not received. Figures are calculated upon the assumption that the notes of the individual company represent 75 per cent. of the purchase price, as they are known to do in some cases. In other cases this sum may be 80 per cent., in which case the total cost is in error by a corresponding amount.

** Equipment is not included in the trust issue, but is included in the total purchase price. See text, page 1049.

† The Pennsylvania Company for Insurance on Lives and Granting Annuities.

‡ Rolling stock owned by holding company and subleased to operating companies. See text, page 1058.

§ These issues are reported retired.

(Continued from page 1049)

standpoint of the company as operating charges and not as fixed charges. In other words, the company must pay for the use of this equipment exactly as it pays for wages, for power and for office rent and before it can declare any money available for interest upon its funded debt or for dividends and surplus. It is a method which is used a great deal therefore by receivers in order to provide the necessary additions and replacements in rolling stock of the companies which the receivers are operating, but the fact that it is so used by receivers does not at all indicate that it is limited to companies in financial distress.

CERTIFICATES HAVE GOOD RECORD

Another inviting feature to the investor at times is that he may obtain a security which matures in from one to ten years and he may choose the date at which his particular certificate or certificates will mature. This feature is especially attractive to those who can predict a definite need for liquidating a certain amount of their holdings at a certain time; it is a useful feature to executors, whether individual or trust company, who hold moneys which must be accounted for and produced in cash at some subsequent and known date. There is only the most remote possibility that the certificate will not be paid in cash, or that the holder will be presented with some subsequent security at the date of maturity of the certificate he holds.

These equipment trust certificates, so far as data have been available, have an almost perfect record of no default on payment. In fact, only two cases of default on these certificates have been found, and in both of these cases the main securities of the defaulting companies are owned by holding companies or other railways, so that the default has no particular significance. There was no seizure of equipment in these cases. Any outstanding certificates were bought in by the bankers of the holding companies.

In these days, when most public utility securities are finding a difficult market, securities of this sort which call for payment as an operating charge are marketed satisfactorily, because the investor sees in them an assured return of principal with satisfactory interest.

The investor feels himself further protected by the fact that what he owns is movable and if for any reason the company using his equipment should fail to meet its payments, or have to cease operation, he with his partners in the ownership of the equipment could move it to some other locality and lease it to some other company. Arguments of this sort with investors have proved efficacious in the marketing of the securities.

EFFECT OF THE ONE-MAN CAR

In this connection, if the equipment purchased is of a standard nature, that is, if it is of the sort that many railway companies in the country are known to be using, rather than of the sort which has been designed for some particular railway specifications, this argument of transferability to another property is much strengthened. According to one banker, who is dealing very largely in these securities at the present time, this very point has increased in many quarters the sale of these certificates. This appears to be another argument for the attempts of the electric railway industry to standardize rolling stock to the greatest possible extent.

The fact that the one-man safety car is to all intents

and purposes practically a standardized piece of apparatus has made it a very popular form of rolling stock to purchase through these equipment trust issues. This is not the only advantage of the one-man car in its relation to equipment trust certificates, but from the standpoint of the investor this feature of the one-man car has been found to be an appealing argument. It is interesting to note in this connection that several of the more recent issues of equipment trust certificates have covered purchases of one-man cars, which have been distributed to several companies under each trust. In other words, a wholesale purchase of one-man cars has been made and they have been leased in lots to several operating companies. It is this treatment of the one-man car in bulk and the recognition of this treatment that has made an argument to the investor, strengthening his sense of security in his investment.

The one-man car has another advantage, this from the standpoint of the company. In these days of decreased net per car-mile and consequent effort to reduce operating cost per car-mile many companies have seen in the one-man car a means of meeting the situation. An outright purchase of the new equipment desired would be out of the question on former means of financing, but the savings resulting from the introduction of one-man cars can frequently be shown to be sufficient to make the necessary periodic payments for the purchase of one-man cars under equipment trusts. In this way the economy of the one-man car is capitalized to pay immediately its purchase price. The result is twofold, in that the company has new equipment which helps merchandise its transportation and that it is enabled to secure lower operating costs. In some cases this change-over could not have been financed except by some such means as the equipment trust.

WHAT THE BROKER SAYS

Brokers have found many and various attitudes on the part of investors when they have tried to market certificates of this sort. Some brokers float these securities almost entirely with banks, who as investors are very much impressed with the standardization of equipment argument and the consequent interchangeability or transferability to other properties in case of default. Some of the newer types of issues which were put out last year were a little difficult to market at first on account of the general fear of traction securities, but as soon as their nature was better understood a market was established which now absorbs the issues practically as fast as they are offered. With the individual buyer peculiar viewpoints were found. Various buyers thought the certificates were all sorts of things, such as bonds of the manufacturer, stock of the railway, notes of the trust company, etc., but brokers claim that this lack of accurate conception of what the securities are has disappeared and that the largely increased amounts of the securities are salable to a satisfactory degree.

Of course, the earlier equipment certificates, which were issued on the ten-year basis, were so much like the car trust equipment of the trunk line roads that they were marketed in the same way and largely, to the same buying personnel as these trunk-line car trusts. It is only since the shorter term issues, which are specifically of an electric railway nature, have been put on the market that some of the above-mentioned viewpoints have been met.

The broker or the banker gets into this game from either one of two approaches. In many cases, the company approaches a broker or banker as soon as it decides to seek money for the purchase of equipment, and an arrangement is made for the broker to absorb whatever certificates are issued by the company, or rather by the trustee for the company. In other cases, the manufacturer makes the sale of his equipment and executes a lease, then deposits this lease with a trustee, who issues equipment trust certificates based upon the lease. The manufacturer then must make arrangements with his broker through the issue of equipment trust certificates created, thus keeping himself supplied with necessary capital for the continuance of his business. In either case the result is the same, that the trustee purchases the equipment with the money received from the broker, the equipment is furnished to the railway company and the latter's payments commence. The broker, however, must now market the securities which he has on hand and the amount that he can get for the certificates is of course a natural function of the prevailing rate of return on securities of similar risk. At the present writing most of the certificates are being marketed at a price to pay approximately or slightly in excess of 7 per cent. It is noted from the accompanying table that the prevailing rate of interest on the certificates is 6 per cent, these being sold at such a discount as to pay the higher rate. But, at the present rate of money, the broker cannot afford to buy these certificates except on a basis which will assure him of something nearer 9 per cent in order that he may be protected in his cost of selling and realize a satisfactory profit.

THE GROUP ISSUE

Most of the issues of equipment trust certificates have been made upon the initiative of the railway companies and their bankers. Of the other type of arranging for equipment trust certificate issues, the six Brill equipment trusts listed are examples. In this case, the manufacturer as indicated sold equipment to several companies on independent leases, each lease having provisions similar to an individual equipment trust lease, and several leases, or in some cases only one lease, are filed with a trustee and certificates issued thereon. In these cases the manufacturer has assisted in the financing at least to the extent of taking as part payment the Series B certificates. These certificates do not bear any interest until after maturity.

Actually, then, in these Brill issues the railway companies have paid 20 to 25 per cent of the cost of the cars, the manufacturer has accepted the Series B certificates for the next 30 or 25 per cent and the marketed certificates have paid for the other 50 per cent. In the case of the Chicago Elevated Railway issue the Series B certificates there, payable after the Series A certificates are retired, served to all practical purposes as the first payment, or rather took the place of the cash payment to the manufacturer.

Another possibility, as indicated by the issues to the American Railway Company, is that of a holding company purchasing the equipment and issuing the certificates through its broker and trustee. In this case the holding company owns the cars through its trustee and pays the certificates from rentals received from its subsidiary operating companies.

Car trust certificates tend to complete the list of securities which brokers have to offer their customers.

The certificates provide a very welcome addition to the class of paper which a broker can provide in trying to meet the varied needs, wishes and whims of the investing public, and it further makes a very satisfactory type of security to market in a given locality when the equipment will be used in that same locality.

One of the objections at the present time to marketing in the home locality of the railway is that the local bankers may not be familiar with this sort of security and the cost of marketing them through the local bankers is therefore frequently excessive. This is unfortunate, because local sales are advantageous, as previously indicated. But the fact that the securities must be marketed away from home does not slow up the sales. In other words, the security is a good one on the general market, and so far as its actual sale is concerned is absorbed perhaps more rapidly in the general market than in the local market. But if it may be sold in the local market there are local results which are to the benefit of the railway company.

THE TRUSTEE "HOLDS THE SACK"

From the standpoint of the trustee it might be said in a way that he "holds the sack," to paraphrase one trust company officer. After the company and banker and manufacturer of equipment have agreed to the price, form of trust agreement, type of equipment, rates of payment, kind of security, etc., they must select a trustee who is willing to act. The trustee examines the lease and trust agreement, to see if it is correct and to see if it conforms with the legal requirements of the state and provides sufficient protection for the purchasers of certificates. If the agreement passes the trustee's scrutiny and the trustee consents to act it charges a small examination fee and issues the necessary certificates and papers. But the trustee apparently is not destined to make a large amount of money on the deal, as a typical fee ranges from \$1 per certificate in small issues to 50 cents per certificate in large issues, and, again quoting a trustee officer, "Unfortunately, most issues are large issues." The trustee of course collects the rental money and makes payment to retire the certificates, for which service he charges a small fraction of 1 per cent of the amount collected. However, this sort of transaction conforms to the usual trust company program and naturally attracts other accounts, with ultimate profit to the trust company, even though the remuneration for the specific acts performed with reference to the equipment trust certificates themselves is not very large.

Philadelphia seems to be the home of most of the trust companies handling issues of this sort. One reason is probably the fact that Philadelphia is the home of a large car building company. Another is that street railway securities have always been a popular investment in that city. The Fidelity Trust Company, as indicated in the table, is especially prominent in handling issues of this sort. The holders of the securities are scattered far and wide and include all classes of security buyers. Certain banks, certain life and fire insurance companies, some trust companies and large numbers of individual buyers find these securities attractive.

Whether this method of purchase can be satisfactorily applied to other than rolling stock or not is another question. So far as it has been possible to determine, no other electric railway equipment, with the possible exception of the appliances of rolling stock, such as

meters and fare boxes, have been purchased by this method. The Philadelphia Rapid Transit Company has recently proposed a \$6,000,000 issue, about half of which would be used to retire existing issues, the other half to be available for track, buildings, power plant improvements, etc. There have been several instances in other lines of business, particularly industrial, where certain kinds of equipment are purchased through equipment trust bonds. A recent interesting case is the purchase of telephone exchange and subscriber station equipment by one of the larger independent companies on this basis.

However, in these days when economies of operation are being analyzed to the most minute detail and when it is sometimes seen that changes in, or additions to, rolling stock would assist materially in the operation of a railway, it is well to investigate this method of purchase of equipment. In many cases it will be found that the savings and increased earnings due to rolling stock additions or replacements will amply take care of the periodical payments which have to be made to retire the equipment trust certificates upon which the new equipment has been purchased.

Apparently, and judging from the present volume of purchases made in this way, this method of financing is already growing fast in favor and may well become the standard in purchasing rolling stock.

Dignified Station Design for Interurban

London & Port Stanley Railway of Ontario Erects Typical Building at St. Thomas

THE people of the province of Ontario, who during the past ten years have established and built up a publicly owned hydro-electric power business, in which they are investing \$100,000,000, are now about to embark on the associated enterprise of constructing and operating a vast system of hydro-electric radial railways.

The London & Port Stanley Railway, a 25-mile steam

wainscoting of the same material in dustless tile corners. Ceilings are heavily and attractively beamed, while all seats are in mahogany finish. The office fittings are of the same material. Lavatories have floors of ceramic mosaic tile, excellent hygienic plumbing installations and partitions of marble slabs with white enameled metal doors.

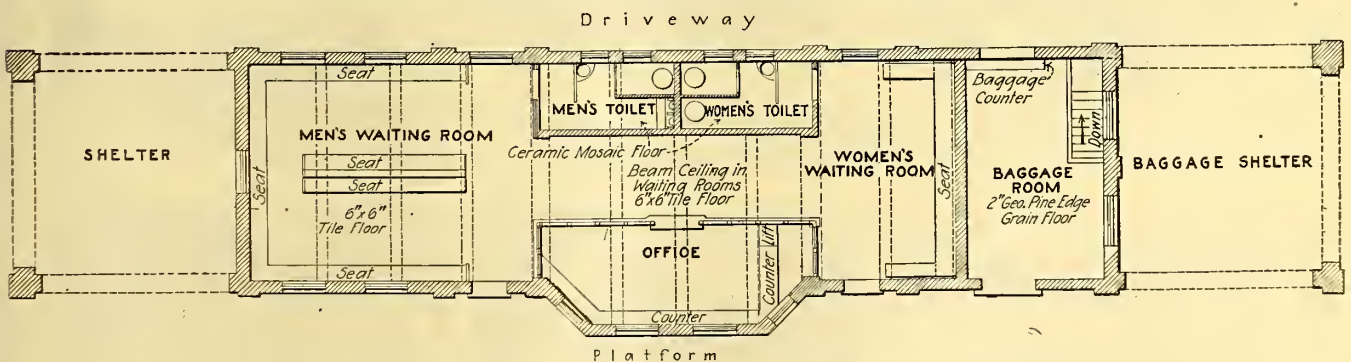
There is an ample baggage room, floored with 2-in.



WHEN THE GROUNDS ARE IMPROVED THIS STATION AT ST. THOMAS WILL BE AN ATTRACTIVE LANDMARK

Georgia pine, and adjoining, on the end of the building, is a shelter for the accommodation of trucks loading baggage. Balance is given to the building on the opposite end by the provision of a similar shelter for passengers.

A neatly curbed asphalt roadway has been constructed behind the building, while the railway right-of-way opposite the building is to be leveled, sodded and suitably ornamented by landscape men. This work has been placed under the direction of the St. Thomas Horticultural Society, an organization of St. Thomas citizens, which will be reimbursed for all reasonable expenditure. A high, closely picketed fence has been constructed on both sides of the line for a considerable distance to conceal a number of unsightly yards on the adjoining properties.



PLAN OF STATION OF LONDON & PORT STANLEY RAILWAY AT ST. THOMAS, ONT.

railroad, electrified four years ago as a practical demonstration of the standards to be adopted in the hydro-radial system, has just completed a new station for the city of St. Thomas, Ont.

While structures and facilities will vary in accordance with the requirements of different centers of population, the St. Thomas station is typical of stations projected. It has a white stone foundation, red wire-cut tapestry-brick walls and an attractive red tile roof. The floors of the waiting room are of 6-in. red tile, meeting

The adoption of this policy has had a marked effect upon the attitude of many people in St. Thomas who were formerly charged by some with being antagonistic to the railway.

The L. & P. S. R. in St. Thomas has direct connections for freight and passengers with the Michigan Central, the Grand Trunk, the Wabash and the Père Marquette Railroads. The passenger trains of the last-named company operate into the L. & P. S. R. station at this point.

Memories of the Not Far Distant Past



Nos. 1, 2, 3, 4 and 6—The Holyoke (Mass.) Street Railway had no easy time of it.

Nos. 5, 7, 9, 13, 14 and 15—The Concord (N. H.) Electric Railway had able assistance from the citizens. Photographs from Curtis Studio.

Nos. 8 and 11—The Cumberland County Power &

Light Company, Portland, Me., was subjected to a slight fall of snow.

No. 10—The safety cars did the work on the Levis County Railway, Quebec, Canada.

No. 12—Pusher plow service was necessary with the Bangor Railway & Electric Company, Bangor, Maine.

City Building and Transportation

Some Technical Relationships Involved—Need of Broad Vision, Executive Skill and Courage—New Field for Technical Professions

IN a paper presented before the joint meeting of the American Institute of Electrical Engineers and the Western Society of Engineers at Fullerton Hall, Art Institute, Chicago, May 12, 1920, James R. Bibbins, supervising engineer the Arnold Company, gave a paper showing how the technical professions should assume leadership in city building and how transportation is largely the determining factor in this work. He said:

"Our American cities are gradually absorbing and increasing percentage of the total population, as is indicated by the study of consecutive census figures. Our problems are therefore growing and there appear two alternatives: First, to neglect the cities, driving the people back to the smaller communities, and, second, to render them so efficient as to decrease the cost of living, production and distribution. In this effort engineers are taking and must take a leading part, and transportation becomes one of the first and deciding factors in the development.

"What is needed is a group of city builders who predict developments far into the future. Problems encountered and matters of procedure which tend toward a satisfactory plan of city building include questions of excess condemnations for public improvements, local district assessments for non-paying extensions, an amendment with reference to frontage consent for carrying out public works, consolidation of condemnation suits, regulation of tramp carriers or jitneys, a variable road tax assessment of vehicles according to size, weight, use and probable wear on streets, a comprehensive street paving program, control of front door delivery in congested districts, control and organization of transportation and distribution of foods and market products, cost-of-service franchises and conservation of utilities with enlightened public regulation.

"In order to realize on any such program as this the various branches of the technical profession must act together in a group to secure good results along the lines of regulation, publicity, co-operation of the various agencies and, finally, the preparation of adequate physical plans."

After reviewing some of the notable mistakes in city planning with reference to transportation, the paper discusses the fundamental conception of the physical plan of a city by considering it broadly as an industrial plant. Under consideration of the site we see the present tendencies of expansion from the former cities' areas, the questions of zone fares versus unit fares and the consequent population distribution, the relation of topography to the plan of a city, the question of waste spaces and examples of intensive development of certain locations. Looking toward the future, we must give relief to densely settled metropolitan areas, must provide for the rapidly increasing motor vehicle traffic and must lay out restricted industrial areas. The administrative business center presents a peculiar problem particularly as related to transportation. Transportation must here assume the function of centrifugal action to counteract the centripetal tendency of long-established precedents. The general street plan as a means of intercommunication and as a means of providing for transportation agencies is the one great remedy for harmonizing various conflicting elements and problems

in the city plan, and transportation systems must be located on these streets with maximum skill and judgment to safeguard the needs of the future. Traffic problems are reduced but not eliminated by any plan of streets. With the available street capacity and the present freight trucking, with motor trucks and other similar vehicles, the transportation systems should be used to their utmost at night and at other off-peak hours to do most of the cities' tonnage movement.

Rush hours, of course, present the most serious problems, and in any analysis it is found that finally the street railways and in the larger cities the rapid transit lines must be depended upon to do the great volume of transportation work. The technical professions must teach the layman the true cost of service as it is affected by this rush-hour situation. Expedients to mitigate the rush-hour problems are through-routing of cars and tapering off the service by superimposed short lines to suit the traffic in outlying sections. In planning for growth of transportation facilities standardization should be a guiding principle. Rapid transit must grow with the city, and it should start right to secure the best permanent results. Electrification of strategic steam lines must of course play an important factor in the suburban service of metropolitan areas.

There are many undeveloped possibilities of relief pending the maturing of a basic transportation plan. One of these is the Chicago freight tunnel, which removes much traffic from the street level, and this method has been little used in other places.

In conclusion the author directs attention to certain matters which he regards as fundamental:

1. Are city transportation plans being developed along intelligent, economic lines with a proper conception of the future and on the principle of the greatest good to the greatest number?

2. We do not want mere bigness in population, industry or wealth if civic development cannot be efficient and wholesome.

3. Cities must be decentralized when they grow beyond certain convenient transportation limits, both as to passenger and freight movement; to focus all business, traffic and community life in a single downtown district is wholly improper, inefficient and inequitable.

4. Intercommunication by streets and transit lines should be as direct as possible to avoid detours and unnecessary passenger mileage; the city center should not be turned into a terminal yard or transfer platform.

5. Through-routing offers the best cure for the remaining traffic necessarily reaching the business district and encourages normal and equitable business expansion.

6. Sub-centers of business and industry should be encouraged and developed to the maximum possible extent; also the walking habit in the outlying residential districts and industrial localities—a matter intimately associated with the program of city zoning.

7. Perfection of the existing street system is the first necessity to permit local transit development without causing needless restrictions and detours; centralized control of future subdivisions and the city plan is equally necessary with the same end in view.

8. Rapid transit development should be carried out with complete unification and should be standardized as fully as possible in its major divisions of street, elevated, subway and railroad suburban service. Any system conceived upon selfish, predatory or even com-

petitive lines must eventually fail or the cost be finally absorbed by the public.

9. The broad economic problem is not one of today alone, but involving the rights and responsibilities of several generations—past, present and future. No other conception permits of equitable adjustment.

10. The American people broadly want good transportation service first and are willing to pay for it. Any restrictive plan of development must result in stunted civic growth and untold economic loss too complex to estimate in mere figures.

11. Finally, conservation, the one big national concept of the century, stands out as a profound public need at the present time. It must be based on sound economics and not be warped by either corporate aggrandizement or political expediency. Chicago is indeed fortunate in having the benefit of the vision of a broad city plan and possessing the existing elements of an unexcelled future transportation system. Moreover, it has the tools to work with in the form of a \$26,000,000 traction fund, accumulated not from capital issues, but from net receipts of local transit.

The entire address of Mr. Bibbins is a thirty-one page pamphlet, issued by the Western Society of Engineers, Chicago, Ill.

Teuton Trolleys Handle Freight

War Experiences and Higher Costs for Fodder and Fuel Expected to Extend the Use of German and Austrian Tramways

A RECENT paper by Wilhelm Neumann, Councillor Austrian State Railways, read before the Austrian Engineering and Architectural Society, discusses encouraging possibilities for the further development of freight haulage on street railways. At the opening of the world war the Vienna tramway system installed a track connection with one steam terminal to take over the passenger traffic released by the closing of the Stadtbahn to such business. The next step was to make use of these connecting tracks for freight.

The pressure for freight haulage on the street railways of Germany evidently was less, for it was not until December, 1916, that the War Department sent out a questionnaire to learn their facilities for freight business. Such business was less of a novelty to German than to Austrian electric railways. The latter had handled freight only spasmodically, whereas the Germans as long ago as April, 1903, were moving freight on sixty of the 148 tramways in the country. Others were not doing so purely because of franchise restrictions.

In those days, also, the cheapness of horse transport and the cost of rehandling were limiting factors. However, by 1913 sixty out of 135 Prussian street railways and nineteen of the railways in the other German states were handling freight. These seventy-nine companies then had 2,600 cars for package, mail and freight, of which 964 were regular freight cars, averaging 6 metric tons each in capacity.

CONCLUSIONS REACHED BY GERMAN ROADS

According to Chief Engineer Winkler of Charlottenburg, Berlin, the German roads before the war had reached the following conclusions on the subject of handling freight.

Street railways should be considered freight feeders to the steam lines and should have direct or indirect

connection with them. Car interchange is impracticable because of the sharper curves, smaller clearances, narrower wheel treads and coupler differences of the street railways. The use of sub-trucks, even if clearances are ample, is of but limited application. Transshipment is then necessary, and for this labor-saving devices should be used as much as possible. The freight was usually hauled in a train consisting of one motor car and two or three trailers. Most freight service was handled at night.

The war led to a tremendous development of trolley freight. In February, 1918, practically all haulage on the electric lines was with trailer cars. In some cities garbage transport was instituted. Düsseldorf was the only city in which a package business was conducted. Most of the roads confined their efforts to carload transfers between the steam railroads and large shippers. Generally the freight trains were run at passenger car speeds and were often interpolated with passenger service. A disadvantage found with wagon trailers on their own wheels was the low speed of 4 to 8 km. an hour (2½ to 5 m.p.h.), compelled by the character of their spring suspension and brakes.

The tariff charges are usually based upon the capacity (not actual load) of the trailer and the distance run. The prices are considerably below those charged for horse drays. An auxiliary saving, due to easier transfer from steam to electric cars, is the quicker release of the steam cars, made possible by the better use of mechanical transfer devices. More freight business by electric railways would not only enlarge the steam railroad revenues but give a better use factor of men, power plant, track and line.

HEAVY WAR TRAFFIC IN VIENNA

Referring to Vienna, Mr. Neumann said that up to February, 1918, the local street railways had made 110,000 car-trips, the equivalent of 310,000 wagon-trips. For the same amount of work 350 horse trucks or 100 motor trucks would have been needed. A great variety of materials was handled, the local distribution of mail being especially successful.

As regards post-war conditions, an upland country like Austria could hardly afford to raise fodder for farm horses, let alone city draft animals. Gasoline was also extremely costly, aside from the fact that motor trucks were not economical in frequent-stop service and were also injurious to street paving and the piping beneath. On the other hand, the development of local hydro-electric power was possible and would tend to lower the cost of transporting goods via electric railway. The speaker recommended the extension of the system, the creation of an electric railway terminal warehouse, construction of sidings, etc.

Motor Cars Kill Eighty-two

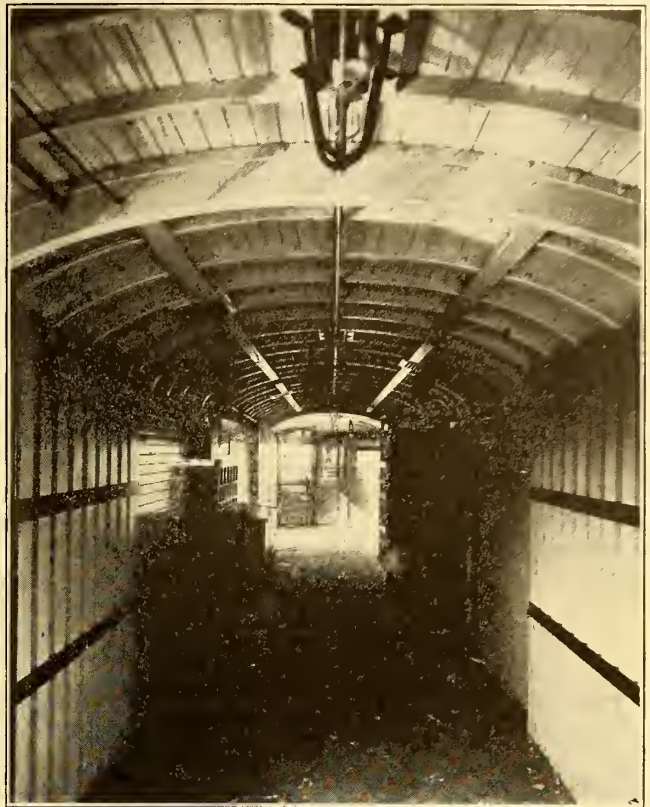
ACCORDING to the report of the National Highways Protective Society, there were ninety-three accidents due to vehicular traffic in the State of New York during April, 1920. The number of persons killed by auto cars was eighty-two, while trolley cars caused the death of five and wagons six. In New York City alone fifty persons were killed during the month by automobiles, nineteen being children under sixteen years of age. Trolley cars caused the death of four persons and wagons six.

Motor Dispatch Line Successful

The North Shore Line Has Placed Twelve New Multiple-Unit Cars in Service to Take Care of This Business

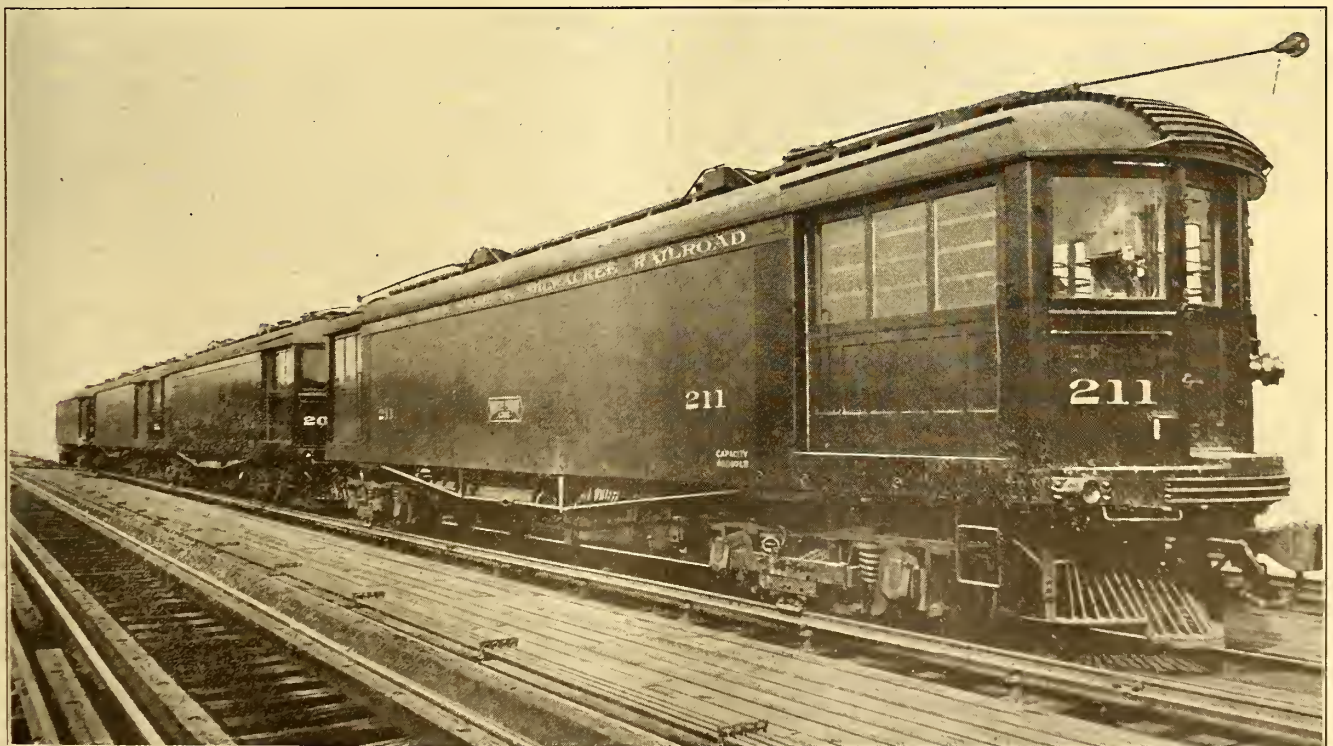
THE Chicago, North Shore & Milwaukee Railroad is enjoying an increasingly popular freight business, which it calls its "merchandise dispatch service" and for which it charges a 30 per cent higher rate than the corresponding steam road freight rate. While the company was at first laughed at for assuming that it could secure business at 30 per cent higher rates than prevailed on the paralleling steam line, its practice of making deliveries within five hours from the time shipments are received has won a volume of business which has forced the company to purchase twelve new motor dispatch cars.

These twelve new cars are of wood construction except for the composite underframe and are 50 ft. long over all, 8 ft. 8 in. wide and 12 ft. 3 in. high from rail to top of roof. They are equipped with Baldwin trucks having a 78-in. wheelbase and with two Westinghouse 557-R-5, 140-hp. motors, mounted on one truck. Westinghouse tapped field HL control and automatic universal airbrakes are used. The motors and control are of the same type that is used on the North Shore Line passenger cars. Both trucks on the motor dispatch cars are built for equipping with motors and the control is a four-motor control, so that these cars can later be very readily equipped with four motors if the service demands. At the present time, equipped with two motors, the cars have a free running speed of 50 miles per hour and are used daily for hauling carload shipments in addition to the l. c. l. shipments carried on the motor car itself, the two motors seeming equal to this work of hauling standard freight-car trailers. This hauling of steam road equipment is made possible by the use of Tomlinson M.C.B. radial drawbars, with which all the cars are equipped. In the l. c. l. shipments the equipment



DESK AND STOVE INSIDE THE NEW MOTOR DISPATCH CARS

of all cars with motors and multiple-unit double-end control makes it possible for any number of cars, depending on whatever the volume of business may require, to be run as a single train. The limiting factor at present is that for any shipments which pass through Wilmette, Ill., a four-car train is the maximum which may be taken through the streets, in compliance with a local ordinance.



A FOUR-CAR TRAIN OF THE NEW MOTOR DISPATCH CARS RECENTLY PUT IN SERVICE BY THE NORTH SHORE LINE

Since one of the main receiving terminals for this merchandise service is at Wilson Avenue in Chicago, necessitating that the cars run over the elevated structure from Wilson Avenue to Wilmette, all cars are equipped with third-rail shoes as well as double trolleys.

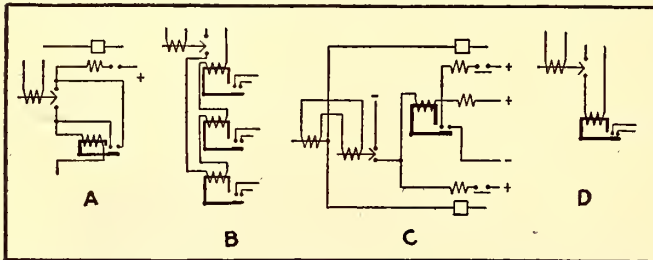
The car bodies are built with four end-side sliding doors and a train door in the center of each vestibule. Inside the car, at the center, a desk and pigeon-hole rack are provided for the conductor to make out and distribute his waybills and records. The lower part of this desk forms a cabinet, in which the air governor, the control and motor cutouts and what other control and brake equipment must be placed within the car body are installed. Opposite the desk an ordinary caboose coal stove is placed. A special blox-on-end floor was used, this being a special patented floor which is widely used in steam road cars and which affords particularly good wearing qualities under the heavy service it encounters. The arched roof is equipped with four Railway Utility Company automatic ventilators.

Completely equipped the motor dispatch cars weigh 66,000 lb. and have a carrying capacity of 40,000 lb.

Uses of the Auxiliary Relay

THE accompanying diagrams show methods of applying the comparatively new auxiliary relay, Type HG, which has been developed by the General Electric Company. In general, this device can be used on any direct-current circuit to close or open automatically a direct or alternating-current circuit of small capacity up to 600 volts. When the operating coil is energized the relay contacts close, and when current is cut off the coil the armature falls by gravity, assisted by the spring action of bronze movable contacts which are under pressure when closed.

A is an application of the relay to "seal in" a circuit made by another relay, so that once current is thrown



SOME USES FOR AN AUXILIARY RELAY

on the tripping coil of an oil circuit breaker this current will remain on until the breaker opens, and the tripping circuit is opened by an auxiliary switch on the breaker.

In B three auxiliary relays with the coils in series are used to control the automatic opening and closing of several circuits, depending upon the operation of a master relay which may function on overload, reverse power or other abnormal circuit condition.

C shows an auxiliary relay connected in one circuit to control a second circuit. This is accomplished by connecting the auxiliary relay with its resistance (if the voltage requires the use of the resistance) across the control bus. It will be necessary, in this case, for the protective relay contact to be capable of breaking the current through the auxiliary relay coil.

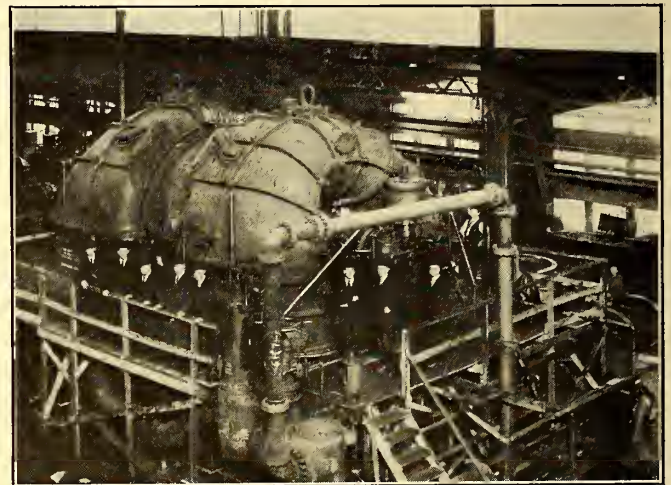
In D the auxiliary relay is used in connection with an overload relay to relieve the contacts of the latter from making or breaking a comparatively large current.

Another 60,000-Kw. Turbine Generator

ON APRIL 15 the low-pressure steam-unit of a new triple-compound turbine generator for the Duquesne Light Company was officially "turned over" for the first time in the East Pittsburgh shops of the Westinghouse Electric & Manufacturing Company. This unit will be installed at the new Cheswick station of the Duquesne company to serve a combined power, light and railway load.

On account of the unusual size of this machine it will be of interest to compare it with the 25-cycle, 60,000-kw. unit installed several years ago by the Interborough Rapid Transit Company, as described last in the issue of this paper for May 10, 1919, page 906.

As the load conditions under which these two units work are different they differ somewhat in design. The



LOW PRESSURE UNIT FOR 60,000-KW. TURBINE

load carried by the Interborough turbine is a transportation load only. For this reason extremely high peaks are encountered during the rush hours, while during the day the load is comparatively light. The unit was, therefore, designed to operate at best efficiency for a load of 40,000 kw. and to take care of a 70,000-kw. load for short periods. On the other hand, while the Duquesne unit will be required to carry large loads for short periods, the off-peak loads will be comparatively high. This turbine generator is designed to operate most efficiently when subjected to a load of 50,000 kw., but also to take care of a maximum load of 70,000 kw. for short periods.

All three of the individual units of the Interborough turbine operate at 1,500 r.p.m., whereas the two low-pressure units of the Duquesne unit will operate at 1,200 r.p.m. and the high-pressure installation at 1,800 r.p.m.

Like the Interborough turbine, this unit is of the pure-reaction, three-cylinder, 88-stage type, designed to divide the load equally among the three generators at 50,000 kw. The entire generating unit measures 53 ft. 8 in. in length, 56 ft. 2 in. in width and 19 ft. 3 in. in depth.

Steam will be supplied to the turbine at 275 lb. pressure and 175 deg. F. superheat and will exhaust into a 29-in. vacuum. It will enter the single-flow, high pressure element through two 18-in. steam headers, each of which is equipped with an 18-in. combination throttle valve.

Fuel Oil and Electrification in California

Increasing Cost and Scarcity of Fuel Are Hastening the Day of Heavy Electric Traction on the Pacific Coast

AT THE convention of the Pacific Coast Section of the A. N. E. L. A., held during the first week of May, J. E. Woodbridge, resident engineer Ford, Bacon & Davis, San Francisco, Cal., gave data regarding the increasing price and decreasing supply of fuel oil and discussed the relation of these to railroad operation in the State.

It appears that the price of delivered fuel oil in California has advanced during the last five years from 60 cents to about \$1.85 per barrel, the two approximations covering slight variations due to locality.

Due to surplus production, approximately 60,000,000 bbl. of oil (nearly a year's consumption) was accumulated early in 1915. Price advances during the subsequent three years were due largely to war demands and a depreciation of currency, which made all field development difficult and expensive. The price advance and other factors so stimulated production and controlled consumption that stock increased during a portion of 1918 and 1919 by 3,000,000 bbl. Many who have not looked further into the fuel oil situation have reasoned from these facts that we may rest easy as to the price of this raw material in the immediate future. Mr. Woodbridge, however, quotes President Kingsbury of the Standard Oil Company of California to the effect that the Pacific Coast supply of fuel oil and of petroleum is rapidly approaching exhaustion. Since May 1, 1915, crude oil stocks have decreased from over 60,000,000 bbl. to less than 29,000,000 bbl. on March 1, 1920. The available supply of crude oil in stock is today less than 13,000,000 bbl. At the present rate of consumption and of production the available stocks will be exhausted in about twelve months, at which time consumers of California fuel oil will be cut off from between 25,000 and 30,000 bbl. per day. Mr. Kingsbury gives examples of increases in demand for oil from various sources and states that the company is now installing new processes by which it is estimated that more refined products, including gasoline, will be recovered from crude oil in such quantities that the company's production of fuel oil within a year will be necessarily lessened about 30 per cent.

The point which Mr. Woodbridge desired to make from the data quoted and other data is that power development, as in the ordinary steam station, at an average "efficiency" of 185 to 200 kw.-hr. per barrel will cost for fuel alone at least 1 cent per kilowatt-hour with fuel prices of \$1.85 and upward. This figure added to other steam operating costs and all fixed charges makes the total cost of power so developed much higher than that of hydro-power, even at present high cost of money and construction. This being the case for steam turbine plants of reasonably fair to good efficiencies, it is much more true of the steam locomotive, with its wasteful boiler and non-condensing reciprocating engine.

In other words, the cost of the fuel oil alone used in the steam locomotives in California and neighboring states, based on its value at the market (amounting to approximately \$50,000,000 per annum, which will increase year by year until this fuel can with difficulty be obtained at all), will in turn compel the steam railroads to seek other methods of operation, the most

promising of which is electrical. Disregarding all other reasons and arguments for electrification, the cost of fuel is going to force this.

In view of the inability of the power companies to meet their present commercial demands and the apparently insuperable financial program involved in meeting future demands a large railroad load cannot be anticipated by these companies with any great degree of satisfaction. The solution, however, is obvious, namely, a railroad power rate which will finance the necessary developments.

Investment Bankers Speak

AT a meeting on May 8 of the board of governors of the Investment Bankers' Association of America the following resolution relating to public utilities was adopted:

Whereas investment bankers are expected to purchase and distribute the securities of public utility companies, which must be sold if utilities are adequately to supply the demands upon them for local transportation, light, heat, power and the transmission of messages, and

Whereas the credit of many of the public utility companies will not permit the sale and distribution of such securities, thus interfering with the development of many commercial enterprises, the welfare of many communities and the comfort and convenience of a great many people, and

Whereas the credit of the public utilities is largely dependent upon the attitude of the public as expressed through the various governing and regulatory bodies,

It is hereby resolved by the board of governors of the Investment Bankers' Association of America that, as steps in the restoration of the credit of the public utilities,

1. Term franchises should be superseded by indeterminate permits securing the right to operate under proper regulation during good behavior, with provisions for equitable adjustment of rates from time to time, as tending to eliminate controversies which inevitably impair the public service, the credit of the companies involved and the value of their securities.

2. The power of regulation and control of public utilities should be vested in state commissions, as tending toward standardization of regulation, which is not possible under local regulation.

3. Members of state commissions should be appointed. If commissioners are elected they are frequently embarrassed by political policies and platforms in the consideration of questions which should be decided only on sound economic and financial principles.

Reinforcing Corroded Steel Poles

IN THE recent triple number of *L'Industrie des Trains* *ways et Chemins de Fer* two engineers of the Nogentais Railway give details of their plan for rehabilitating steel poles, used for supporting trolley wires, particularly at the ground line where corrosion occurs. Their plan is to drop into the pole a reinforcing cage, afterward pouring in enough concrete to surround the reinforcing. The reinforcement consists of six rods about $\frac{3}{4}$ in. in diameter and 14 ft. long, equally spaced around the outside of steel rings of $3\frac{1}{4}$ -in. outside diameter. Three spacing rings are used, one near the middle and one near each end of the cage, their width being about 1 in.

Where necessary the poles can also be reinforced by means of a sleeve placed at the ground line on the outside. Unless the fittings can be removed from the pole this sleeve has to be made in two sections with suitable clamping arrangement to hold it together. The internal reinforcing requires the work of four men for one hour.

Letters to the Editors

Cost of Preparing Pulverized Fuel

FULLER ENGINEERING COMPANY
ALLENTOWN, PA., May 14, 1920.

To the Editors:

The writer has read with considerable interest the remarks published in the issue of the *ELECTRIC RAILWAY JOURNAL* for April 10 by T. A. Marsh, chief engineer of the Green Engineering Company, on the subject of preparing and burning pulverized coal.

In his first paragraph Mr. Marsh states that he believes it to be fundamentally wrong to burn coal in a powdered condition. The writer takes exception to this statement, because it certainly is better and easier to burn coal in pulverized form than in lumps on grates subjected to the action of the heat.

In his second paragraph Mr. Marsh states that some accurate way of measuring the ash discharged from the stacks from pulverized-coal-fired furnaces should be found before definite statements concerning it are made. It is true that a large percentage of the ash from pulverized-coal-fired furnaces will be discharged from the stacks. The percentage, however, dissipated from a first-class installation, equipped with economizers and settling chambers, will not be sufficient to cause a complaint, as has already been shown by installations using pulverized coal in thickly populated districts. This question of ash dissipation depends greatly upon the velocity of the gases passing through the setting and the percentage would naturally vary according to the operating conditions and the general design of the installation. The same is true with the ash discharged from a stoker installation, which varies according to the conditions under which the stokers are operated.

In his fourth paragraph Mr. Marsh states that the cement industry has more data on the subject of pulverized coal than have steam producers. This statement is absolutely correct. We are in touch with practically every plant in the United States, and in fact have more data on what is being done in connection with pulverized coal in the cement industry than any other organization. We are positive that any one who at present is operating his coal plant so that the cost of preparing the coal is as high as \$1 per ton is not operating that plant efficiently unless the particular coal plant has a very small capacity and is operated only periodically.

In order to show just what the cost of preparing coal is at present, the following figures are given for the month of August, 1919, for the plant of the Allentown Portland Cement Company, where 2,976 gross tons of coal was pulverized. The details are:

Operation	Cents
Drying	8.04
Grinding	8.74
Operation	0.43
Power	17.93
Labor	3.68
Repairs	7.65
	46.47

The cost is thus slightly under 46½ cents per gross ton, or 41 cents per net ton, no interest or depreciation included. This can be taken as representing the average cost in Portland cement plants in the Lehigh Valley

district, for the quantity of coal pulverized daily in this plant is not large, and no doubt in larger plants even these figures would be bettered materially.

The cost of preparing coal will vary primarily according to the quantity of coal pulverized daily, so that any general statements or criticisms that are made as to the cost of pulverizing coal in one plant have no bearing on the subject as a whole. H. G. BARNHURST,
Chief Engineer.

The Single-Truck Car and the Double-Truck Track

NEW YORK CITY, May 15, 1920.

To the Editors:

In the issue of the *ELECTRIC RAILWAY JOURNAL* for Jan. 31, 1920, you commented upon public misunderstanding of the single-truck car. The riding qualities of such cars as compared with double-truck cars were considered, somewhat unfavorably for the former, although you expressed the belief that the modern single-truck safety car possessed such good riding qualities that it should become more popular with the public.

In this connection it may be well to call attention to the fact that even the modern safety car, since it perpetuates the single-truck idea, cannot make good riding track out of poor riding track. We are advised that even before the advent of the safety car some roads had to take single-truck cars off of their lines and substitute double-truck cars simply because the latter rode the poorly surfaced tracks much more smoothly. It was either this or spend exceptional sums in reconstruction of the tracks. Thus the safety car may lead to another source of maintenance expense in that it requires a better and more costly degree of track maintenance to keep the tracks safe for the safety cars. "ENGINEER."

[NOTE—"Engineer" is undoubtedly correct in his contention that a single-truck car emphasizes the defects in the track over which it runs, the poor condition of which is partly due to the damage done by its double-truck predecessors. However, once the track is in reasonably good condition, as it should be in normal times for the comfort of riders and for the conservation of the equipment, the track itself and the adjoining pavement, then the safety car should operate without producing serious wear and tear of the track.—EDS.]

Calls One Express Organization Most Efficient

PRESIDENT George C. Taylor of the American Railway Express Company in a recent address to the Merchants' Association of New York said that he could not see the best and cheapest express service come from a restoration of several old companies nor the formation of several new ones. He argued that one express company operating over all transportation lines can give a better service by the use of the most direct route. One such company avoids duplicate service and expense, also divided responsibility and resultant delay in case of loss, avoids all circuitous routing and rehandling of packages at junction points in transfer to or from other companies, can maintain through car routes, and realize other economies not possible when several agencies divide the express business. The best service should come from one organization which now comprises over 135,000 employees and has 35,000 offices.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Engineers to Confer

Returns on May 15 Indicate 90,000 Engineers Will Be Represented at Meeting Next Month

At least 100 delegates, representing a membership of more than 90,000 engineers, will attend the organizing conference of technical societies to be held in Washington, D. C., June 3 and 4, according to a statement given out May 15 by the joint conference committee, which has just announced a tentative program for the meeting to consider the formation of a country-wide federation of national, state and regional engineering bodies.

THIRTY-ONE SOCIETIES REPRESENTED

Thirty-one different societies, on May 15, had advised the committee that delegates had been named or would be appointed forthwith. Among them are the American Society of Civil Engineers, American Institute of Mining & Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Society for Testing Materials and American Electric Railway Engineering Association.

The committee urges all engineering societies to be represented and to participate in the deliberations of the conference, which, the committee believes, will be "one of the most important gatherings that has been held in the history of the engineering profession in this country."

Richard L. Humphrey, chairman of the joint conference committee, will call the conference to order at 10 a.m., June 3, in the New Willard Hotel. Following the election of a temporary chairman and the appointment of committees there will be fifteen-minute addresses on the general subject of the engineer in public affairs by Arthur P. Davis, president of the American Society of Civil Engineers; Philip N. Moore, past-president of the American Institute of Mining Engineers; William F. Durand, chairman, San Francisco Section of the American Society of Mechanical Engineers; and Le Roy K. Sherman, president of the American Association of Engineers.

MR. MCGRAW WILL DISCUSS PUBLICITY

At a round-table luncheon, June 3, James H. McGraw, president of the McGraw-Hill Company, Inc., publishers of the *ELECTRIC RAILWAY JOURNAL*, will speak on "The Value of Publicity for Engineers." The afternoon session will be devoted to committee reports and

ten-minute discussions on licensing of engineers, good roads and other topics. In the evening, Homer L. Ferguson, past-president of the United States Chamber of Commerce, will talk on "Co-operation of the Business Man and the Engineer in Public Affairs."

A business session will occupy the morning of June 4. Prof. F. H. Newell will be the speaker at luncheon, while in the afternoon, at the Cosmos Club, the general subject will be co-operation of engineers in local affairs. A number of addresses are on the program for the evening session. The speakers include Robert S. Woodward, president Carnegie Institute; George Otis Smith, director United States Geological Survey, and James R. Angell, chairman National Research Council.

Hearings Begun on Schedules

Hearings on the rearrangement of schedules on the Cleveland (Ohio) Railway before a special committee of the City Council were opened during the week ended May 22. Councilman Alva R. Dittrick is chairman of the committee.

At the same time the compromise agreement was made John J. Stanley, president of the railway, stipulated that he would discuss schedule changes with the special committee, but not payment under those schedules.

Union officials have stated that this stipulation will not prevent them from seeking changes in accordance with their original demands concerning hours of labor and over-time payments. In other words, their demands on these points will be the same as those presented prior to May 1.

These demands are to the effect that 60 per cent of the runs be arranged on a straight eight-hour basis, 30 per cent on eight hours' running time completed in ten and one-half hours and 10 per cent on eight hours' running time to be completed in twelve and one-half hours.

The old agreement called for time and one-half for over-time above the ten-hour schedule. If they get their demands, the union officials say, they will have time and one-half above the eight hours originally demanded.

Paul E. Wilson, assistant secretary of the railway, said that cars will be run on any schedule changes that are made by the committee. He feels that it will not be difficult to reach any agreement on the proposed changes. Other officials said that a certain amount of shortening can be made in the schedules without materially increasing the operating expenses through over-time charges.

Court Called Upon

Federal Authority Asked to Settle Wage Matter in Des Moines—Decision Expected Soon

Both sides in the controversy over a wage agreement between the Des Moines (Ia.) City Railway and its employees are waiting for a ruling of Judge Martin J. Wade of the federal court, under whose direction the road is being operated by the receivers.

The receivers have requested Judge Wade to direct what measures should be taken to meet the award of the arbitration board in the wage settlement. Two of the arbitrators brought in a report fixing a maximum wage scale of 70 cents an hour. The receivers maintain that the revenues are insufficient to meet this increased cost. They have requested the court to direct the company's next step.

The contract between the Des Moines City Railway and its men provides that differences as to wage demands are to be settled by arbitration. When the two parties were unable to agree on a wage this spring the company named J. G. Gamble, an attorney, as its arbitrator. The men named Ben Wiley, the business agent. These two men named as the third arbitrator Rev. J. E. Kirby, pastor of the Plymouth Congregational Church. After hearing the evidence Mr. Wiley and Rev. Kirby decided that the men's demand for an 80-cent maximum should be met by a maximum of 70 cents. The present maximum is 57 cents.

COMPANY NEEDS MORE REVENUE

In making his findings, Rev. Kirby issued a statement announcing that while he felt that the men must have at least 70 cents an hour to live decently he could not see how the company could meet this wage increase without an increase in rates. At present there seems to be little disposition to put the question of a higher fare before the people again at this time.

In presenting its case before the federal court, attorneys for the railway maintained that if the 70-cent maximum wage was granted the company would have to cut service or put the cars in the carhouse.

Des Moines is operating under a 5-cent maximum fare granted by a franchise secured in 1913. A year ago the people, largely through a fight among union labor organizations, defeated a proposal for a 6-cent fare. Last fall, on a showing that the company could not maintain its service on the 5-cent rate, Judge Wade ordered a very material cut in service.

Open Shop in Buffalo

Mitten Management Takes Usual Liberal Attitude on Wages, but Insists Union Shall Not Dominate Employees

After four weeks of negotiations between officials of the International Railway, Buffalo, N. Y., and representatives of the employees, members of the Buffalo local of the Amalgamated Association, an agreement has been reached whereby the open shop principle is effective on the local and interurban lines of the company. Danger of a strike was averted when Herbert G. Tulley, president of the company, announced the company would not stop employees from joining the union and would not discriminate against union men. The men will receive a wage increase of 12 cents an hour retroactive to May 1, thus bringing their scale up to 60 cents an hour. The men sought a maximum scale of 88 cents an hour with an eight-hour day. The company and the employees have agreed to submit to a board of arbitration the question of hours and any additional wage increase.

C. J. JOYCE, counsel for the Mitten traction interests, who are now in control of the International Railway, has been selected by the company as its member of the board and James J. Vahey, Boston, senior counsel for the Amalgamated Association, is the choice of the men. These two men will meet and select a third member of the board. President Tulley has suggested that Chairman Charles B. Hill of the Public Service Commission, some representative of the commission or a man selected by the commission serve as the umpire. This suggestion is said to be opposed by the union.

The wage advance granted the employees will increase the International's payroll about \$1,000,000 a year. President Tulley says it will consume all of the increased revenue obtained by reason of the 7-cent fare. The wages of shopmen, carhouse men, power house men, etc., will also be increased 12 cents an hour. The increase in wages in the first week in May amounts to \$20,122 over the payroll of the week immediately preceding and the increase in gross earnings of the company derived from the 7-cent fare for the same week was \$14,201.

MR. TULLEY'S PRONUNCIAMENTO

The letter of Mr. Tulley to the local division of the Amalgamated Association follows:

The following recital covers the proposed adjustments and procedure which it is understood are to be now submitted by your committee to the employees of this company for their consideration:

1. The question of employees becoming members of Division 623 shall not be made a part of the agreement, and there shall be no discrimination by either the company or Division 623 against any employees for joining or not joining the union.

2. The provisions of the present contract covering hours shall continue as at present until changed by mutual agreement.

3. In accordance with our understanding, the wages of all trainmen are advanced as of May 1, 1920, from the maximum of 48 cents an hour to the new rate of 60 cents an hour, with wages of all other employees adjusted accordingly. This increase in wages for the first week in May amounts to \$20,122 over the payroll of the week immediately preceding. The increase in gross earnings derived from the 7-cent fare for the first week in May was \$14,201. This shows that all of the increased earnings gained from the increased fare during this period are now being paid to the men by the company under the new 60-cent scale.

The company's present earnings will not permit it to pay a higher scale than that based on 60 cents an hour for trainmen until some means be found to increase the earnings, from which increased wages must be paid. The present contract calls for

arbitration, but arbitration of wages under present conditions can only be effective if the deciding vote be cast by a representative of the Public Service Commission, which today alone has the power to grant the increased fares necessary to make the payment of an increased wage award possible.

It is, therefore, now understood that the question of adequate wages shall be submitted to a board of arbitration, as provided under the contract, and that the chairman of the Public Service Commission, Second District, State of New York, shall be requested to serve as the third arbitrator, or that he select a member of, or some one associated with, the Public Service Commission as his representative to serve as such arbitrator.

The Public Service Commission alone has the authority to say what service the company shall render and what fare may be charged, and further, it is only just to the company that the deciding vote shall rest with one who, having the power to determine what increased expenditures shall be made by the company, also has the authority to secure for it sufficient revenue to meet such expenditures.

The Public Service Commission represents the interested public who must pay the bill and should, therefore, have a voice in determining the rate of wages to be paid.

Court Decision Ends Dubuque Strike

United States Judge Voids City's Jurisdiction Over Rates and Orders Higher Fares Permitting Wage Increase

Dubuque's railway strike has been settled. Service was restored by the Dubuque (Iowa) Electric Company on May 1. The new fare is 8 cents, with seven tickets for 50 cents. The demand of the company for permission to run one-man cars was dismissed without prejudice. The company must continue the operation of cars from now until the franchise expires, unless conditions should develop which it is beyond the company to control. The right is reserved to the city to review the books of the company at any time in order to determine whether an 8-cent fare is justified. Thus means were provided for making wage concessions to the men, and an agreement on this matter was the subject of later negotiations.

THE settlement agreement was reached at a conference of counsel for the company and the city with the City Commission, after urgent appeal from Judge Henry T. Reed in the federal district court. Judge Reed played no favorites. He said that from the information he had received it seemed that the railway had taken the matter into its own hands and was trying to hold the city by the throat until it had secured its demands. The company suspended operations without an attempt to fulfill its obligations to the city, and had refused, up to the time at which the court spoke, to concede to propositions that did not fully comply with its own ideas of an adjustment.

The strike was declared March 1. Judge Reed has declared void the authority of the city to prescribe or con-

Under the caption "Big Open Shop Victory," the Buffalo *Commercial*, one of the afternoon newspapers, in an editorial, said:

There will be no street car strike. The officers of the International and the employees acting through their union have come to an agreement. The men will get the increase that President Tulley offered them several weeks ago and more later on if an arbitration board thinks they are entitled to it and the company can afford to pay it.

But of far greater importance to the public was the yielding of the men to the principle of the open shop. The demand for a closed-shop provision in the contract of employment is withdrawn, and there will be no discrimination shown by either company or union against employees for joining or not joining the union.

An American principle has triumphed. It is the triumph that comes when right battles firmly and unyieldingly against wrong. It came in this case because Mr. Mitten and Mr. Tulley stood out manfully and unflinchingly against yielding in a matter of principle. Whether this triumph does or does not mean anything so far as altering the practice of the company is concerned, it does mean a great moral victory for the friends of the open shop in Buffalo. It will encourage employers to insist upon hereafter eliminating all closed-shop provisions from future agreements, where such provisions now exist. It will hasten the day when all the employers of Buffalo shall get together and adopt the slogan of industrial freedom for themselves and their employees.

We congratulate Mr. Tulley and the other officers of the International Railway upon the firm and intelligent manner in which they have handled this affair and brought it to a successful conclusion.

We congratulate the employees of Division 623 for their good judgment in yielding a principle that was untenable and unsound. But more than all we congratulate the people of Buffalo that a principle as old as the Magna Charta and as sound as democracy itself has been vindicated. It strikes the death-knell of autocracy in the labor world and foreshadows the universal emancipation of both labor and capital from the tyranny of a sovereignty unknown to our Constitution and a standing menace to our liberties.

trol rates of fare. The details leading up to the strike were given in full in ELECTRIC RAILWAY JOURNAL for April 17, page 824.

At the time of the strike a 7-cent fare with four tickets for 25 cents was being charged and the wage was 42 cents an hour maximum. The new rates set up by Judge Reed are 8-cent cash fare, seven tickets for 50 cents, and a 4-cent cash fare for children under twelve years of age with seven tickets for 25 cents. The new wage settlement is 54 cents to 60 cents an hour after eighteen months.

In opposing the rates of fare in open court the company contended that they were not reasonable or just. In his finding Judge Reed said:

The court does not determine that question, nor does the defendant (company) waive any of its rights in that respect. In case the defendant shall at any time desire

Fare and Labor Crisis in Tri Cities

Iowa and Illinois Cities Confronted with Problem Involving Fares and Wages

a change in said rate, it shall first apply to the proper rate-fixing body, if there be such, for a change in such rates and the defendant shall not increase such rates until it has been authorized to do so either by such rate-fixing body or has been granted release against such rates by some court of competent jurisdiction by a temporary or permanent injunction or otherwise.

At the present time there is no public utilities commission in Iowa and it is presumed that this explains in part the circumstances under which the case was heard in a federal court, the details in this connection not being available at the time of this writing.

NO CONTRACT BETWEEN CITY AND COMPANY

The most important part of the decision of Judge Reed was his finding that "the provisions as to rates of fare contained in the defendant's franchise ordinances do not constitute a contract between the plaintiff (city) and the defendant; that the said provisions were and are beyond the power of the plaintiff to enact, and are void, and the plaintiff is hereby permanently enjoined from imposing such provisions against the defendant."

The order that was made by the court then goes on to say that the defendant is entitled to a reasonable and just rate for service furnished by it and that the City Council is empowered from time to time to fix reasonable and just rates for such service subject to the right of the company to have the reasonableness and justice determined by a court of competent jurisdiction. The decision further reads that the company is "ordered to furnish continuous street-car service during the remaining period of its franchises, in accordance with all the terms thereof except the provisions as to rates of fare."

A local ordinance forbids the use of safety cars on the city streets. A counter-claim against this ordinance was made a part of the suit in the district court, but this was dismissed without prejudice.

More Than 50 Per Cent Advance Asked

Motormen and conductors of the Toronto (Ont.) Railway have fixed a flat rate of 85 cents an hour as their demand for 1920. The present schedule gives 50 cents an hour for the first three months, 52½ cents an hour for the succeeding nine months, and 55 cents an hour thereafter. With the abolition of the ratings, the demand of the railway men means an increase of from 54 to 70 per cent. There is at present a short period of grace to the company over the regular day, but the employees now ask overtime after eight hours have been worked.

The present wage schedule on the Toronto Civic Railway in the city ranges from 63 cents an hour, for beginners, to 66 cents for experienced men. In connection with this schedule, the Civic Railway employees receive back pay dating to the beginning of the present year.

On the decision of a Socialist majority in the City Council of Davenport, Iowa, rests the answer as to whether this community will walk or have electric railway transportation after June 1. The Council was elected on a platform which included a 5-cent fare promise. There are five Socialist Aldermen and a Socialist Mayor, with a Republican minority of three Aldermen. All of the Socialist Aldermen are understood to be in favor of reducing the fare on the traction lines to 5 cents from the present 7-cent charge.

MAYOR C. L. BAREWALD, while elected on the Socialist platform, is understood to be in favor of granting the Tri-City Railway's request for an extension of the 7-cent fare until Sept. 1, by which time the company will have had a chance to come to a working agreement with its trainmen and shopmen. Whether the Mayor will be able to lead a majority of his Socialist Aldermen to this point of view is now the crux of the situation. The Republican minority favors the 7-cent extension.

NEW FARE EXPIRES ON MAY 1

This 7-cent fare expires automatically on June 1, according to an agreement made between the city and the company last fall, following a five-day strike and five-day tie-up of the traction lines last August. Since this 7-cent fare has been in effect the Tri-City Railway has barely been able to pay operating expenses. The lines of the company in Iowa have been in worse shape in this respect than the Illinois lines, although even in Illinois the lines have not been profitable on the 7-cent fare.

A further complication in the situation is the new wage scale demanded by the trainmen and shopmen. They have asked a 66⅔ wage increase over their present scale of 60 cents an hour and have coupled this wage demand with a plea for an eight-hour day and a closed shop. At present the men work a nine-hour shift and have a practical but not an official closed shop. They submitted a contract on May 5 calling for 96 cents an hour the first six months in company employ, 98 cents for the second six months and \$1 an hour afterward. They are at present earning 54, 57, 60 cents an hour. On the Clinton, Davenport & Muscatine interurban, operating between Clinton and Muscatine, Iowa, through Davenport, the wage demands were even higher, calling for \$1.01, \$1.03 and \$1.05 an hour. The former interurban scale was the same as the city lines, 54, 57 and 60 cents.

NEW DEMAND CONSIDERED UNREASONABLE

This scale was demanded following a conference between union heads and the international officials of the Amalgamated Association the latter part of April. Trainmen say that they did not vote to ask this scale. The city trainmen, however, are following the lead of their scale board now conducting negotiations with J. G. Huntoon, vice-president and general manager of the company.

Public sentiment regards the demand for a \$1-an-hour scale as unreasonable.

If the Council does not grant an extension of the 7-cent fare a traction tie-up is predicted. The trainmen state they will not work for less than 60 cents an hour and the company states it cannot pay that on a 5-cent fare.

There is a possibility that the Council, if it refuses to grant the 7-cent extension after June 1, will call for a special election, putting the 7-cent fare to a vote of the people. The trainmen's present agreement expires at the same time as the 7-cent fare, on June 1. A special election could not be called until June 20 at the earliest.

On the Illinois lines of the Tri-city Railway the wage situation prevails exactly as in Iowa, but the fare situation is not the same. In Illinois the 7-cent fare does not expire on June 1, but may be changed at any time on action of the Public Utility Commission. The railway officials have not made application for an increased fare of the Illinois commission, preferring to solve the Iowa situation first.

There is a compulsory arbitration clause in the trainmen's present contract, but it appears at present writing that the wage question cannot be satisfactorily solved before June 1 unless the Council of Davenport grants the petition of the traction lines for an extension of the fare. In consequence a tie-up threatens after June 1.

The petition for an extension of the 7-cent fare by the Tri-City Railway was refused by the City Council on the evening of May 20, the vote being five to three, with the Socialists in the majority. The company has not yet formulated plans for action after June 1, when the fare reverts to 5 cents.

New Working Conditions at Boston

Edward Dana, general manager of the Boston (Mass.) Elevated Railway, has announced that new agreements have been made at the conference now being held between the company and the representatives of its employees. They are:

A guarantee of eight hours' work a day for extra men when called.

Compensation for time lost in the course of doing outside work.

Seventy-cent meal tickets for men unable to eat at home and for those working three hours or more overtime.

Extra pay for work on "owl cars" and on one-man cars.

These changes in working conditions will add about \$250,000 to the payroll.

Popular Vote on Fares

Denver Apparently Faces Grave Dangers as Result of Council's Unwillingness to Meet Issue

Despite strong recommendations by the Colorado Industrial Commission the City Council of Denver, Col., on May 10, voted five to four to refer the 7-cent fare ordinance to popular vote at the next regular municipal election. This will not be held until May, 1921. No reasons were given by the Council for its action and no investigation of any nature whatsoever of the company's financial condition was conducted by or for it to determine whether the higher rate of fare is necessary.

BUSINESS INTERESTS IGNORED

The Council's action was also taken despite the indorsement of the measure by the business interests of the city as represented by the Denver Civic & Commercial Association. A meeting was held by the public utilities committee of the Council for the purpose of securing expressions from the citizens regarding the measure, but neither at this meeting nor at the regular meetings of the Council was a single protest made other than those which were voiced by some of the Councilmen themselves.

The ordinance was initiated by the Denver Tramway as an immediate means of relief to provide the additional revenues necessary in order to permit it to continue to pay the wage increases of 10 cents an hour granted to employees by a local board of arbitration on March 18.

Prior to the circulation of the petitions for the measure and anticipating that political or other reasons entirely apart from the merits of the case might determine the action of the Council, the railway served notice on the local branch of the Amalgamated Association that effective on June 1 the contract between them would be canceled and the wage scale of 58 cents an hour maximum for trainmen fixed by the board of arbitration would be reduced to the 48-cent-an-hour maximum scale established by the National War Labor Board.

The Colorado laws require that thirty days' notice be given the State Industrial Commission of any contemplated reduction in wage scales or of cessation of service and in compliance therewith similar notices were served on that body.

INDUSTRIAL COMMISSION RECOMMENDED LEGISLATION

The Industrial Commission conducted hearings and made a comprehensive study and investigation of the company's finances and its findings substantiated those of the numerous previous investigators and the claims of the company that the revenues from the present 6-cent fare are barely sufficient to pay the wage scales previously effective. These were established by the National War Labor

Board. The commission, therefore, recommended to the City Council that it pass the 7-cent fare measure.

The Industrial Commission did not establish the new wage scales which are to prevail on and after June 1, 1920, by reason of the refusal of the City Council to pass the 7-cent-fare ordinance, but by its findings and recommendations has in effect authorized and approved the action of the company.

The company has now exhausted all legal means in its power and as the rate regulating authority has ruled that the present 6-cent fare shall continue in effect for another year, the only recourse which it has left is to establish wage scales which the revenues derived from that rate of fare will permit it to pay.

The local representatives of the Amalgamated Association have stated that they will not work for a lower wage than that granted by the board of arbitration. The stage is, therefore, apparently set for a strike of the employees and a temporary demoralization of service on June 1.

Public Invited to Arbitration Hearings

The question of wages to be paid trainmen in the employ of the railway lines of the Northern Ohio Traction & Light Company, Akron, Ohio, has been submitted to arbitration and the hearings will be held daily until all the evidence is submitted.

Charles Currie, arbitrator for the company, and E. E. Zeisger, representing the employees, have extended an invitation to the city and public generally to take part in the proceedings, both holding the arbitration to be a matter of great public interest.

The only difference to be adjusted by the board is that of wages. The employees ask 80 cents an hour, ten hours' pay for eight hours' work. The company contends it has not the money, and its income will not permit of the payment of an additional wage.

A. C. Blinn, vice-president and general manager, has issued the following statement relative to the position of the company:

I feel that the men are entitled to receive more pay. Wages in every line of work in this vicinity have advanced and it is only fair that the men who operate cars should receive higher pay. The situation, however, is such that the present cost of the service is not being met by the income from fares and the street railway has no other source of income.

On May 15 Governor Cox named S. D. Hutchins, Columbus, as the third arbitrator in the wage dispute between the Northern Ohio Traction & Light Company and its platform men. Mr. Hutchins is resident representative at Columbus for the Westinghouse Traction Brake Company. Mr. Currie, the arbitrator for the company, is very well known in traction circles in the Central West. He is president of the London (Ont.) Street Railway. Messrs. Currie and Zeisger failed to agree upon a third member.

Disagreement at Toledo

Final Terms of Railway Settlement Measure Still a Matter of Contention

Members of the cost-of-service commission at Toledo, Ohio, and Henry L. Doherty failed to agree on the final terms of the ordinance being drafted for a permanent settlement of the railway problem at Toledo. The sessions of the week ended May 15 were consumed largely in trying to reach an agreement on valuation of the railway property.

MR. DOHERTY WANTS \$9,000,000

Early in the week Mr. Doherty submitted as his last and lowest figure \$9,000,000. He had offered the road for \$11,000,000 on time payment basis previously. The suit now pending in the federal court seeks to determine a valuation of \$15,000,000 for the same property.

In the meantime the city representatives are holding out for the original valuation of \$7,110,000 placed upon the lines by their valuating committee. It was hinted that they might be favorable to raising this figure to \$8,000,000 to secure an agreement before the measure was placed before the voters for their approval.

The measure will not be submitted to Council this week, but may be ready in time for the meeting a week hence. It will first be submitted to Federal Judge John M. Killits and then handed over to the City Council. Both may have something to do with making compromising changes, but Judge Killits has said it is the intention to pass it along unchanged.

When the commission and Mr. Doherty could not agree on three points he said he wanted to withdraw his offer on valuation. In addition to the valuation these questions could not be satisfactorily worked out:

The right of the city to insist upon electric power at a rate that could be given by a modern plant and as supplied at other cities.

That stocks should be sold at a discount upon the par value, if necessary to provide money for improvements and betterments.

Law Director Martin also wants a provision so that the city may have control of the board of trustees to provide against the issuance of securities beyond the capital value of the company organized to carry on the business on the cost-of-service plan.

Notwithstanding the break between the principals in the problem, the attorneys for the Toledo Railways & Light Company and the city are ironing out rough places in the wording of the ordinance.

COURT POSTPONES ACTION

No effort has been made to press the case of the Rail-Light and the city now pending in court. Judge Killits has felt no disposition to place the case on the calendar at an early date and so far the city has hired no special counsel with the \$20,000 war fund appropriated by the Council.

As a part of the railway settlement of April, 1916, Judge Killits created the Craig fund, an account to which 6 per cent of the weekly earnings of the company should be paid and the money administered by an appointee of the court for betterments of service. This money was a portion of a fare increase not needed immediately to take care of salary increases.

COURT APPROVES EXPENDITURES

Sixty Peter Witt cars were purchased with proceeds of the fund. However, since that time the changes in labor conditions and expenses of the Toledo Railways & Light Company have been mounting till other fare increases have been made.

The company has been allowed by the court to spend \$100,000 for track improvements. This was subsequently increased by \$21,014 to take care of a deficit. The court also ordered the custodian of the fund to pay \$75,347 for 300 fare boxes which were installed last September. Since the beginning of the operation of the fund there has been paid into the fund a total of \$652,057 and for improvements there has been paid out \$442,582.

RAILWAY EARNINGS INCREASE

The amounts paid to the fund indicate that the earnings of the company on railway business have been increasing slightly over a period of ten months.

Movies in a Railway Campaign

Motion pictures were used by the advocates of municipal ownership in the recent campaign of Mayor Couzens to establish city-owned lines in competition with the Detroit United Railway. The picture was largely animated drawings. Tiny cartoon street cars flitted across the screen to show the round-about way which, it is claimed, workers living in some sections of the town now have to travel. The pictures emphasized the waste of time and pointed out the number of transfers many workers have to make in order to reach their destinations. Pictures were also shown of cars loaded to overflowing. An idea was then given of the type of transportation which the advocates of municipal ownership hoped to obtain by their program.

What effect the pictures had in winning votes to the municipal ownership proposal will probably always remain problematic, but there is no doubt left as to the interest which the pictures aroused. It is said that as a result of the showing of the pictures a railway company elsewhere is planning to have a film prepared in its campaign for increased revenue. This company is not receiving a fare large enough to maintain the present service, let alone build the new lines which the city wants and needs. The company plans to show the citizens by means of the "movies" what an increase in fare would enable it to give in the way of electric railway service in the future.

Wages Doubled in Three Years

Franklin T. Griffith, president of the Portland Railway, Light & Power Company, Portland, Ore., has signed a new wage agreement with the Portland officials of the Amalgamated Association dating from May 1, 1920, for one year. It is in effect an extension of the present wage scale of the company. There is no change in the schedule for platform men since Oct. 1, 1919, the maximum wage being 62 cents an hour, with an average wage of 61½ cents. The only change will be in the schedule of a limited number of men employed in work in the shops. The wages of these men were not fixed by the War Labor Board on a basis comparable with those of the platform men. These men will accordingly receive slight increases, amounting in the aggregate to about \$11,000 annually. The wage for platform men has been increased from a maximum of 29 cents in 1917 to the present wage of 62 cents an hour.

Philadelphia Wages Readjusted

In conformity with the wage increase of the Cleveland (Ohio) Railway, effective on May 1, 1920, the general committee, under the co-operative plan, has recommended to the management of the Philadelphia (Pa.) Rapid Transit Company that an increase in the existing scale of wages of the trainmen of the Philadelphia Rapid Transit Company be established, effective as of May 1, 1920, on the following basis of pay in cents per hour:

Surface motormen and conductors	.....58½, 62 and 65
Elevated motormen	.....61½, 65 and 68
Elevated conductors	.....58½, 62 and 65
Elevated guards	.....58½, 61 and 63

The wages of other employees will be adjusted according to the provisions of the co-operative plan as soon as the necessary facts and figures are obtainable, to be effective as of May 1, 1920.

The co-operative plan for collective bargaining of the Philadelphia Rapid Transit Company provides as a basis for determining wages the average of the wage scales of the employees of the street railway companies of Buffalo, Cleveland, Detroit and Chicago.

Third New York Arbitrator Chosen

Judge A. E. Sutherland, Rochester, N. Y., was picked on May 18 by B. E. Tilton, general manager of the New York State Railways, Syracuse, N. Y., as the arbitrator representing the company. Judge Sutherland was selected out of a list of seventeen eligible men, one of whom was to be chosen as the neutral arbitrator in the wage and hour dispute arbitration proceedings to be held to settle the differences between the organized employees of the New York State Railways in Utica, Rochester and Syracuse and the company. The list of names was compiled by James H. Vahey, counsel for the Amalgamated Association and arbi-

trator for the union. The ease with which agreement was reached over the selection of the third arbitrator has been the subject of much favorable comment.

Detroit Wage Conference Unproductive

Employees of the Detroit (Mich.) United Railways and company officials conferred on May 18, but the results were not made public. The men are asking an increase of wages, which the company claims it will be unable to pay unless an increase of fare is granted by the city. A hearing before the City Council has been requested by the railway officials.

A letter from General Manager Burdick to the City Council states that the company has had presented for consideration demands in behalf of the city motormen and conductors for an increase in wages and for a change in working conditions which aggregate many millions of dollars more than the revenue will support that is now derived from operation at the present rate of fare.

It is expected that a 6-cent fare will be asked to meet the wage increase demanded. The Kronk ordinance is still on the books, although the Corporation Counsel argued in the Circuit Court hearing on the company's motion for the dismissal of the city's ouster suit that the Kronk ordinance was invalid. It fixed the rate of fare at 5 cents on non-franchise lines.

The rate of fare on the franchise lines is 5 cents except the Pingree lines. It is believed, however, that the city could agree to a fare increase, inasmuch as an understanding now obtains in regard to the Pingree lines where a straight 5-cent fare is charged although the franchises specify eight tickets for 25 cents during certain hours of the day.

Increase of Four Cents an Hour

An increase in wages has been granted to the employees of the British Columbia Electric Railway, Vancouver, B. C., as from April 1, 1920. The new scale is as follows:

First six months	.....49 cents an hour
Second six months	.....54 cents an hour
Third six months	.....57 cents an hour
Thereafter	.....60 cents an hour

This is an increase of 4 cents an hour to all classes.

The interurban line passenger motormen and conductors will be paid as follows:

First six months	.....49 cents an hour
Second six months	.....55 cents an hour
Third six months	.....59 cents an hour
Thereafter	.....62 cents an hour

Pro rata increases have been made in all other lines represented under the Amalgamated Association. The new wage scale was the result of negotiations between the company and the men in which the company's offer was accepted. The existing agreement was not opened, but a supplementary agreement entered into.

News Notes

Butte Lines Suspended.—Service on the Butte (Mont.) Electric Railway was suspended on May 9 on account of the strike of the members of the workmen's union for an increase in wages of \$1 a day. Jitneys have been resorted to in the emergency.

Strikers Will Not Be Restored.—Gaylord Thompson, general manager of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., has announced that the employees who went on strike will not be restored to their old positions under any circumstances. The company has not attempted to operate cars at night.

Rapid Transit Commission Will Retire.—Because of the defeat of the \$15,000,000 bond issue in a referendum vote at Cleveland, Ohio, recently, the Rapid Transit Commission appointed by Mayor Harry L. Davis will automatically retire. Mayor W. S. Fitzgerald, successor to Mayor Davis, has made no announcement of his intentions with respect to the rapid transit and subway matter. It may be taken up later, but the decisive vote against the bond issue would indicate the uselessness of endeavoring to get this important and needed improvement through until general conditions are better.

Pension System Announced.—A non-contributory pension system for all employees of the Boston (Mass.) Elevated Railway, effective as of Feb. 1 of this year, was announced on May 10 by John H. Moran, chief auditor, in his testimony before a special board of arbitration which is investigating demands of the employees for increased wages. The pension will be computed on the basis of 1 per cent of an employee's average yearly earnings for ten years prior to his retirement, multiplied by the number of years he was continuously employed. No pension will be less than \$300 nor more than \$2,000 a year.

Toronto Car Case Concluded.—Argument by counsel upon the application of the city of Toronto to the Ontario Railway & Municipal Board for an order to compel the Toronto Railway to produce 200 new cars and put them into commission, or pay a fine of \$100 a day for every day the company is in default, was concluded on April 26, after several adjournments. Judgment was reserved. The chief contention of counsel for the company, in opposing the application, was that the company should not be compelled to get 200 new cars, as the city could refuse to take them over next year, when the company's franchise expires.

Plans for No-Accident Week.—The committee in New York and Pennsyl-

vania in charge of "No-Accident Week" campaign is completing its program to make the seven days from June 6 to 12 as free from accidents as its efforts can bring this about. Several local committees have been organized, and a series of posters has been prepared. The principal poster is 14 in. x 17 in. It is a symbolic one representing carefulness guarding against accidents. It is reproduced in the four-color process. Smaller relay posters or dodgers have also been compiled. G. R. Rinke, Utilities Mutual Insurance Company, New York, is secretary of the committee.

Wages Increased on Shore Line.—The Connecticut Company, New Haven, Conn., has posted notices of an increase in wages of the trainmen on the Shore Line Electric Railway, Norwich, Conn., operation of which has reverted to the Connecticut Company. The increase became effective on May 1. The men were getting 42½ cents. For the first year of employment men will receive 44 cents an hour, 45 cents for the second year, 46 cents for the third year, 47 cents for the fourth year and 48 cents for the fifth year. After the fifth year the wage per hour will be 50 cents. This wage increase is only slightly lower than the wages asked by the men of the Shore Line road when they struck on July 16, 1919.

Power Shortage Threatened.—Large users of power in California have been warned that the deficient rainfall this year and the large increase in the use of electricity may result in a serious power shortage during the summer. State Power Administrator H. G. Butler has sent letters to all gold dredgers and cement mills operating in northern California, interurban electric railways both north and south and the street railways in the northern cities urging power conservation. He says that it is probable that some restrictions will be necessary later in the year. As a means of conserving power, he suggested that after May 15 the interurban roads arrange as far as they could to run their freight trains and do their switching during the night hours.

Boston Wage Hearings Concluded.—Final evidence was submitted on May 12 by both the company and the employees in the Boston (Mass.) Elevated Railway wage arbitration. The arbiters considered the statement of Mayor Peters protesting against the increase being allowed to the men "until they showed themselves worth more" in enabling the road to increase its earning power. Edward Dana, general manager of the company, agreed with the Mayor in his contention that a number of employees were not giving the company full labor for the compensation received. He added, however, that as a whole, the employees were an efficient body comparable with any other body of electric railway men in the country. The hearing was adjourned until May 20, when the final argument was presented by counsel for both sides.

Ten Per Cent Wage Advance Offered.—The demand of the brotherhood of employees of the Interborough Rapid Transit Company, New York, N. Y., for an increase in wages of 25 per cent over the 25 per cent increase granted Aug. 1 last was met by the company on May 19 with an offer of an increase of approximately 10 per cent. This offer was made after a four-hour conference in the offices of the railway between the executive committee of the brotherhood and Frank Hedley, James L. Quackenbush and J. A. Doyle, president, general counsel and superintendent of car equipment, respectively. It was arranged for the committee to submit the offer to the general committee of the brotherhood as soon as this body could be called together and report back to the company. If the offered increase is accepted it will go into effect on June 6.

Programs of Meetings

California Electric Railway Association

The annual meeting of the California Electric Railway Association has been set to be held at the Palace Hotel, San Francisco, Cal., on May 25. A number of very important matters now confronting the industry in California will be discussed. The association has also arranged with the Railroad Commission for an informal hearing on that date to submit its views and suggestions for relief. The present status of the passenger automobile and motor truck competition with electric lines will also be taken up.

Missouri Association of Public Utilities

The entertainment committee of the Missouri Association of Public Utilities, with the approval of the executive committee, has arranged to hold the 1920 convention at the New Madison House, Jefferson City, Mo., on June 3, 4 and 5. An opportunity will thus be presented to inspect the new Capitol building. An interesting and instructive formal program has been arranged for discussion. The entertainment features have also been arranged with a view to affording a wide variety of choice. Handsome prizes will be awarded in the contests in which ladies will engage.

New York Electric Railway Association

The thirty-eighth annual meeting of the New York Electric Railway Association will be held at the Hotel Champlain, Buff Point, Lake Champlain, N. Y., on Saturday, June 26. The meeting will be called promptly at 9 o'clock. The program of subjects to be discussed and the list of speakers at the dinner will be available later. Requests for hotel accommodation should be made as early as possible to Joseph P. Greaves, 243 Fifth Avenue, New York. William F. Stanton, Rochester, N. Y., secretary of the association, desires to be advised at the earliest possible moment the names of representatives who will attend.

Financial and Corporate

Chicago Surface Lines' Net Increased

Under Unified Operation with Increases in Fares the Chicago Surface Lines Show Prosperous Year

The Chicago Surface Lines' operating statement for the twelve months ended Jan. 31, 1920, showed an increase in gross earnings under unified operation that kept pace very closely with the increase in operating expenses, with the result that the gross income for division between the companies participating was 19.17 per cent greater than at the end of the previous year. Up to Aug. 1, 1919, gross receipts increased approximately 13 per cent, due largely to the return of the soldiers. The increase of 27 per cent in passenger revenues, however, is due chiefly to the fact that since August, 1919, an increased rate of fare has been in effect.

responsible for the great proportion of the increases in the operating costs.

In April, 1919, the Illinois Public Utilities Commission denied the No-

an appeal to the Appellate Court resulted in an order upon the Commission to receive further information bearing on the case and in August, 1919, immediately after the strike settlement, which materially increased the wages of the employees, the companies again petitioned for an increase in fare to pay the granted increases in wages. After hearings the Public Utilities Commission on Aug. 8 fixed the rate of fare temporarily at 7 cents. By supplemental order, effective Dec. 1, 1919, two ticket rates were established, namely, fifty for \$3 and ten for 65 cents. A second supplemental order, effective on Dec. 27, 1919, abolished these ticket rates and reduced the unit cash fare from 7 to 6 cents. This latter rate of fare is still in effect as an emergency rate.

On the Chicago Railways, as is shown by its income statement, the net income amounted to \$182,461, as against a deficit of \$374,017 a year ago. As there were no earnings the previous year available for the annual \$250,000 sinking fund on series "C" consolidated mortgage bonds, that accrual became a cumulative charge against future earnings, in accordance with the terms of the consolidated mortgage. The \$182,461 net income, therefore, was necessarily applied to this deferred sinking fund payment and is the reason why the Chicago Railways failed to pay a dividend on its outstanding capital stock.

The Chicago City Railway paid four quarterly dividends of 1.25 per cent each, or 5 per cent on its outstanding capital stock, during the year. The accompanying tables show the income statement, first under unified operations and then for each of the separate companies, together with the percentage change in each instance. Detailed statistical information is also given for the unified operations.

The city of Chicago under the 1907 traction ordinance should receive \$1,448,848 as its share of the railway

EARNINGS, EXPENSES AND DISTRIBUTION OF RESIDUE RECEIPTS—CHICAGO SURFACE LINES.

Year ended Jan. 31:	1920	1919	Per cent Change +Inc.—Dec.
Revenues:			
Passenger cars (a).....	\$43,417,640	\$34,186,578	+27.00
Chartered cars.....	7,102	4,387	+61.80
Funeral cars.....	816	2,459	-66.80
Total passenger revenue.....	\$43,425,558	\$34,193,424	+27.00
Newspaper cars.....	10,127	9,318	+8.68
Freight earnings.....	1,985	1,925	+3.11
Hospital car service.....	2,175	1,582	+37.50
Advertising in cars and stations.....	235,965	231,742	+1.82
Rents of buildings, etc.....	73,332	74,412	-1.45
Rent of equipment.....	14,647	18,871	-18.28
Sale of power.....	94,302	87,340	+7.98
Interests on deposits.....	99,921	88,962	+12.32
Miscellaneous.....	5,426	3,315	+63.70
Gross earnings.....	\$43,963,438	\$34,710,098	+26.64
Expenses:			
Maintenance way and structures.....	1,991,810	1,135,568	+75.40
Maintenance equipment.....	3,057,446	2,400,827	+27.30
Power maintenance.....	298,750	273,870	+9.10
Renewals.....	3,009,196	2,776,808	+8.35
Power operation (b).....	2,990,479	2,841,212	+5.26
Conducting transportation.....	16,633,324	12,477,148	+33.28
General and miscellaneous (c).....	3,199,010	2,366,504	+35.20
Total operating expenses.....	\$31,180,015	\$24,271,937	+28.42
Net operating revenue.....	12,783,423	10,438,161	+22.45
Taxes.....	2,074,000	1,460,000	+42.10
Residue receipts.....	\$10,709,423	\$ 8,978,161	+19.30
Chicago Railway Co.—60%.....	\$ 6,425,654	\$ 5,386,897	+19.30
Chicago City Railway Co.—40%.....	4,283,769	3,591,264	+19.30

(a) Includes revenue from transportation of mail carriers.

(b) This low power figure is due to a long term contract made in 1912 for the purchase of energy.

(c) Includes expenses of Board of Supervising Engineers.

operation that kept pace very closely with the increase in operating expenses, with the result that the gross income for division between the companies participating was 19.17 per cent greater than at the end of the previous year. Up to Aug. 1, 1919, gross receipts increased approximately 13 per cent, due largely to the return of the soldiers. The increase of 27 per cent in passenger revenues, however, is due chiefly to the fact that since August, 1919, an increased rate of fare has been in effect.

The gross earnings amounted to \$43,963,438, of which 99 per cent was from passenger revenue. Operating expenses and taxes amounted to \$33,254,015, equivalent to 75.64 per cent of the gross revenue, while the gross income, before division of the city, was 24.4 per cent of the total revenue earned.

During the year the passenger car revenue increased \$9,251,062, due to the several fare changes. This was made necessary by the increase in wages and decrease in basic workday demanded by the employees. The wage increases from 48 to 65 cents per hour are re-

vention, 1918, petition of the railways for an increase in fare. Later it denied a petition for a rehearing. However,

STATISTICAL INFORMATION—CHICAGO SURFACE LINES.

Year ended Jan. 31:	1920	1919	Per cent Change, +Inc.—Dec.
Total mileage all tracks.....	1059.48	1059.29	
Revenue car-miles.....	115,012,243	113,223,258	+15.76
Revenue car-hours.....	12,924,273	12,854,669	+0.54
Total car-hours (a).....	19,922,185	.....
Ratio CM/CH (speed m.p.h.).....	8.90	8.81	+10.21
Passenger traffic:			
Revenue passengers.....	743,742,491	685,300,718	+8.52
Transfer passengers.....	528,760,761	491,659,702	+7.55
Other free passengers.....	29,772,504	27,401,922	+8.65
Total passengers.....	1,302,275,756	1,204,362,342	+8.12
Gross passenger revenue.....	\$43,425,558	\$34,193,424	+27.00
Average fare per revenue passenger (cents).....	5.83	4.99	+16.84
Average fare per total passenger (cents).....	3.34	2.84	+17.60
Car-mile statistics:			
Operating revenue (cents) (b).....	38.00	30.42	+24.85
Operating expenses (cents).....	27.08	21.42	+26.45
Residue receipts (cents).....	9.32	7.92	+14.39
Passenger traffic (total).....	11.31	10.62	+6.49
Car-miles per revenue passenger.....	0.0884	0.0941	-6.06
Car-hour statistics:			
Operating revenue (a).....	\$3.38	\$2.68	+25.10
Operating expenses.....	\$2.41	\$1.89	+27.50
Residue receipts.....	\$0.83	\$0.70	+18.58
Passenger traffic (total).....	100.70	93.70	+7.47
Taxes—Per cent of gross revenue.....	4.72	4.22	+0.50
Taxes—Per cent of net revenue.....	16.20	13.99	+2.21
Depreciation—Per cent of operating revenue (b).....	6.86	8.28	-1.42

(a) Includes dead time, etc.

(b) Based on following: \$43,769,214 for 1920, and \$34,533,796 for 1919.

company's net earnings. Last year the city received only \$381,216. It is understood, however, that the city will refuse to accept its division, claiming that the increases in the unit rate of fare abrogated the ordinance providing for this distribution of net income.

President Busby of the Chicago City Railway, in addressing the stockholders, referred to the recent court decisions settling certain fundamental principles to be followed by the Public Service

in its letter to Commissioner Nixon, however, said that it would be willing to lease that portion of its road within New York City to the city for municipal operation, and such portion as lies in Nassau County to the various communities there served, for local operation. Commissioner Nixon stated that he had a suggestion as to a plan under which the lines within New York might be taken over by the city, which was originally prepared to meet the Staten

Illinois Financial Inquiry Continued

On May 3 the so-called down-state public utilities were heard at Springfield, Ill., by the Public Utilities Commission, the inquiry into their financial needs being along the same lines as that held in Chicago on April 29 and reported at length on pages 939-941 of this paper for May 8. The down-state utilities estimated their immediate needs as between \$50,000,000 and \$80,000,000. The hearing at Springfield differed from the Chicago hearing, however, in that the public utilities men in making their statements told what they thought was necessary as to rate of return.

W. H. Sawyer, president of the East St. Louis & Suburban Railway, declared that the utilities must have a return of 12 per cent on the value of their properties and also a 4 per cent reserve in addition. Another witness put the rate of return at 10 per cent. Other witnesses said that industrial corporations are now able to outbid the public utilities corporations for money. All the witnesses took a rap at the political demagogues as being largely responsible for the present difficulties.

Among those who appeared at Springfield, in addition to Mr. Sawyer, were B. J. Denman, president of the Tri-City Railway & Light Company, Davenport, Iowa, which operates several properties in Illinois; Edgar S. Bloom, Central Union Telephone Company; Marshall E. Sampson, president

INCOME AND PROFIT AND LOSS STATEMENT OF CHICAGO CITY RAILWAY.

Year ended Jan. 31:	1920	1919	Per cent Change +Inc.—Dec.
Division of income of C. S. L. (40%)	\$4,283,770	\$3,591,264	+ 19.30
Expenses, including interest on capital investment	3,477,245	3,580,614	—2.89
Net earnings of south side lines	806,525	10,650	+7470.00
City's 55 per cent as per Jan., 1907, ordinance	443,589	3,858	+7470.00
South side lines 45 per cent as per ordinance	362,936	4,793	+7470.00
Deduct Southern St. Ry. proportion as per ordinance	19,962	.....	+ 100.00
Balance—Chicago city proportion	342,975	4,793	+7070.00
Add—Interest on capital investment	2,705,676	2,668,657	+ 1.38
Other income—net	36,170	*72,047	+ 150.5
Total income	\$3,084,821	\$2,601,403	+ 18.58
Deduct interest on bonds and notes outstanding	1,780,884	1,755,217	+ 1.46
Net income	1,303,937	846,186	+ 54.10
Add—Surplus from previous year	50,640	104,614	+ 51.60
Surplus	1,354,577	950,800	+ 42.20
Dividends (5%)	900,000	900,000	.....
Miscellaneous	46	160	— 71.30
Total deductions	\$ 900,046	\$ 900,160	— 0.12
Surplus at end of year	\$ 454,531	\$ 50,640	+ 797.00
Net return earned on capital (per cent)	7.24	4.70	+ 54.10

* Deficit.

Commission in making valuations of utility properties. He expressed the hope that these decisions would eventually result in a valuation and findings which will fully protect the purchase price of the company's property as fixed by ordinance and which will provide for a rate of return on such valuation that will restore the credit of the company and enable it to procure the new capital necessary to provide for extensions and betterments.

Foreclosure Proceedings Begun

A petition of foreclosure of \$3,000,000 in bonds, containing an application for the appointment of a receiver, has been filed in the Federal Court against the New York & North Shore Traction Company by the Citizens' Savings & Trust Company, Cleveland, Ohio. The court has reserved action on the request for a receiver.

The New York & North Shore Traction Company operates between the village of Mineola, L. I., and the hamlet of Port Washington, L. I. High cost of maintenance of the road is said to have brought the company into court. The action is based on the \$3,000,000 in bonds held by the Cleveland company. The bonds were issued May 15, 1914, for fifty years. Interest amounting to \$38,500, due April and Oct. 1 of last year, was not paid, the action charges.

Public Service Commissioner Lewis Nixon, of the First District, has sent a letter to Mayor Hylan, enclosing a copy of a letter from the New York & North Shore Traction Company announcing that the road is practically ready to cease operation and go through foreclosure proceedings. The company,

Island Midland situation in Staten Island. He assured the Mayor of the support of the commission to aid in any way in securing adequate transportation to the people.

INCOME AND PROFIT AND LOSS STATEMENT OF CHICAGO RAILWAYS

	1920	1919	Per cent Change +Inc.—Dec.
Division of income of C. S. L. (60%)	\$6,425,654	\$5,386,897	+ 19.1
Deduct: Expenses, including interest at 5% valuation	4,597,910	4,700,792	— 2.2
Net earnings of Chicago Railways	\$1,827,744	\$ 686,105	+166.2
City's 55 per cent—per 1907 ordinance	1,005,259	377,358	+166.5
Chicago Railway Company's 45 per cent	822,485	308,747	+166.0
Add—Interest allowance on valuation (5 per cent)	4,541,539	4,501,961	+ 0.9
Interest on bank balances	46,980	31,146	+ 51.0
Interest on treasury securities	72,100	78,778	— 8.5
Total income	\$5,483,104	\$4,920,632	+ 11.4
Deduct—Interest on			
First mortgage bonds	\$2,784,700	\$2,784,050	+ 0.02
Consolidated mortgage bonds	1,756,538	1,772,947	— 0.9
Purchase money bonds	203,650	203,650	.....
Interest on loans	115,839	19,475	+495.0
Sinking fund reserve accrued	250,000	450,000	.....
Federal income tax on interest coupons	42,000	42,000	.....
Corporate expenses and adjustments	147,916	222,528	— 32.2
Total deductions	\$5,300,643	\$5,294,649	+ 0.1
Net income	182,461	* 374,017	+148.9
Surplus from previous year	37,126	511,143	— 92.8
Total surplus at end of year	\$ 219,587	\$ 137,126	+ 60.2
Less proportion of percentages allowed on additions to property for the year ended Jan. 31, 1914, appropriated to income that year, now returned out of surplus to reduce cost of property	175,000	.....	.....
Interest on income bonds	.....	100,000	.....
Surplus at end of year	(a) \$ 44,587	\$ 37,126	+ 20.2

(a) The surplus stated is before making provision for interest on the adjustment income bonds for the two years ended Jan. 31, 1920.

* Deficit or Loss.

\$6,000,000 Note Issue

The American Light & Traction Company New York, N. Y., has sold to Halsey, Stuart & Company an issue of \$6,000,000 of five-year 6 per cent gold notes, convertible into the company's common or preferred stock.

of the Central Illinois Public Service Company, and O. F. Barry, representing independent telephone companies which are said to serve 800 communities in Illinois.

The hearings in Chicago have been reviewed previously in this paper.

Engineering Investigation Begun

Ford, Bacon & Davis, New York, N. Y., are to investigate the Syracuse unit of the New York State Railways preparatory to the adoption of a service-at-cost agreement. Their engineers and accountants are already at work in Syracuse.

City Engineer Henry C. Allen, who has officially approved the contract between the city and firm of investigators, said:

The investigation will cover every angle of the street railway problem and every fact in connection with the finances, property, rolling stock and necessary improvements of the New York State Railways.

Increase in Net Income in Philadelphia

The Philadelphia (Pa.) Rapid Transit Company reports earnings as follows:

April	1920	1919
Operating revenue.....	\$3,174,883	\$2,909,234
Operation and taxes.....	2,172,118	1,936,218
Operating income.....	1,002,765	973,015
Non-operating income.....	36,571	46,562
Gross income.....	1,039,336	1,019,578
Fixed charges.....	819,036	820,090
Net income.....	\$220,300	\$199,487
Four Months Ended April 30		
Operating revenue.....	\$12,096,560	\$11,126,351
Operation and taxes.....	8,671,745	7,818,630
Operating income.....	3,424,815	3,307,720
Non-operating income.....	160,568	188,685
Gross income.....	3,585,384	3,496,406
Fixed charges.....	3,265,703	3,238,155
Net income.....	\$319,580	\$258,251

Financial News Notes

Milton Contributes to Railway.—The town of Milton, Mass., has voted to contribute \$10,000 to the cost of operation of the lines of the Eastern Massachusetts Street Railway.

Second Preferred Stock Created.—The stockholders of the American Railways, Philadelphia, Pa., at a special meeting approved the proposal to create \$4,000,000 of second preferred stock and to amend the charter accordingly.

Bonds Extended and Interest Increased.—The Department of Public Utilities of Massachusetts has approved an agreement between the East Taunton Street Railway, the Boston Safe Deposit & Trust Company and the Bristol County Savings Bank, whereby the maturing date of railway bonds to the amount of \$21,000 is to be extended from March 1, 1920, to March 1, 1923. Under the agreement the interest rate is raised from 5 to 6 per cent.

Deficit for Quarter \$488,225.—The total operating revenue of \$646,886 exceeded the total operating expense of \$646,713 by only \$172 for the month of March, according to the financial state-

ment of the Rhode Island Company, Providence, R. I. The statement shows the net income for the three months of \$43,509, from which total deductions of \$531,735 are made, leaving a deficit of \$488,225 for the quarter.

4.97 Per Cent Return at Dallas.—Gross earnings of the Dallas (Tex.) Railway during April were \$246,341, while total expenditures were \$209,925, leaving net profits of \$36,416, or a return of 4.97 per cent on the agreed valuation. A total of 5,355,000 passengers was carried during the month. Of this number more than 650,000 were transfer passengers. Of the expenditures \$20,000 was for improvements, more than \$38,000 for repairs to tracks and \$18,200 for repairs to equipment.

Power Lines Divorced from Railway.—The Niagara & Erie Power Company, Buffalo, N. Y., has completed details by which it becomes sole owner of the high tension transmission power line of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., between Lackawanna and Dunkirk, from which the railway obtains its power for the operation of interurban cars. It is reported the lines were sold for \$220,000. By the terms of the deed the power company is divorced from the railway.

Another Estimate of Chicago Surface Value.—The firm of Mitchell, Castenholz & Company, employed by the city of Chicago to value the surface lines for rate-making purposes as a check against the figures established by Stone & Webster and the Public Utilities Commission, has set the total value at approximately \$115,000,000. This is \$43,500,000 less than the official traction figures based on the 1907 settlement, according to which the present value is about \$158,500,000.

Abandonment Denied.—Plans are under way for the reorganization of the Buffalo & Lake Erie Traction Company, according to reports following the sale of the transmission lines along the company's right-of-way to the Niagara & Erie Power Company. The line is now being operated by a receiver. Rumors that the company would abandon its line between Buffalo and Dunkirk are denied by company officials. It is said the line between Dunkirk, N. Y., and Erie, Pa., is the most profitable division.

Monongahela Company Conserving Cash.—G. M. Alexander, president of the Monongahela Valley Traction Company, Fairmont, W. Va., submitted his report at the annual meeting of the stockholders. The statement shows that after the payment of operating expenses, taxes and interest, sinking fund charges and depreciation reserves, as well as payment of dividends on preferred stock, net profits for the year ended Dec. 31, 1919, totaled \$414,034. This amount, equivalent to more than 5 per cent on the common stock, has been carried to the profit and loss account. The report explains that no dividends were paid on the junior issue in 1919.

One-Year Railway Notes.—Hambledon & Company, Baltimore, Md., are offering for subscription at 98½ and interest, yielding more than 8.50 per cent, \$2,000,000 of one-year 7 per cent gold notes of the Monongahela Valley Traction Company, Fairmont, W. Va. The notes are dated May 15, 1920, and the principal is due May 15, 1921. The interest is payable quarterly May 15, Aug. 15, Nov. 15 and Feb. 15 in Baltimore. The notes are in coupon form in the denomination of \$1,000 and \$5,000 each. The holder of the notes has the privilege of exchanging them at 100 and accrued interest, any time before maturity or redemption, into an equal amount of the company's general mortgage 7 per cent five-year bonds due in 1923.

Interborough Doing Better.—A comparative statement of earnings of the Interborough Rapid Transit Company, New York, N. Y., for the month of April with the same month a year ago shows the operating revenue for the month as \$4,599,227, an increase of \$584,190 over April, 1919, and that operating expenses increased \$400,055, reaching a total of \$2,737,820. The increase in net operating expenses for the month was \$184,134. Non-operating income increased \$207,100, making the total \$1,694,709, and there was also a net corporate income, exclusive of accruals under contract provisions, of \$14,963, as compared with a deficit in April, 1919, of \$130,767. Operating percentage increased from 58.22 per cent to 59.53. During the month the company carried 86,186,189 passengers as compared with 75,271,333 in April of last year. The figures also show that for the ten months ended with April 30 last the deficit of the Interborough company decreased from \$3,457,832 to \$1,979,817.

Step Toward Foreclosure Sale.—The Supreme Court of Massachusetts has issued an order of notice in the bill of equity of Howard P. Converse against the Plymouth & Sandwich Street Railway, Plymouth, Mass., that on the petition of Myron E. Barker, interviewing petitioner, the receiver of the railway be directed to sell the assets as the court shall direct. A hearing in equity session was set for May 11. The railway was projected and partly built a number of years ago and extended from the southern terminus of the Brockton & Plymouth Street Railway to Manomet. It was originally planned to go through to the center of Sandwich. Several years ago a section was constructed from Sagamore station in Bourne to Sagamore Beach and this was operated. It was planned to join the road with the New Bedford & Onset Street Railway by a track along the Cape Cod canal to meet the other road at Buzzards Bay, but the war prevented this. In spite of the advance in materials a section was constructed from Fresh Pond through to join the Sagamore section. It was operated for a few weeks and then the road went out of business.

Traffic and Transportation

Traffic Changes Urged

New Orleans Committee Recommends Rerouting of Many Lines—Company's Educational Campaign

Rerouting and straightening of car lines and strict regulation of vehicular traffic in congested areas are recommended in a report recently submitted to the Association of Commerce of New Orleans, La., by a special committee which has been investigating electric

After much discussion with auto owners and others, your committee has decided to recommend that existing ordinances be rigidly enforced, and if that cannot be done, that parking of cars for extended periods in the congested district between Poydras and Conti and Elk Place and South Peters, with the exception of Canal Street, be prohibited.

WANTS MORE ONE-WAY STREETS

The report recommends further that automobile traffic be kept on the move as much as possible. There should be an increase in the number of one-way

move to the front of the car, was described in a previous issue of the *ELECTRIC RAILWAY JOURNAL*. Recently the company has been running a series of advertisements in the local newspapers asking the public to "learn the truth" about electric railway operation. In one of these ads the company shows that delays are often unavoidable because of the blocking of the tracks by automobiles and horse-drawn vehicles.

A special feature of this educational campaign has been a window-display showing a trolley car's "innards." The company assumed that, if the public realized the complicated structure of a car, it would more readily appreciate the reasons why riders were not carried free. On the wall were hung car curtains and placed on mounds and on the floor were a number of the many parts that go to making and operating an electric car. To each part was attached a card showing the cost of that particular part in 1915 and in 1920—the advance in each instance being from 25 per cent to 100 per cent. A photograph of the exhibit appears in the adjoining column.

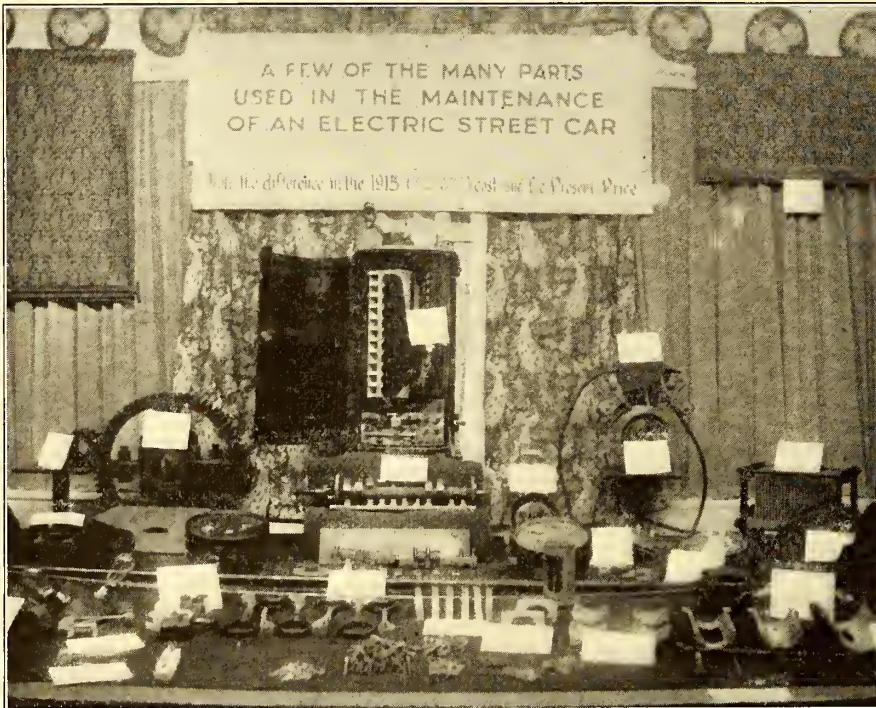
Appeals Milwaukee Interurban Case

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has appealed to the Wisconsin Supreme Court from the decision of Circuit Judge E. T. Fairchild barring its interurban cars from Milwaukee thoroughfares. The Supreme Court recently issued a stay of execution in the case, exercising its right of original jurisdiction. The interurban cars were to have stopped operating over city streets, beginning at midnight on May 5, but the court's stay of execution prevented interruption of service.

In bringing the suit, the city contended that the company's interurban business was being run illegally because of the absence of an interurban franchise. The company contended it could not afford to accept a franchise, as it would be held liable to numerous damage suits which might be brought by abutting property owners along its rights of way.

With John I. Beggs assuming control of the lines of the company, there comes the word that a compromise with respect to the entrance of interurban cars into the city will shortly be worked out. The local Association of Commerce has interested itself in this matter and has offered to secure the full sanction of the property owners along the right-of-way so that there could follow no suits against the company as a result of its entering into a franchise agreement for the interurbans with the city.

Mr. Beggs promptly signified his willingness to accept the co-operation of the Association of Commerce for securing a franchise under these conditions. Clifford Williams, city attorney, issued a statement to the effect that the matter might be settled in this way.



CAR PARTS SHOWN WITH PRICE CARDS IN NEW ORLEANS

railway service in that city. The committee was appointed by the association in March, its task being to study the local traction situation with a view to formulating plans for bettering the service furnished by the New Orleans Railway & Light Company.

LINES SHOULD BE STRAIGHTENED

The committee's report declares that:

There will never be an ideal street railway system until a radical rerouting and straightening of lines is arranged. The ancient system peculiar to New Orleans of centering all lines on Canal Street, by which that locality is simply made a parking place for trolley cars, establishes a state of constant congestion with its waste of time and expense of upkeep that affects the entire system.

The committee recommends the elimination of as many lines as possible from Canal Street. Poor equipment, it is added, except on a few lines, has undoubtedly played a prominent part in the delays from which the public suffers.

With respect to automobile regulation, the report says:

streets. The paving program of the city should be pressed. The committee also declares that the transfer system should be extended so that passengers may take any one of a number of cars to reach their destination.

Automobile drivers should be punished for running by street cars while the cars are taking on or discharging passengers, as this endangers the lives of hundreds daily. Hasty starting of street cars also is condemned. Signs telling routes of cars are suggested and use of the front door as an exit is urged. A bureau of complaints should be established. The report concludes:

The committee is impressed with the fact that the management of the railways company is striving to improve the service to the best of its ability under present conditions.

The company has been conducting a campaign of education to impress upon its patrons the need for their co-operation if the service is to be improved. The "move forward" competition, the object of which was to induce riders to

Routing Changes Thorough

Los Angeles Railway Follows Commission's Recommendations for Complete Rerouting

A comprehensive program for the rerouting of car lines in Los Angeles, Cal., was placed in effect on May 9. The traffic changes, which are the most extensive and far-reaching in the history of the Los Angeles Railway, affect practically every line in the city. By the elimination of many curves and by the providing of more direct routes, they are expected to result in a marked reduction in car headway. The saving in car mileage alone, it is estimated, will amount to 4,000,000 miles annually.

The principle followed in the rerouting of the cars has been the straightening out of circuitous lines by giving a direct run from terminal to terminal. At the same time, the ends of many runs have been trimmed. In such cases shuttle cars will be operated to the ends of lines, with through service in the morning and evening rush hours.

MANY SECTIONS BENEFITED

Many localities in the city are benefited by this rerouting of the cars, as additional service is now provided to the Southern Pacific Station and other important centers. Special attention has been given to evening travel on the downtown streets. Aiding this general scheme, two thoroughfares are provided for the exclusive use of automobile and pedestrian traffic. This has been accomplished by removing all cars from Third Street west of Main Street and from Eighth Street.

Changes of equipment to conserve power will be made as a part of the general rerouting plans and economy scheme. One-man safety cars will shortly be placed in service. The "safeties" will be used on shuttle lines reaching outlying districts and making connections with the through lines. The arrival of the cars, which were ordered several months ago, has been delayed owing to unsettled industrial conditions in the East. They were to have been introduced simultaneously with the changes in routing.

CHANGES COST \$500,000

The rerouting program has entailed expenditures on the part of the Los Angeles Railway to the extent of approximately \$500,000, principally caused by the construction work on additional curves, various track alterations and readjusting of overhead construction and power lines. Offsetting this expenditure, the State Railroad Commission estimates a saving of 13 per cent of the operating cost to be effected through the rerouting scheme. However, this estimate was based on 1918 costs, so that with the increased expenses of two years, it is yet to be determined whether the plan results in a credit of dollars and cents.

Recommendations made by the State Railroad Commission and the Los Angeles Board of Public Utilities were

largely responsible for bringing about the routing changes. The Railroad Commission, after a thorough investigation of the Los Angeles system, advised the enactment by the city of drastic anti-parking legislation and the complete reorganization by the company of its car routes.

The no-parking ordinance subsequently enacted by the City Council has been in effect for several weeks, and has already resulted in speeding up the movement of cars. The plan,

New Form of Transfer for Dallas

To do away with the abuse of the transfer privilege by car riders the Dallas (Tex.) Railway has adopted a modified form of transfer good for a limited period after its issuance. The new transfer bears a dial on which the hours and quarter-hours are indicated, and to be accepted as fare must be presented within fifteen minutes of the time punched. The company's applica-

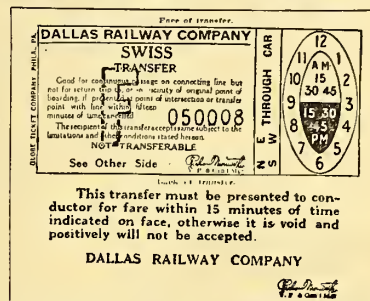
New Type of Transfer on Dallas Railway Lines

Mr. Street Car Rider:

Your street car company presents herewith facsimile reproductions of the few transfer which will be issued

This transfer plan has been adopted to give you a maximum of fifteen minutes to change cars at points of intersection, and to improve the old system commensurate with the growth of our city.

This transfer does not designate lines transferred to and will be accepted on all lines going in the same general direction at a point of intersection, but not for a return trip or in the vicinity of point of boarding.



This transfer must be presented to conductor for fare within 15 minutes of time indicated on face, otherwise it is void and positively will not be accepted.

DALLAS RAILWAY COMPANY

Points to Remember About the New Transfers

Where You May Use Them—

These transfers will be accepted only at points of intersections, and the following additional locations, which have been designated as transfers points:

Lines crossing Lamar will accept transfers at Lamar or Ervay.

Transfers will be accepted between State and McKinney lines at Fairmount.

Transfers will be accepted between Bryan and Swiss lines at Washington.

Transfers will be accepted between Second, Main and Elm at Exposition or Race.

A time limit of 15 minutes is provided, which is ample time to make transfer from any line to another line in the city. The transfer is good until 15 minutes after time indicated by punch marks on face of transfer, after which time it is void, and will not be accepted for fare.

You are urged to examine transfers carefully at time of issue, to avoid possibility of dispute with accepting conductor.

In case of dispute you are requested to pay your fare and take the matter up with the Service Department, 309 Interurban Building.

Conductors are not authorized to make adjustments.

This Company Has but One Commodity to Sell and That Is Service. You, the Public, Are Its Sole Customer



DALLAS RAILWAY COMPANY

INTERURBAN BUILDING

HOW DALLAS LEARNS TO TRANSFER, 1920

which has been described in previous issues, establishes a zone within which the parking of vehicles is barred.

Fare Snatchers Go to Jail

Three of a gang of "floaters" who "knocked down" while employed as conductors on the Hartford lines of the Connecticut Company were sentenced to jail by Judge Alexander W. Creedon in Hartford police court on May 18. A fourth conductor, for whom a warrant was issued, got out of town.

Charles E. Brown will serve forty days in jail for taking small sums on four occasions and Joseph T. Degnan will serve thirty days for stealing money three times. Albion J. Cusick, who pleaded not guilty to the charge and forced the company to put on two of its secret inspectors to testify, was sentenced to thirty days. The men gave assumed names upon being employed in Hartford. They had been discharged by the company after working in Waterbury.

tion to John W. Everman, supervisor of public utilities, for permission to issue the new form of transfer was noted in the ELECTRIC RAILWAY JOURNAL for May 15. The application has since been granted.

Under the new system the use of differently colored transfers to indicate various routes is eliminated. Only the line of origin is indicated, the transfer being good on any line going in the same general direction as the line from which it was issued. The day of the week is indicated on the new transfers by the color of the latter, the date being not otherwise indicated. The cost of printing is therefore lessened.

In announcing the change in the form of transfer, the company ran quarter-page advertisements in the Dallas newspapers. In addition to describing the new system these ads carried a facsimile of the transfer which the company proposed to introduce. One of these advertisements is reproduced above.

Seattle Won't Tolerate Jitney Competition

Strict regulation of jitney bus service in Seattle, Wash., became effective recently when Mayor Hugh M. Caldwell signed an ordinance, with an emergency clause, which prohibits the operation of buses in districts adequately served by the Seattle Municipal Railway. It is estimated this will increase the railway receipts about \$1,000 a day.

The ordinance requires jitney bus operators to apply to the city controller for a permit, the application to give full information of the route, schedule proposed and character and capacity of vehicle. The application will be referred to the utilities department for investigation. If a favorable report is made, the license will be issued by the City Council. The license will require operation on definite schedule over a specified route. The carrying capacity of each machine will be limited to two passengers in excess of the number of seats.

Washington Changes from Tickets to Tokens

Simultaneously with the change in rate of fare from four rides for a quarter to four rides for 30 cents and from 7 cents cash to 8 cents cash for single rides the Capital Traction Company and the Washington Railway & Electric Company have introduced the use of metal tokens of a size somewhat smaller than a dime in place of the paper tickets formerly sold in strips of four. In order to redeem the outstanding paper tickets both companies arranged to repurchase these at convenient points throughout the city.

The metal tokens have come to be popularly known in Washington as "suspender buttons" because of the perforations by which a small letter "W" is formed in the center of the piece. There have naturally been some protests against the change. The suggestion has been widely advertised that a safe way to carry the tokens is to fasten them together with a safety pin.

Effect of California Bus Development

The great differences in burdens under which buses and electric railways operate in California are brought out clearly in an address made before the Optimists' Club of Los Angeles on April 29 by H. B. Titcomb, vice-president of the Pacific Electric Railway. Mr. Titcomb estimates that the electric railways in Southern California are paying out of every \$10,000 which they receive approximately \$3,000 in taxes, interest on money invested in roadway and maintenance of its roadway and paving adjoining thereto. At the same time the jitney buses and auto trucks do not pay out more than \$200 from every \$10,000 gross they take in for these items. They have no investment in roadbed and no maintenance tax on such a roadbed.

Until there is a tax of from 25 to 30 per cent on the gross receipts of all automobiles that use the roads for hire the two means of transport will not be on the same basis. The electric roads, added Mr. Titcomb, are anxious to improve their rail transportation and elevated tracks and make other improvements, but these are practicable only when the company is prosperous and can secure credit.

Transportation News Notes

Will Lengthen Zones.—The Northern Massachusetts Street Railway, Athol, Mass., rezoned its line on May 13. The number of zones has been reduced from forty-two to twenty-five.

Trial Period Soon to Expire.—The three months probation or trial period of operation of the Louisville (Ky.) Railway is about up. T. J. Minary resigned the presidency in February to become chairman of the board of directors of the railway, and since that time the affairs of the company have been in direct charge of an executive board of control.

Asks 10 Cents Cash.—The Jamestown (N. Y.) Street Railway has petitioned the Public Service Commission for permission to increase its fares from 7 cents to 10 cents and to sell ten cash-fare tickets for 75 cents instead of fifteen tickets for 75 cents. The proposed increases affect the lines between Jamestown, Falconer, Celeron, Lakewood, Busti and Ellicott.

Six-Cent Fare Planned.—The New York & Stamford Railway, Port Chester, N. Y., has announced its intention of rezoning its line and of charging a 6-cent fare in each zone. L. S. Miller, president of the company, has informed the Chamber of Commerce of Greenwich, Conn., that, if present service is to be continued, jitney competition in that city must cease.

Seven-Cent Fare Stands.—The Scranton (Pa.) Railway on May 15 was given permission by the State Public Service Commission to continue in effect until further orders the 7-cent fare prescribed by the commission on May 7, 1919. Eight complaints were filed with the commission against continuance of these rates. Experts in the employ of the commission have not completed their survey of the company's property.

Would Raise Columbus Rates.—The Columbus (Ga.) Railroad has announced its intention of applying to the State Railroad Commission for an increase in its railway, lighting and heating rates. The company recently stated that a 10-

cent fare would be necessary for the carrying out of its contemplated improvement program. It has asked the commission to appoint an appraisal board to audit its books and to determine the amount of its investment.

Would Raise Jersey Rates.—Two electric railways operating in the State of New Jersey recently applied to the State Board of Public Utility Commissioners for permission to raise their rates. The Atlantic Coast Electric Railroad, Asbury Park, has asked for an increase in its rate from 6 cents to 8 cents. The Atlantic City & Shore Railroad, Atlantic City, seeks a 7-cent fare in Atlantic City, with a 3-cent charge for each transfer.

Eight Cents in Morgantown.—An 8-cent cash fare has been granted the West Virginia Traction & Electric Company, Morgantown, (W. Va.) on its Morgantown City lines by the State Public Service Commission. The company will sell thirteen tickets for \$1. The present 3-cent charge for transfers will be continued. The fare was formerly 6 cents. The increase in rates has already been approved by the Morgantown municipal authorities.

Seven Cents Asked in Niagara Falls.—Application has been made to the Public Service Commission by the International Railway, Buffalo, N. Y., for permission to increase its fare in the city of Niagara Falls from 5 cents to 7 cents. The company would sell four tickets for 25 cents, the same as is charged in Buffalo. The company's application, made through Herbert G. Tulley, president, also has been sent to the City Council of Niagara Falls.

Wants 8 Cents in Salt Lake.—A cash fare of 8 cents has been asked by the Utah Light & Traction Company, Salt Lake City, Utah. The company, whose application for a 7-cent fare was presented to the State Public Utilities Commission some time ago, has filed with that body an amended petition, requesting an 8-cent cash fare with a ticket rate of thirteen tickets for \$1. The company also asks permission to charge 5 cents each for school tickets.

Ten-Cent Fare Asked.—The Union Traction Company of Indiana, Anderson, Ind., has applied to the State Public Service Commission for authority to charge a 10-cent fare on its Broad Ripple line, Indianapolis. In asking for the increase the company stated that 2 cents of each fare was paid to the Indianapolis Street Railway for use of the latter's tracks. The company recently petitioned for an increase in the rate on its interurban lines from 2½ cents to 3 cents a mile.

Would Raise Interurban Rate.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has filed with the State Public Service Commission a revised fare schedule which it proposes to place in effect on its line between St. Joseph and Savannah. The company would charge 7 cents to the city limits and 8 cents

in each of the four zones between the two municipalities. The commission has suspended the new tariffs until Aug. 17.

Wants More in Hornell.—Stating that, unless more revenue was obtained in the immediate future, the Hornell (N. Y.) Traction Company would be compelled to cease operation, R. W. Bull, receiver and general manager of the company, announced recently that he would shortly apply to the Public Service Commission for the First District for an increase in fare from 6 cents to 7 cents. The commission a short time ago refused to allow the railway to operate one-man cars on the North Hornell line.

One-Man Cars Barred.—The City Council of Bay City, Mich., has passed an ordinance requiring the placing of two platform men on all cars operating within the city limits. The measure was adopted in the face of a vigorous protest from the Saginaw-Bay City Railway. The company contends that, if it is compelled to operate its cars with two men each, it cannot continue to furnish the present standard of service. Enforcement of the ordinance will, it is estimated, result in a loss to the company of \$55,000 a year.

Buses Authorized in Rockford.—Motor bus lines can legally operate in the city of Rockford, Ill., in competition with the Rockford City Railway, according to a recent decision of the State Public Utilities Commission. The commission has issued a certificate of convenience and necessity to the Fay Motor Bus Company to operate through the streets of Rockford. The commission's action in permitting a private transportation company to compete with the railway is expected to furnish a precedent for other cities of the State.

Higher Express Rates Asked.—Petition for a 40-cent minimum rate for single line interurban express shipments and a 50-cent minimum rate for joint line shipments have been filed with the Indiana Public Service Commission by the Indianapolis & Cincinnati Traction Company, the Terre Haute, Indianapolis & Eastern Traction Company and the Union Traction Company of Indiana. The present minimum rate is 25 cents. The roads have also asked for an increase in the basic passenger rate from 2½ cents to 3 cents a mile.

Favors Grand Rapids Increase.—The street railway committee of the City Commission of Grand Rapids, Mich., has recommended to the latter body that an ordinance be passed authorizing the Grand Rapids Railway to charge 7-cent cash fares with sixteen tickets for \$1 and to reroute its cars in accordance with plans already submitted to the commission. The ordinance will specify that in case the increased fare more than provides for operating expenses and a reasonable return on the investment, the excess shall be charged against the company's capital account when a valuation is made.

Would Charge 6 Cents in Dallas.—The Dallas (Tex.) Railway, in response to a request of the City Commission for a specific statement of the system's needs, has presented a petition asking for a 6-cent fare with a 1-cent charge for transfers. This action follows a letter recently sent by Richard Meriwether, vice-president and general manager, to the City Commission, going into details regarding the system's financial condition and explaining that additional revenue was necessary for the company. Upon receipt of Mr. Meriwether's letter, the commissioners voted to ask Mr. Meriwether to place some concrete proposal before them so that action might be taken thereon.

Wants More in Fort Worth.—The Northern Texas Traction Company, operating the electric railway system in Fort Worth, Tex., and the Fort Worth-Dallas and Fort Worth-Cleburne interurbans, has formally applied for an increase in fares. Either 6 or 7 cents is asked, the raise to be determined by an investigation of earnings and expenditures. Under the franchise, the city of Fort Worth cannot set the fare, the provision of the franchise being that the company is entitled to a reasonable rate. The increase in fuel contracts, price of material, interest rates and the necessity of spending \$1,000,000 on extensions in Fort Worth necessitate raising the rates, according to the company.

Efficiency Bonus Made Permanent.—The Dallas (Tex.) Railway, after a four months' trial of its efficiency bonus plan, has announced that the system will be continued in force. Richard Meriwether, vice-president and general manager, said that the plan, which was first tried out at the beginning of the year to promote efficiency among trainmen and as a means of reducing avoidable accidents, had proved most satisfactory. Under the plan trainmen who maintain a perfect score during the month are given bonus pay. During the month of March only eighty-five trainmen out of a total of 560 failed to receive bonus pay. Awards under the plan are made by a board composed of representatives of trainmen and company officials.

Free Hand for Seattle Manager.—As a possible means of increasing revenues on the Seattle (Wash.) Municipal Street Railway, the City Council has agreed to give Superintendent David W. Henderson a free hand in all matters pertaining to the routing of cars and the fixing of schedules. This means that when Mr. Henderson determines that a material saving may be effected by a change in route or schedule, he will have authority to proceed without consulting with the Council. Mayor Caldwell and a majority of the members of the Council have expressed themselves as extremely opposed to an increase in fares and as determined to exhaust every possible means of increasing revenues without resorting to an increased fare.

New Franchise Being Drawn.—Patrons of the New York State Railways, Rochester Lines, will probably have to pay a 7-cent fare in Rochester as matters stand under the service-at-cost agreement now being drawn up. Corporation Counsel Charles L. Pierce is working on the contract which the Common Council directed him and the Mayor to prepare and submit to the Council for its action. It is expected that the agreement will be ready by May 25. City authorities have decided to work on a tentative valuation of the railway property in order to get adequate service as soon as possible. For the present, it was pointed out, the city will not attempt to consider a permanent valuation. All the revenues derived from the city lines will be kept entirely separate from the returns of the lines which run out of the city.

Would Charge 10 Cents in Lansing.—Ten-cent cash fare or four tickets for 30 cents, with 5 cents straight for children and no special rates for workingmen, are the fares which the Michigan Railway, Kalamazoo, Mich., will ask in Lansing, Jackson, Battle Creek and Kalamazoo, according to J. F. Collins, general manager, in a statement to the City Council of Lansing on May 10, after a petition for higher fares had been read. The petition says the matter must be settled before June 1, to avoid serious consequences. Since the 6-cent fare was granted in June, 1919, all expenses have increased, according to the petition, while the men now demand nearly a 100 per cent increase in wages. The wage agreement expires June 1, and the men on the city lines ask raises from 40 and 42 cents an hour to 75 and 80 cents, and interurbans from 46 and 48 cents to 85 and 90 cents. Until this scale is adjusted and service improved it is reported that the Council will grant no fare increase.

One-Man Car Ban Lifted.—The Nashville Railway & Light Company has been granted the right to operate one-man cars by order of the State Public Utilities Commission. The commission overruled the recent ordinance of the City Commission, ordering the cars replaced by double-entrance, two-crew cars. The company appealed to the Public Utilities Commission, claiming a shortage of cars if the thirty-three one-man cars now in use should be withdrawn from operation. Although the petition set forth merits claimed for the one-man car, the commission did not act upon that contention, but on the basis that removal of the cars would unfavorably affect the public. The report of the commission quotes an opinion given by Frank M. Thompson, Attorney-General, in which he states that the Public Utilities Commission has the sole power to handle the question of the one-man car, instead of the City Commission. In February, the City Commission passed the ordinance which directed that the street railway company cease operation of the one-man cars by May 25. It was directed that

a motorman and a conductor be used and that entrances at both front and rear be installed on all cars in operation carrying passengers.

New Publications

Americanism Versus Bolshevism

By Ole Hanson. Doubleday, Page & Company, Garden City, N. Y. 299 pages, 5 x 7½ in.

After reciting his own experience with the I. W. W. in Seattle, Mr. Hanson passes on to sketch briefly the history of syndicalism in France, Germany, England, Russia and the United States. He regards the syndicalist as "simply a revolutionary criminal." The last part of the book is devoted to a discussion and explanation of the cures for bolshevism. Mr. Hanson says "we have had enough of weakness, conciliation and pandering." His motto is "America First."

The Practical Solution of the Chicago Terminal Electrification Problem.

By H. B. Barnes, consulting engineer, Denver, Col.

In a brief monograph Mr. Barnes has outlined the possibilities of applying the electric locomotive with a storage battery tender to yard service in the terminals of steam railroads in large cities. He has cited Chicago as an example, but points out the principles which apply elsewhere also. He estimates that in this service the energy consumption with battery locomotives would not be substantially different from that with the contact system. Moreover, the use of the battery would permit charging at off-peak hours and hence would enable a central station to sell energy to a railroad at an advantageous rate.

The New Industrial Unrest

By Ray Stannard Baker. Doubleday, Page & Company, Garden City, N. Y. 231 pages. 5½ x 8 in.

Mr. Baker is a trained observer. He has nothing to present but perspective. This he does, in so far as the nature of the work will permit, with all the charm that has made his writings in other fields so popular. The author says that it was his effort to present a survey, for the general reader, of the present industrial crises and the various reconstructive experiments now under way to meet it. He has succeeded. In concluding Mr. Baker develops the shop council system of settling labor disputes, the system greatly favored by the Industrial Commission, before which he testified. As has been indicated, the great value of the work lies in the detached portrayal of the facts by the observer.

Personal Mention

High Honor for Mr. Emmet

General Electric Engineer Awarded Edison Medal by American Institute of Electrical Engineers

William LeRoy Emmet, consulting engineer of the General Electric Company, was awarded the Edison Medal by the American Institute of Electrical Engineers on May 21. Mr. Emmet has spent most of his professional life with the General Electric Company and one of its predecessors, the Sprague Electric Railway & Motor Company.

He is a graduate of the United States Naval Academy, class of '81, and served as a cadet midshipman until 1883. He re-entered the navy as junior lieutenant in 1898, serving as navigator on

Mr. Emmet has contributed many technical papers of importance to national societies. He is a member of the Naval Consulting Board of the United States. He holds the degree of Doctor of Science from Union College.

Changes in Journal Staff

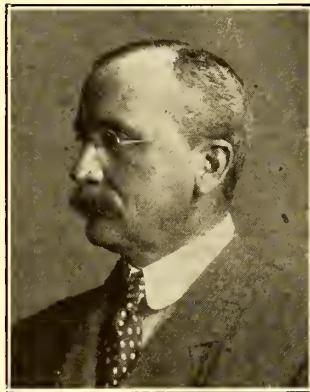
The following changes have been made in the editorial staff of this paper: H. V. Bozell, who joined the organization recently as associate editor, as was noted in the issue for Feb. 7, 1920, has been appointed co-editor. Henry H. Norris has been appointed managing editor; Harry L. Brown, Western editor, and C. W. Squier and C. W. Stocks, associate editors.

J. D. Mortimer Honored by Milwaukee Employees

James D. Mortimer, retiring president of the North American Company, which controls the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was the guest of the employees of the latter company at a reception at the Public Service Building, Milwaukee, on May 13. The reception, which was under the auspices of the Employees' Mutual Benefit Association of the Milwaukee company, was arranged to afford the system's personnel an opportunity to bid Mr. Mortimer good-by. During the course of the evening Mr. Mortimer was presented with a handsome diamond ring on behalf of the E. M. B. A.

The reception at the Public Service Building was preceded by a dinner at the Hotel Pfister tendered President Mortimer by the officers and staff of the company and the officers and directors of the employees' association. S. B. Way, vice-president and general manager of the company, delivered an address in which he pointed to the growth of the system under Mr. Mortimer's direction. He stated that in the ten-year period in which Mr. Mortimer has been in charge of the system passenger revenues have increased from \$4,220,609 to \$8,076,724.

Adrian J. Hughes, Jr., has been appointed superintendent of the motive power department of the United Railways & Electric Company, Baltimore, Md. Mr. Hughes has been connected with the company since 1914. He was graduated from Cornell University in 1912 with the degree of electrical engineer, and shortly thereafter entered the employ of the Edgar Thomson Steel Mills, Pittsburgh, Pa. Early in 1914 he resigned to become connected with the United Railways as engineer in the lines and cables division.



W. L. R. EMMET

the U. S. S. *Justin* during the Spanish-American War. He is a direct descendant of a brother of Robert Emmet, the famous Irish patriot.

Mr. Emmet's inventions have contributed much to electric railway developments on the power side. His most important electrical work has been along the line of alternating-current devices, but he is best known for his contributions to the development of the steam turbine. He designed and directed the development of the Curtis turbine by the General Electric Company, and was instrumental in applying the turbine in connection with electric motor drive to steamships.

He is the inventor of several types of transformers, including a form of air-blast type and of several types of insulation of alternators. After experimentally investigating the possibilities of oil switches at Brooklyn and Niagara Falls, on the heaviest circuits then existing, he designed and used the first switches of this type. The varnished cambric cable is also an Emmet invention.

Des Moines Management in New Hands

F. C. Chambers Made Operating Head of City Lines—W. Clapper to Manage Interurban System

New officers have been elected to take charge of the Des Moines City Railway and the Inter Urban Railway, Des Moines, Iowa. The changes in the operating personnel of the two companies were noted briefly in the *ELECTRIC RAILWAY JOURNAL* for May 15. S. G. Harris of the Harris Trust & Savings Bank, Chicago, succeeds Emil G. Schmidt as president of the city and interurban lines. F. C. Chambers, electrical engineer of the two companies, has been made vice-president and general manager of the Des Moines City Railway and a vice-president of the Inter Urban Railway, while Will Clapper becomes general manager and a vice-president of the Inter Urban Railway. E. B. Bieghler has been appointed assistant treasurer of both companies. E. W. Miller is made superintendent of transportation.

F C. CHAMBERS, now vice-president and general manager of the Des Moines City Railway and a vice-president of the Inter Urban Railway, has been connected with the Des Moines traction system for the past seven years. He joined the city lines as electrical and mechanical engineer in 1913. In April, 1918, he took charge of power generation and distribution for both the city and the interurban lines. Later he was placed in charge



F. C. CHAMBERS

of rolling stock. For several years he has had charge of substation equipment.

Mr. Chambers entered the traction field in 1896, in power house work for the Adrian Light, Heat & Power Company, Adrian, Mich. In 1901 he went to Rome, N. Y., as chief engineer for the Rome Gas & Electric Company. He left Rome in 1905 to become electrical engineer for the East St. Louis & Suburban Railway. From 1908 to 1911 Mr. Chambers was superintendent of power for the Springfield (Ill.) Consolidated Railway. In 1911 Mr. Chambers went to Chicago, where he became superintendent for the County Traction Company, now known as the Chicago & West Towns Railway. He remained with the company until 1913, when he went to Des Moines.

Will Clapper, who becomes vice-president and general manager of the Inter Urban Railway, was formerly traffic manager of that system. Mr. Clapper was born in Iowa. He entered the railroad business as chief clerk to the commercial agent of the Missouri & St. Louis Railroad in Minneapolis in June, 1899. In January, 1900, he went

to Des Moines as chief clerk to the division freight agent of the Wabash Railway. He was subsequently promoted to traveling freight agent, to commercial agent, and still later to division freight and passenger agent. He continued in the employ of the Wabash Railway as the Iowa representative until March, 1915, when he took up his work as traffic manager of the Inter Urban Railway.

E. W. Miller, promoted to the position of superintendent of transportation of the city lines, has been with the company for about ten years. Three years ago he was appointed assistant superintendent of transportation, and on May 1 of this year was appointed superintendent to succeed L. L. Sloss, resigned. Prior to his connection with the electric railway industry, Mr. Miller served the Chicago, Burlington & Quincy Railroad at Quincy and various other points in Illinois for about four years, finally being transferred to Des Moines, Iowa, where he shortly afterward became connected with the Des Moines City Railway.

Herbert F. Rech has been appointed assistant chief engineer of the Detroit power stations of the Detroit (Mich.) United Railway. Mr. Rech will have particular charge of combustion work.

R. V. Miller, general superintendent of the Oklahoma Union Railway, Tulsa, Okla., has been appointed general manager of the company, and will have general charge of the operation of the system. The position of general superintendent has been abolished.

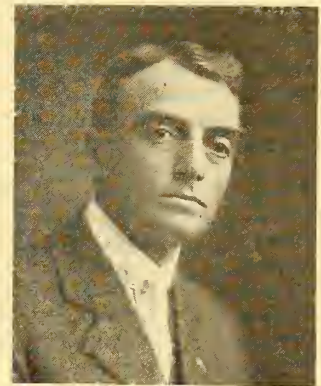
Edward J. Peartree has been appointed general manager of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to succeed the late Peter E. Hurley. Since the death of Mr. Hurley in June, 1918, Mr. Peartree has been acting general manager of the company.

Walter R. Moynihan has been appointed assistant treasurer of the United Railways, St. Louis, Mo. Mr. Moynihan was formerly in the employ of the Boston & Albany Railroad, for which he had charge of land and tax matters in the legal department, with headquarters in Boston.

R. C. Brooks, manager of the electric light and power properties of Stone & Webster at Pawtucket, R. I., has been appointed manager of the Sa-

vannah (Ga.) Electric Company. Mr. Brooks succeeds R. G. Carroll, who has been made manager of the Galveston (Tex.) Electric Company. Before going to Pawtucket three years ago, Mr. Brooks was manager of the Dallas (Tex.) Electric Company and, still earlier, manager of the Austin (Tex.) Light & Power Company.

R. G. Carroll, manager of the Savannah (Ga.) Electric Company, has been appointed manager of the Galveston (Tex.) Electric Company to succeed W. E. Wood, recently made manager of the Houston (Tex.) Electric Company. Mr. Carroll has been connected with Stone & Webster properties for a number of years, serving successively as assistant treasurer of the Pensacola Traction Company, assistant treasurer of the Northern Texas Traction Company and acting manager of the Beaumont and Port Arthur traction and lighting systems. He was subsequently transferred to Key West, Fla., as acting manager of the Key West Electric Company. Two years ago he was appointed manager of the Stone &



W. CLAPPER

Webster properties in Savannah, remaining until his recent promotion.

Charles F. Lederer, until recently superintendent of way of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has become associated with the rail welding department of the Metal & Thermit Corporation, New York, N. Y. Mr. Lederer entered the track department of the Milwaukee Electric Railway & Light Company in April, 1908, and was soon promoted to construction gang foreman. Later he was appointed division roadmaster and in 1912 became city roadmaster. In May, 1919, he rose to assistant superintendent, and in September, 1919, became superintendent of way, which position he held until his recent resignation from that company. In the above-mentioned capacities Mr. Lederer obtained much practical experience in rail welding and in the construction of welded special work as well as in making repairs to broken frogs, switches and mates. In fact, Mr. Lederer, so far as is known, is believed to have made, in April, 1915, the first thermit-welded frog.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Armature and Field Coils

Hard Winter Responsible for Heavy Demand—Labor Troubles Hold Up Deliveries

Volume of sales of armature and field coils and supplies has been very large during the past winter. Manufacturers have had much trouble in keeping up production on coils. The past winter has been one of the hardest experienced by railway men for many years. Many burnouts occurred and manufacturers have been so swamped that in at least two instances they have not caught up yet with the rush of orders resulting from the bad weather. Labor trouble in the Naugatuck Valley has held up copper strip and the railroad tie-up has further lengthened deliveries, which are now thirty to sixty days on coils.

A great number of companies called in many motor equipments after the heavy snowstorm of February and found it necessary to replace many coils. The armatures were tested, shellacked and baked and coils renewed wherever necessary.

One large railway which previous to the storm had received a large consignment of new motors from a manufacturer called in the entire number after the heavy snow and had them all inspected and baked.

Cotton Sheeting Shortage Hurts Tape Makers

Deliveries Excellent Considering Transportation Difficulties—Prices Firm and Further Rise Is Possible

Manufacturers of friction tape, like other producers of electrical material, are making an uphill fight to fill orders. Purchases for electrical uses are heavy, one leading manufacturer having done more than 40 per cent more tape business so far this year than for the first quarter of 1919. Raw material shortage presses harder than labor conditions. For some time cotton sheeting, the chief material used in tape production, has been very scarce and high priced to boot. Before the war this material sold around 5 or 6 cents per yard and could be had in ample quantities. Today 30 cents per yard must be paid, or about \$1.08 per pound, and as this material is uncertain in regard to future supply in the quantities needed for satisfactory deliveries, it is entirely within the bounds of reason that a further price advance may be forced in the not distant future.

Electric railways are buying tape at about the same rate as last year.

Ninety-nine per cent of the roads purchase black tape of a few widths, the $\frac{1}{2}$ and $\frac{3}{4}$ inch sizes being most common. The grades vary considerably with different manufacturers and with different railway specifications. Present prices range in general from about 58 to 70 cents per pound, depending upon quantity and quality. In urgent cases shipments can be made from jobbers' stocks practically on receipt of order, and some manufacturing plants can fill such orders within three or four days. By and large, however, four or five weeks represents manufacturing delivery for

new orders placed direct, one of the larger plants being at this time just about a month and a half behind on its orders. Not long since this factory had seventy carloads of finished material in its works awaiting shipment, but conditions have improved materially, so that today carload shipments are going forward pretty well in comparison with the late period of extreme congestion. Of course, jobbers located near the factories, especially in New England, have had the benefit of freight embargoes and have taken the opportunity to fill up their stocks.

Sales of Rail and Track Supplies Increase

Heavy Demand for T-Rails—Special Work Sales Improving—Girder Rails Fairly Active—Labor Shortage Affects Relaying

Sales of track supplies, including rails, special work and miscellaneous accessories are improving. With one exception, manufacturers report sales to date this year considerably ahead of the corresponding period last year and even better than sales of last fall.

One manufacturer is quoting four to six weeks delivery on turnouts, crossings, mates and small pieces, while a month to six weeks longer is required for the heavy, complicated, special work pieces. This company will accept a limited amount of tonnage in the standard sections for third and fourth quarter delivery.

Another manufacturer of special work is making deliveries of from two to three weeks on the smaller pieces of special work and from two to three months on the heavy types of crossings. Considerable difficulty has been encountered in making delivery on mates, etc., as manufacturers have been unable to get supplies of rail sections from which they are made on account of the railroad tie-up. From one source special work sales are reported as greatly improved over the years 1917 and 1918, but not quite up to the mark of a normal pre-war year. It is agreed that the present demand is largely because of deferred maintenance requirements. However, no decrease in sales is expected, as representatives who have been scouring the East, Central and Middle West sections generally advise that the electric railways, including both city and interurban lines, are from one to two years behind schedule on track work. This work must necessarily be delayed further for the reason that track labor is scarce, maintenance-of-way departments in most instances having only about 50 to 60 per cent of the

usual number of laborers. Rail deliveries will also hold up a considerable amount of work, as shipments normally scheduled to go forward during the fall months may not be delivered until midwinter.

Considerable welding and patching up is being done by the railways in order to delay purchasing, but the enormous amount of deferred maintenance, covering a period of from four to five years, has finally forced a buying movement that is considered quite satisfactory.

The Bethlehem Steel Company has produced a chart of percentages of special work prices from the year 1912 up to date, based upon the average price of all orders received by the company in this line during the year 1919.

With 100 per cent given as the 1919 price, the percentage effective from 1912 to July, 1915, was 55; for 1916, 51 per cent; for 1917, 68 per cent; for 1918, 120 per cent, and for the first four months of 1920, 95 per cent. Inquiries for bolts, spikes and nuts, fish plates, etc., have been active, but the majority of producers are sold so far ahead that delivery rather than price is the deciding factor.

American Construction Materials Needed by Brazil

Brazil offers a market for all kinds of construction materials and machinery, not only in the immediate future but for an indefinite time to come, according to Trade Commissioner W. W. Ewing, whose report on that country has just been issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce.

Mr. Ewing recently returned to the

United States after a tour of investigation covering all the South American republics. He is convinced that Brazil, by reason of its vast undeveloped territory and its immense resources, is rapidly increasing in importance as an export field.

Some of the goods that it will most urgently need in the next few years are coal, iron, steel and most manufactured materials. Railway materials of all kinds are included.

Contracts received recently by both the General Electric Company and the Westinghouse Electric & Manufacturing Company for electric locomotives and equipment for the Paulista Railway electrification bear out this statement in regard to railway supplies.

In at least two other instances reports are being prepared by consulting engineers for the installations of railway and other electrical equipment which may be undertaken this year.

New Air Brake Company

Organized to Manufacture Brake with Uniform Cylinder Pressure

The Automatic Straight Air Brake Company has been acquired by Kidder, Peabody & Company, John F. Alvord and George W. Goethals and under their direction will commence the manufacture and sale of a new air brake. The construction of the new brake, it is asserted, is such that it will give uniform brake cylinder pressure and uniform brake resistance simultaneously on all cars in the train, both standard passenger trains and the modern long freight train. At the same time, the company states, there can be no undesired emergency application of the brakes nor failure to release the brakes when desired.

New directors elected to the board of the Automatic Straight Air Brake Company are John F. Alvord, who has also been elected president of the company; William L. Benedict, of Kidder, Peabody & Company; Robert E. Graham, of George W. Goethals & Company, Inc.; Edward D. Kenna, formerly vice-president of the Atchison, Topeka & Santa Fe Railway, and Robert Winsor, of Kidder, Peabody & Company. Other directors are Carl R. Ganter, of Shattuck, Glenn, Huse & Ganter; Harry I. Miller, who has been elected a vice-president; James D. Mortimer, president of the North American Company; Morgan J. O'Brien, of O'Brien, Boardman, Parker & Fox, and Harry B. Hunt, of the American Locomotive Company, also a vice-president of the new company, and A. M. McCrea, Union Spring Company.

The company has leased a plant in New York City at Twenty-fifth Street and Eleventh Avenue for manufacturing purposes. It is also operating a testing plant at 183 Greenwich Street, New York City.

For the present, it is the intention of the company to concentrate its efforts in the steam railway field, although the manufacture of air brakes for electric railways will be taken up later.

Rolling Stock

Beaver Valley Traction Company, New Brighton, Pa., has placed an order for five safety cars with the Osgood-Bradley Car Company.

Columbus (Ga.) Railroad, noted in the Feb. 21 issue of the ELECTRIC RAILWAY JOURNAL as having placed an order for nine safety cars, has specified the following details on this equipment:

Builders J. G. Brill Co.
 Type Birney safety
 Total capacity 70
 Length over all 28 ft. $\frac{1}{2}$ in.
 Truck wheelbase 8 ft.
 Rail to trolley base 12 ft. 6 in.
 Width over all 8 ft.
 Body Semi-steel
 Interior trim Mahogany, light
 Roof Arch
 Air brakes Safety Car Devices Co.
 Armature bearings Ball
 Axles, diameter $3\frac{1}{8}$ in.
 Car signal system Faraday
 Car trimmings Bronze
 Conduits and junction boxes,

National code
 Control K-63, double end
 Compressor West D H 16
 Curtain fixtures,
 For side windows and vestibule
 Material Fabrikoid or Pantasote
 Designation signs Hunter
 Door operating mechanism,

Safety Car Service Co.
 Fare boxes Center platform
 Wheelguards Six bar, H B, lifeguard
 Gears and pinions Pressed steel
 Governor hand brakes,

West S 6 A Norway iron
 Heater equipment, not specified
 Headlight Golden Glow, S. M-95
 Motors 2-West, 506-AM-2
 Paint or varnish Light mahogany
 Registers Stone & Webster standard
 Sanders Air, furnished by builder
 Sash fixtures, not specified
 Seats, Heywood Bros.,

57-SF steel mahogany
 Seating material,
 Rattan, 16 in. x 32 in. cushions
 Slack adjuster, not specified

Step treads $\frac{1}{2}$ in. x 10 in.
 Trolley catchers or retrievers Ideal
 Trolley base $1\frac{1}{4}$ in. x 16 in. x 16 in.
 Trolley wheels or shoes
 Trucks Brill 29-E-1
 Ventilators Utility standard
 Wheels Southern Wheel Co., standard

Boston Specifies Details for 170 Cars

The Boston Elevated Railway, noted in the March 20 issue of the ELECTRIC RAILWAY JOURNAL as being in the market for seventy-five center-entrance motor cars, in addition to thirty center-entrance motor cars and sixty-five all-steel elevated cars previously announced as having been purchased, has specified the following details on this equipment:

Number 65
 Date of order April 12, 1920
 Car builder Pressed Steel Car Company
 Type Elevated
 Seating capacity 44
 Weight of car body 31,750 lb.
 Weight of trucks, motor 10,130 lb.
 Weight of trucks, trailer 3,680 lb.
 Weight of equipment 20,955 lb.
 Total weight 71,515 lb.
 Bolster centers 32 ft. $3\frac{3}{4}$ in.
 Length, over all 46 ft. $7\frac{1}{2}$ in.
 Truck wheelbase 6 ft.
 Width, over all 8 ft. $9\frac{5}{8}$ in.
 Height, rail to top of roof 12 ft. $6\frac{1}{2}$ in.
 Body All Steel
 Interior trim Bronze and enamel
 Headlining $\frac{3}{8}$ Agasote
 Roof Monitor
 Air brakes Westinghouse
 Axles $4\frac{1}{2}$ x 8 Journal
 Bumpers Anti-climber

Car door signals National Pneumatic
 Car trimmings Pressed Steel Car Company
 Bearings Stucke side bearings
 Center plate, steel casting
 Conduits and junction boxes West.
 Control West. A. L. F. M.
 Couplers Tomlinson
 Curtain fixtures Curtain Supply
 Curtain material Double face Pantasote
 Door operating mechanism
 National Pneumatic
 Gears and pinions G. E. and West.
 Hand brakes Vertical wheel
 Consolidated Car Heating Company
 Heater equipment
 Journal boxes Symington
 Motors 2 motors, G. E. 259, and West. 301
 Motors Inside hung
 Paint, varnish Chicago Varnish Co.
 Sash fixtures Forsythe
 Seats Longitudinal
 Seating material Not yet decided
 Springs Open hearth steel
 Step treads M. I. thresholds
 Trolley shoes B. E. Ry. Co.
 Trucks Standard Motor Co., C-60
 Ventilators Perry
 Wheels (type and size) Trailer 3 K. 31
 Motor 3 K. 34

The order for seventy-five center-entrance cars was placed with the G. C. Kuhlman Car Company, the Laconia Car Company having received the first order for thirty cars of the center-entrance type.

Number 105
 Date of order April 24, 1920
 Delivery To begin during Aug., 1920
 Car builder Laconia Car Company, 30
 Car builder G. C. Kuhlman Car Co., 75
 Type Center entrance, motor
 Seating capacity 56
 Weight of car body 21,000 lb.
 Total weight 44,000 lb.
 Bolster centers, length 24 ft.
 Length, over all 48 ft. $9\frac{1}{2}$ in.
 Truck wheelbase 5 ft. 6 in.
 Width, over all 8 ft. $8\frac{3}{4}$ in.
 Height 11 ft. $8\frac{1}{2}$ in.
 Body Semi-steel
 Interior trim Cherry finish-bronze
 Headlining lower deck $\frac{3}{8}$ Agasote
 Headlining, upper deck None
 Roof Monitor
 Air brakes West. St. with Emer. feature
 Armature bearings Plain
 Axles Cambria steel $3\frac{3}{8}$ x 7 journal
 Bumpers Rico anti-climbers
 Car signal system Consolidated Car
 Heating Co., National Pneumatic Co.
 Car trimmings Aero metal and bronze
 Bearings Stucki side bearing M. I. plates
 Control G. E., K 35
 Couplers Tomlinson type A, form 8
 Curtain fixtures Curtain Supply 48 and 63
 Curtain material Pantasote
 Designation signs Hunter, end
 Keystone, side

Door mechanism National Pneumatic
 Fare boxes International motor driven
 Fenders or wheelguards Not yet placed
 Gears and pinions G. E.
 Hand brakes National staffers
 Heater Equipment

Consolidated Car Heating Co.
 Headlights Not yet placed
 Journal boxes Taylor Electric Truck Co.
 Lightning arresters
 G. E. type M, form D.3
 Motors 4 G. E. 247, inside lining
 Paint, varnish or enamel Not yet placed
 Registers International
 Sanders Ohio Brass
 Seats Heywood & Wakefield—30 cars
 Seats J. G. Brill—75 cars
 Seating material Wood slat
 Slack adjuster Gould
 Springs Taylor Elec. Truck Co.
 Step treads Universal
 Trolley catchers Q. P. catcher
 Trolley wheels B. E. Ry.
 Trucks Taylor Electric Truck Co.
 Ventilators Perry
 Wheels 26 in. rolled steel

Recent Incorporations

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway proposes to build a line in Long Beach from the harbor district to Dominguez Junction. Provision has been made to connect with the Daisy Avenue line at State Street.

Franchises

Indiana Service Corporation, Fort, Wayne, Ind.—The board of public works of Fort Wayne has signed franchises giving the Indiana Service Corporation authority to lay double tracks on Clinton Street, from Main Street to Lewis Street; on Creighton Avenue, from Calhoun Street to Fairfield Avenue, and on Wells Street from the St. Mary's River bridge to Fairmount Place. In addition to this some improvements will be made to the Calhoun Street line.

Track and Roadway

Los Angeles, Cal.—The California Railroad Commission will hold a hearing on June 15 in Los Angeles for the purpose of selecting a site for the proposed union railway terminal in that city. As a part of the terminal development the Pacific Electric Railway proposes to extend its elevated tracks from Sixth and Main Streets to the Brooklyn Avenue bridge.

Indiana Service Corporation, Fort Wayne, Ind.—Plans are under way for extending the Huéman Street line of this company west through the northwestern part of the Fort Wayne west of St. Mary's Avenue and north of the Nickel Plate tracks. This section of the city has built up very rapidly within the past few years and is in bad need of car service.

Southern Public Utilities Company, Charlotte, N. C.—The Southern Public Utilities Company is double-tracking its Myers Park line in Charlotte.

Toronto, Ont.—The City Council of Toronto has authorized the city treasurer to deposit with the Hydro-Electric Power Commission of Ontario debentures amounting to \$4,328,665 in connection with the construction of the proposed hydro-radial between Toronto and Bowmanville.

Portland, Ore.—The Commission of Public Docks of Portland, has announced its intention of building an extension of the St. Johns Street line of the Portland Railway, Light & Power Company to connect with municipal terminal No. 4. C. B. Moores, chairman of the commission, and G. B. Hegardt, chief engineer and secretary, have been authorized to enter into an agreement for this purpose with the railway company.

Philadelphia, Pa.—Mayor Moore and William S. Twining, director of the Department of City Transit, have awarded contracts aggregating \$410,732 for work on the Frankford elevated line. The awards are as follows: Steel superstructure on Front Street near Arch and Frankford Avenue between Dyre and Bridge Streets to the Phoenix Bridge Company, for \$272,436. Column foundations for the superstructure

to Brown-King Construction Company for \$37,299. Passenger station at Kensington Avenue and Tioga Street, Standard Construction Company for \$100,790.

Professional Note

Edward H. Rockwell and Frank C. Doble announce the establishment of the engineering firm of Rockwell & Doble, with offices at 40 Central Street, Boston, Mass. The firm will handle a general engineering and construction business. Mr. Rockwell is a civil engineer, and is head of that department at Tufts College. He is a graduate of the Worcester Polytechnic Institute and has had a wide experience, including work for industrial clients, bridge builders, consultation service and special work for the United States government. Dr. Doble is a graduate in electrical engineering from Tufts College, class of 1911. His experience includes service in the electrified zone of the New York Central lines in the transmission department, in street-railway work and in a consulting capacity for several years.

Trade Notes

The Delta-Star Electric Company's New York office was removed from 100 Broadway to 25 Broad Street on May 6.

Ralph D. Mershon, consulting and electrical engineer, has removed his offices to 143 Liberty Street, New York City.

Los Angeles Railway Corporation, Los Angeles, Cal., has purchased 575 registering fare boxes from the Johnson Fare Box Company, Chicago.

Electrical Securities Corporation, New York, N. Y., announces the removal of its offices from 71 Broadway to 165 Broadway, New York City.

The Collyer Insulated Wire Company, Pawtucket, R. I., has awarded contract for two additions, one 25 ft. x 75 ft. and the other 20 ft. x 32 ft., to its plant.

Locke Insulator Company, Baltimore, Md., has awarded a contract for the construction of three buildings at Light and Cromwell Streets, which will be used for the manufacture of insulators and bushings.

Norton Company, Worcester, Mass., will erect a large building which will enable the company to double the capacity of its abrasive storage and milling department.

Transportation Engineering Corporation, Chicago, Ill., has moved from its former quarters in the Manhattan Building to new quarters in the Transportation Building.

Western Electric Company, New York, N. Y., has let a contract for the construction of a ten-story, reinforced concrete and steel building at Greenwich and Clarkson Streets to be built

by the Turner Construction Company. The cost is estimated at \$2,500,000.

Safety Electric Products Corporation, Los Angeles, Cal., recently incorporated, is manufacturing switches, metal boxes, etc. Frank H. Trimble, formerly connected with the F. H. Trimble Manufacturing Company, now out of existence, is interested in the company.

Herman H. Sticht & Company, New York, N. Y., announces that it has added a carbon-brush department to its business and is acting as Eastern agent for the Boxill Bruell Carbon Brush Company, Indianapolis, Ind. The latter company does not manufacture a universal brush but rather a series to suit conditions.

New Advertising Literature

Appleton Electric Company, Chicago, Ill.: Bulletin No. 13 giving a complete list of its "Pagrip" metal moldings and fittings.

Griscom-Russell Company, 90 West Street, New York, N. Y.: Bulletin No. 902, describing its multiwhirl cooler for lubricating oils.

Sullivan Machinery Company, Chicago, Ill.: Bulletin 75T on its class WK-31 gasoline-engine driven portable air compressor.

Trumbull-Vanderpoel Electric Manufacturing Company, Bantam, Conn.: A 128 page catalog, No. 2, giving price list and other data on electrical supplies manufactured by the company.

R. Thomas & Sons Company, East Liverpool, Ohio., Catalog No. 19, giving descriptions and illustrations of its transmission-line insulators and other insulating devices and material.

Belden Manufacturing Company, Chicago, Ill.: Catalog No. 8, with new discount sheets, covering rubber covered wire, switchboard cables, tips, terminals, tapes, insulating materials and many other products.

Shepard Electric Crane & Hoist Company, Contour Falls, N. Y.: Booklet, "A Hoist Below the Hook," showing different rigs to be used with electric hoists in moving heavy cases, motors, heavy gears and other equipment.

The Continental Fiber Company, Newark, Del.: An eighty-eight-page booklet entitled "Insulation," in which it describes the various products manufactured by the company, including vulcanized fiber, "conite," "bakelite-dilecto," etc.

Iron Age Publishing Company, New York, N. Y.: A 1216-page 9 x 12 in., Catalogue of American Exports, containing catalogs of leading American manufacturers of engineering, railway, foundry and electric equipment and supplies, iron and steel, machinery and tools, hardware and cutlery. It is written in five languages, English, Spanish, French, Portuguese and Russian. Metric equivalents are used throughout, and data and other information are included which will make it useful to the technical as well as other buyers.