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## MR. MELLEN ON GOVERNMENT OWNERSHIP

Charles S. Mellen, formerly president New Haven Railroad, has added to the extraordinary testimony which he has recently given before the Interstate Commerce Commission by declaring that public ownership of railroads is inevitable, and from the context of his remarks it seems as if he considers that such a result would be desirable. Mr. Mellen, whose opinion on this subject is quoted in the *New York American* for last Sunday, reaches this conclusion by the following system of logic: Public utilities are naturally monopolies; monopolies mean power, and power in private hands is practically always accompanied by abuse. The boards of directors of large railroad corporations only nominally represent the stockholders. Actually they are under the control of financial bosses who make enormous profit from their control of the railroads. The present "exorbitant" salaries paid to the executive officers of railroads are given to keep them quiet and subservient to these bosses. If the possibility for this abuse was stopped and if there was full publicity of the accounts, those who control the railroads would be willing to have public ownership come, and the men who are now operating the lines would be willing to remain as operators in the service of the public. The service which the public enjoys would therefore be the same as at present, while the management would be free from the pressure above and other temptations.

## THE IRRESPONSIBLE POLITICAL BOSS

We agree with Mr. Mellen that there have been evils in private ownership, a conspicuous example being that of the road of which he had charge. But if he had put into force ten years ago the rules which he now recommends of strict accounting, of making the directors direct and of full publicity in regard to all matters connected with his property, many, if not most, of the evils which the New Haven Railroad has undergone would not have occurred. On the other hand, with public ownership there would be the same troubles, but multiplied a thousand times, as those to which Mr. Mellen calls attention in his excoriation of private ownership. It may be true that absolute power is usually abused, but the possibilities of such abuse by the executive under private ownership is prevented in a number of different ways. The power which he can exercise is checked by the financial interests in control of the property, by directors who direct, by the regulatory commissions, by the officers of the law, and by public opinion, provided there is publicity so that all action by the railway officials is known. But it would

be difficult to conceive of a more arbitrary and irresponsible body than a political organization in power under the present system of American politics. The regulatory body, if there was any, would be of the same political stripe, and it is hard to make public opinion effective in any political contest where the patronage is considerable, as has been shown in many instances in the case of Tammany Hall and other well-intrenched political organizations. There are many objections to the government ownership of public utilities, but one of the greatest is the power which it would confer on the irresponsible political leader. There is good precedent for the rule that until our elected officials can show a good stewardship over the few things which they now have committed to their direction, it would be the height of foolishness to make them stewards over many things.

## A BASIS FOR COMPARING CAR WEIGHTS

In a communication on another page of this issue, J. R. Harrigan, general manager, Kansas City, Clay County & St. Joseph Railway, makes some interesting comparisons of weight between the all-steel cars with which his road is equipped and the sample car for the Michigan Railway which was described in our issue of May 16. Mr. Harrigan's figures lead him to a conclusion that is almost exactly the same as that drawn by F. M. Brinckerhoff in a communication published last week, and he cites the fact that on the basis of weight per seated passenger the Michigan cars are almost twice as heavy as those of his own line. This basis of comparison is, of course, always productive of interesting results. The business of most electric railways is the transportation of passengers, and in the end the passenger is the unit upon which comparisons must rest. But in the case in question, where space in the car has to be provided for baggage and express, this condition does not hold, and the seated-passenger basis becomes misleading. Of course, this unit has survived regardless of numerous attempts to displace it, and for city cars it is admittedly the best possible universal basis for comparing car weights. Nevertheless we cannot pass by this opportunity to call attention to its weakness when applied to interurban cars and to urge again the use, in such cases, of the more accurate unit available in the weight per foot of length of car body, exclusive of trucks and equipment. With the steel car, which is now coming prominently under consideration, the body alone offers a fertile field for analysis, and the inclusion in a question of weight of the trucks and equipment certainly does not clarify the issue.

### SCHEDULES IN STEAM FOLDERS

At this season when electric railways are making up their time-tables and other advertising literature for the summer business, they should not overlook the publicity channel afforded by the similar publications of the connecting steam railroads. An excellent example of such enterprise as initiated by a steam railroad is afforded by the useful booklet which has been issued this spring by the Lehigh Valley Railroad on the transportation service of all the electric railways within its territory. Within the compass of twelve pages, the schedules and rates of fare are given in alphabetical order for several hundred towns. This compactness and convenient form of reference is obtained through the use of a simple key. Thus numerals opposite the locality correspond to the name of the electric railway, while letters are used to indicate the headway which obtains for the greater part of the day. In this way practically all the information that the prospective passenger needs is in one pocket folder so that he can plan for more extensive trips than if he had to look for individual time-tables as he traveled from line to line. It is not to be expected that a steam railroad should advertise a paralleling electric service, but it serves its best interests when it gives the widest possible publicity to the fact that hundreds of attractive spots can be reached best by a combination of long-distance steam railroading and short-distance trolleying.

### DOING LITTLE THINGS IN A BIG WAY

In the paper by Charles H. Coe abstracted in last week's issue of the *ELECTRIC RAILWAY JOURNAL*, the writer showed a Lamb-like tendency to bring our popular adages into contempt. Said he, in substance, "We have a-plenty of leaders but not enough good men in the ranks." If this is true, what is to become of "There is plenty of room at the top" and other familiar letters in the alphabet of progress? And yet Mr. Coe must know of what he is talking about, for he has the task of instructing hundreds of men each year in the duties of platform men, who have to do little things well. Granting for the sake of the argument that he is right, it is fair to ask why it is so difficult to get men to do little things in a big way—that is, to do them well. Is it not because some workers fail to realize the dignity and importance of their work? There is certainly no more important work in the transportation field than the proper operation of a car. When one considers that the owners of a car place in the care of two men a piece of property worth from \$3,000 to \$15,000 and assume the moral and financial responsibility for the damage which these men can cause, the latter should feel a great sense of responsibility. While it may be true that it is difficult to get men to do this our observation leads us to believe that a large proportion of them do take their work and themselves seriously. As in other cases, it is the conspicuousness of the occasional exception which proves the existence of the rule.

### THE NEW YORK CENTRAL SHOPS

The Harmon shops of the New York Central Railroad, which are described elsewhere in this issue, consist of a combination of general schemes which is unique in both electric and steam railroad practice. The shops are designed to care for electric locomotives and motor cars, and the advantages of overhead cranes for the latter purpose have been combined with the use of drop pits for handling the heavy driving wheels of the locomotives by extending the transfer pits in the locomotive shop so that they are served by the cranes in the car shop.

The arrangement is, of course, adapted peculiarly to the needs of the New York Central locomotives which are characterized by having armatures mounted directly upon the driving-wheel axles, but with such equipment it is singularly effective, because with locomotives of this simplified design there is nothing of great weight that requires lifting when repairs are made except the air compressor and heater boiler. These can be taken out of the cab by one of the overhead cranes in the car shop and promptly replaced by new pieces without holding the engine on a car-shop track for more than a few hours.

The car-shop arrangement with through tracks and bays running transversely with the length of the building is unique only in the number of tracks housed under the single roof. The scheme of having an overhead crane to serve two tracks along which it moves longitudinally has been used elsewhere in several instances, but by limiting the track length to 180 ft. and by adding two-track bays with cranes to give the required track space the designers have provided a compactness of arrangement and a rapid means for transporting material that is most desirable.

Contrary to the usual custom, the shop floors are depressed alongside the tracks as is generally done only in the case of inspection sheds. This scheme, however, has been found to work out very satisfactorily in practice. The general movement of material to and from the machine shop and storeroom is, of course, at right angles to the pit tracks, but as passageways with floors at rail level are provided at each end of the pits and connected to the depressed portions of the floor by ramps, no difficulty of transporting material is experienced.

Power is supplied within the shops by overhead trolleys, of which some carry reduced voltage. These have pendant connections, and the general use that is made of this convenience could be copied to advantage in many electric railway shops throughout the country. Workmen are never seen pinching or pushing trucks from place to place. Invariably temporary connections are made to the motor leads, and the trucks are made to move themselves as desired. An enormous amount of time and trouble is saved in this way, and it is undoubtedly due in part to this as well as to the other labor saving devices, such as individual traveling cranes for the machine tools in the machine shop and the telpher operating in the machine shop, storeroom and

car-locomotive shops, that such rapid and satisfactory work is turned out by the shop force. Hand trucking and the use of slow and costly hand jacks seem to have been absolutely eliminated.

#### A STRIKING EXAMPLE OF THE VALUE OF PUBLICITY

When the thirty-five railroad systems that are appealing to the Interstate Commerce Commission for permission to increase freight rates prepared to present their case, one of the first things done was to arrange that the arguments and evidence should reach the public ear as well as the ear of the commission. To accomplish this, bulletins were prepared and have been sent out two or three times a week to the newspapers and other publications of the country, to legislators, members of Congress, governors, college professors, commercial organizations, shippers and everyone else who would have an interest in, or whose opinion would be likely to influence the case for or against, the railroads. These bulletins set forth the railroads' cost of living, and from every possible point of view presented the reasons why the railroads should be allowed to increase rates. The bulletins are confined to matter filed with the commission either in the form of testimony or argument; they are broken up into brief paragraphs with an ample number of subheads and black type to bring out, so that he who runs may read, the important points in the case.

Senator La Follette thinks that this effort to lay the case for the railroads before the public was a crime, and he proposes to prohibit by law anything of the sort in the future. So far as heard from there is no one but the Wisconsin Senator who holds this view. On the other hand, the railroads have been congratulated upon the frankness and effectiveness with which they have set forth their case. A newspaper editorial before us says that "One of the very best things the railroads have done recently was to inform the public about their own business. They did this through the issue of a great number of statements. It was a campaign of education that shed light upon rates and needs, wages and earnings, income and outgo, about which the public, which foots the bills, was ignorant."

There is no danger that this form of public education will be prohibited. It is, in fact, encouraged by common sense and approved by the sense of fairness which has not disappeared from the earth, even with respect to railroads. Even the murderer and the burglar are entitled to their day in court. But this phase of the case hardly requires affirmative argument. The methods and successes of the steam roads' campaign in behalf of increased freight rates is referred to more for the purpose of emphasizing the value and necessity of this kind of public education on behalf of the electric railways of the country. In some respects their need for higher rates has been overshadowed by the demands of the steam railroads, but the necessity in their case is certainly no less.

#### THE OPERATING RATIO

One of the most common units of comparison presented in electric railway financial reports and used by the investor is the operating ratio—that is, the percentage which the operating expenses bear to the gross operating revenues. There are, however, two strong objections to the use of this figure for comparative purposes. In the first place, different companies pursue various methods for the inclusion of certain items in operating expenses, such as taxes and depreciation charges. It is unnecessary to say that the operating expenses of two roads are not comparable unless items identical in character are included therein.

In the second place, the operating ratio considered by itself is useless for comparison even in cases where the operating expenses do contain analogous items unless full allowance is made for differences in operating conditions. For instance, when one realizes that the operating ratios vary as greatly as from 36.4 on the Hudson & Manhattan Railroad and 41.76 on the Interborough Rapid Transit Company to 66.1 on the Detroit United and 69.02 on the Boston Elevated Railway, the necessity of a knowledge of all of the qualifying factors is evident. Differences in length of track, character of road-bed and rolling stock, grades, equipment used, character of territory traversed, cost of labor, relative importance of allied industries and many other factors have more or less effect on the amounts expended yearly for operating expenses and hence on the operating ratio. Moreover, the financial policies of the companies may make comparisons ineffective, as, for example, when one railway charges as much as possible of permanent improvements to maintenance and the other as little as possible.

The operating ratio is of value, however, as affording a means of approximately judging the performance of two companies operating under approximately the same conditions or of the same company during a series of years if the same general policies in regard to the accounts are followed. It will not tell, of course, where any differences lie, but a very high or a very low operating ratio will often call attention to the necessity of detailed comparisons. Hence, in making a comparative analysis of the operating ratio from year to year, it is wise to consider separately the main features of the operating expenses, for only in this way can the trend of fluctuations in the various groups be traced. The value of this method may be seen, for example, in the case of the conducting transportation expenses, where as low an increase as possible in connection with increased traffic and increased passenger revenues is an important measurement of operating efficiency.

In some cases where there is a large rise or fall in the gross operating revenues it is better to base efficiency percentages simply on the operating expenses. The reason for this is that the change in the gross operating revenues renders percentages based thereon unserviceable for comparison unless there is a corresponding change in the operating expenses. Under

such conditions it is preferable to use the relation of each operating expense division to the total operating expenses. Then, if there is a radical change in the individual group percentages during the period with only a slight change in the total operating expenses, the indications point to something wrong.

These are points which a railway desiring to publish a complete annual report may well bear in mind. By giving an analysis in the body of the report to show the changes during the period in the component parts of the operating expenses, on one basis or the other, the company would afford the stockholder and the investor a better opportunity to judge the efficiency of the management. Some railways at present show these increases or decreases in amounts, but it would be better to show them in percentages, for these show variations to a finer degree.

#### THE WASHINGTON HEARING AND THE ASSOCIATION

The hearing in Washington on the subject of the proposed municipal operation of the electric roads in that city and the protest made by the American Electric Railway Association on the proposed bill furnish an example of what can be done by united action. With the exception of President King of the Washington Railway & Electric Company, all of the speakers who protested against the bill before the House committee were in no way directly connected with the immediate issue. They went to Washington because they believed, correctly, that the principle of private ownership and operation in other cities in the country might be affected by the plan suggested for Washington, and they were willing to contribute their experience for the benefit of the railway companies and the citizens of that city so that no mistake would be made. It was a situation which demanded prompt and co-operative action, and the services of those who understood best the fallacies of the municipal ownership propaganda were promptly volunteered. The different speakers were promptly notified that the request for a hearing on the merits of the bill had been granted by the committee in charge, and for six days, two days during each of the past three weeks, representatives of the railway industry in different sections of the country went to Washington and presented the most comprehensive collection of statistics on the subject of the municipal operation of electric railways which had ever been prepared. Such a series of statements cannot but have an important influence upon any unbiased set of men who read them, and should have their effect upon the committee and upon the House of Representatives to which the committee will report.

The situation at Washington may be duplicated at any time in any one of a large number of cities in this country, perhaps not in regard to municipal ownership but upon some other important question. This is one reason for the maintenance of the American Electric Railway Association. It is the agency through which the specialized knowledge of the country in regard to

matters which arise can be made available for the use of any member company. What was done in Washington can be done in any other city if the occasion arises and the call for help comes.

#### INNOCENCE AT SAFFRON HILL

We are loath to believe in metempsychosis, yet ever and anon come stray bits of evidence from the circumambient ether or elsewhere that almost persuade us to confidence. Just now comes a projection of odic force or something like that, from an etheric vibrator, or its kin, at Saffron Hill, which suggests with convincing force the reincarnation of the late Prof. Keeley. A French gentleman with a long enough American experience to acquaint him with the commercial value of publicity, has been weaving spells about the London daily press in a way to suggest the finest efforts of the lamented M. Svengali. By tradition one looks upon the London newspaper man as partaking somewhat of the hard-headed materialism usually attributed to his country, but in this instance he appears in the genial confiding rôle of a Wall Street lamb.

The inventor of the latest traction marvel, 300 miles an hour at no particular expenditure of energy, seems to have taken his cue from the alleged exploit of the Fish Commission of crossing the shad with the jelly fish to avoid bones, and has produced a fearsome blend of the late New England Portelectric system with the principles of electric dynamic repulsion enunciated by Prof. Elihu Thomson in a notable lecture before the Institute some twenty-odd years ago. His car, cigar-shaped as befits all of its kind, is hurled through space by the attraction of a series of solenoids distributed along the track. Meanwhile it is booted out of contact with the supporting structure by a series of alternating current magnets which impel it as it flies through space. It has no wheels save those supplied by the inventor and the admiring reporters. The result is, according to the inventor, that it practically eliminates all friction by floating in the air and can be driven at almost any speed desired with the expenditure of very little power. Besides such an achievement as this the Brennan monorail system and all that has gone before it sinks into utter insignificance. If two sets of wheels imply formidable friction and one set of wheels very little, then surely no wheels at all should bring complete escape from all the confines of dynamics. And the most delightful feature of the invention is that reporters, politicians, a worthy admiral or two, and other non-technical persons seem to have taken it with true British seriousness. A friendly acquaintance with our engineering confrères on the other side of the water had almost persuaded us that the supposed inability of the Briton to see a joke was baseless slander, but the incident of Saffron Hill brings us grave evidence to the contrary. We have looked in vain for a telltale "Adv." at the bottom of the newspaper accounts of this marvel, and have wondered.

To be serious, we do not fancy that our American

readers, hardened as they are by a long series of epoch-making inventions that have not worked, will attach very much importance to this latest marvel, nor do we think that American tramways will be denied sufficient capitalization to lay tracks and run motors thereon for some time to come. The American investor now hails from Missouri, although to judge from these latest reports, a sanitarium in that exhilarating climate might profitably be colonized from London. We shall await further details of the hypnotic project from Saffron Hill with vast interest. In the meantime we shall only suggest that those who think that M. Bachelet has discovered a new principle in transportation might look up with advantage the history of the other systems which have been proposed along this line. The same objection applies to them all and is expressed in our comments on the Albertson car about ten years ago, when we said editorially, "Why this struggle to avoid the smallest item of resistance at high speeds? Has not the Professor ever heard of air resistance, or does he plan to run his train in vacuo? If rolling friction, due to weight on the wheels, and track resistance properly so called, were the only obstacles to high speed, railroading would be a joy forever. The hundred-mile-an-hour train would be a back number, and no up-to-date witch would ride anything so slow as a broomstick."

#### THE NEW YORK MUNICIPAL CAR

Elsewhere in this issue is published the first of several articles on the remarkable car which the New York Municipal Railway Corporation has developed for rapid transit subway and elevated service. A large number of new features have been embodied in the design, construction and equipment of this car, and these will be described in proper course, but the departure which stands out most prominently as compared with previous cars for like service is the use of a width of 10 ft. and a length of 67 ft. to produce a vehicle which will carry a total of 270 passengers under the care of one trainman.

It is a remarkable fact that when the Public Service Commission of the First District, New York, was criticised at an open meeting of engineers held Oct. 17, 1910, for adopting a greater width for future subways not one of the speakers referred to the possibility of wider rapid-transit cars being used to advantage in them. Even the Commission defended the greater width on the ground that it permitted the use of the subway by electrified suburban lines operating cars narrower than Pullmans but say 2 ft. wider than the usual city rapid-transit car. It was, therefore, a most original and happy conception on the part of the New York Municipal Railway Corporation to adopt the widest possible car and thus make really effective use of the more liberal clearance. Furthermore, as the existing lines were to be operated in conjunction with the new ones, the decision for a wide car involved also the unusual procedure of adjusting the old lines to accommodate the new car, but the changes thus required will be a minimum because the new car will impose no appreciably

greater wheel loads on the present elevated structure than many of the smaller cars now running over it. The net gain of the change thus made is 25 per cent in possible track capacity alone. To be sure, no one can foretell when the ultimate track capacity of the new routes will be reached or on what sections it will first come, but it goes without saying that a 25 per cent increase over the present rush-hour saturation capacity of the New York subway would be a boon indeed.

Those who have followed interurban and electrified suburban car development are aware that cars of equally large dimensions have been built before, but so far as we know this has never been the case with such a combination of low weights, modest motor equipment, high schedules and enormous passenger capacity. The low weight is a revelation of the merits of the side-girder construction, for here is a high-speed motor car that in pounds per seated or standing passenger actually weighs less than surface cars constructed within the last decade. The use of only two 140-hp motors to propel a car weighing 61.4 tons when fully loaded at express schedules of 25 m.p.h. and maximum speeds of 50 m.p.h. is startling in comparison with the previous use by the same management of two 200-hp motors under an elevated car weighing 46.6 tons. No better proof could be found of the merit of the new tap-field motor than this comparison of equipments.

The impressive dimensions of the N. Y. M. car certainly have been utilized to the best possible extent. Obviously end doors alone were out of the question in a car 67 ft. long. The first thought would be to add a center door, but in this instance three pairs of double side doors are used, and these are located so as to divide the amount of passenger interchange as evenly as possible. Even during the hours of light traffic passenger movement will be faster than in other rapid-transit cars, for one-half of each doorway will still be available. In this connection, also, it should be stated that many of the stations will be furnished with ticket offices and stairways at each end instead of at the center only. This arrangement will avoid the common defect of long-train loading at many of the older designs of subway and elevated railway passenger stations where the middle cars of trains are crowded at the very time that the end cars are not even filled to their full seating capacity. Thus there is no question about the feasibility of this high-capacity car from the standpoint of quick station loading and unloading. Furthermore, as the present Brooklyn trains are never operated with less than two cars, it cannot be said that the new car will be too big for the minimum service requirements.

The comparisons with earlier types of city rapid transit cars as made in the article are offered in no invidious sense. Each car represented an advance in the art at the time that it was built, but its dimensions were usually fixed by ironclad limitations. The N. Y. M. design, however, incorporates with splendid advances in car construction and equipment a degree of foresight that makes it stand out among the cars of to-day as the new *Vaterland* and *Aquitania* do among the giants of the sea.

# Harmon Shops of the New York Central Railroad

The Repair Work for the 192 Motor Cars and the Fifty-seven Electric Locomotives in Service on This Road Is Handled in a Single Shop Possessing Numerous Original Features of Design—A Description of the Shop and Its Equipment Is Published

All of the repair work on the electric locomotives of the New York Central & Hudson River Railroad is done in a single shop located at Harmon, N. Y., and as the shop buildings and their equipment possess many original features of design which undoubtedly assist in producing the remarkably low maintenance costs obtained by this company, a description of the installation is given in the following article.

The shop is located at the approximate end of the main line electric zone, and at this point is made the change of motive power from electricity to steam. In consequence, the installation at Harmon includes a large roundhouse with complete terminal facilities for steam locomotives as well as the repair shop for the electric locomotives and cars. However, the organization for the care of the steam locomotives is entirely separate from that for the electric equipment, the electric zone being considered as a separate division. The shop facilities for the electrical equipment include, in addition to the main repair shop, a running-inspection shed through which pass all electric locomotives on their arrival at the Harmon terminal, and a local power house which supplies both the steam locomotive roundhouse and the electric locomotive shops with power, heat and light. This is under the jurisdiction of the electric division.

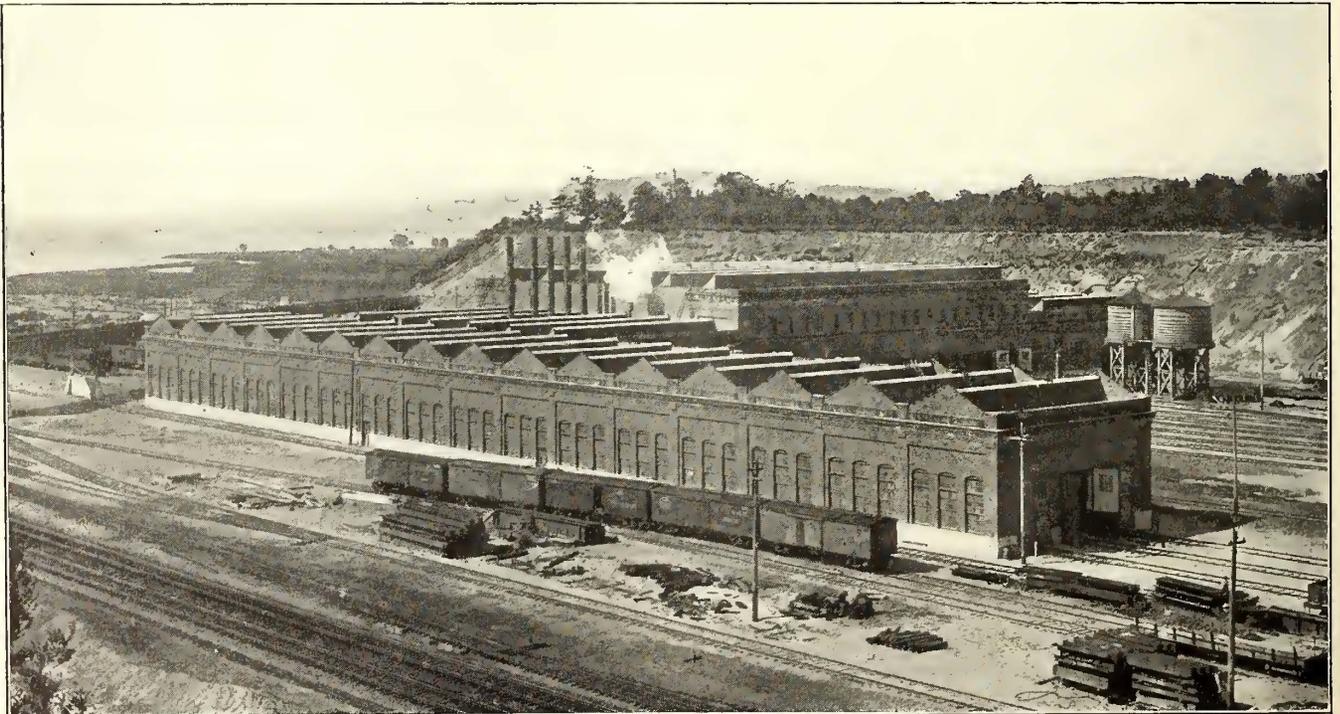
## RUNNING-INSPECTION SHED

The running-inspection shed, which is 400 ft. long x 25 ft. wide, is of wood-frame construction covered with corrugated galvanized iron, this temporary design being used on account of the possible extension of the electric zone. It houses a single track with a pit which extends for practically the full length of the building, and the floor, which is of concrete, is depressed about 8 in. below the top of the rail. The rails are fastened to longi-

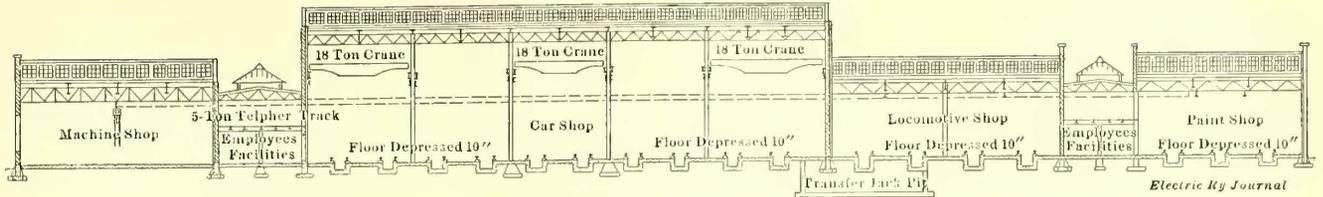
tudinal wood stringers with screw spikes. At 20-ft. intervals in the sides of the pit are compressed air connections and lighting plugs for portable lamps. The building is heated by forced circulation of hot water through pipe coils on the wall, a hot-water heater being installed at one corner of the shed. Tungsten lamps of 250-watt capacity are used for lighting, power being supplied from a local lighting circuit.

As all engines go through the running-inspection shed upon arrival at Harmon, sand, oil and water for the heater boilers are supplied to them at this point, and space is provided in the building for oil cans as well as storage for oil and waste. There is a sand bin over the center of the building and the sand boxes on the engines are filled from this by gravity, a pair of hoses extending downward from each side of the bin. The bin is supplied by a sand elevator of the bucket type which raises the sand from a pit alongside of the building, the latter in turn being supplied direct from the steam-locomotive sand-drying plant by sand cars which are emptied into the pit.

No third-rail is installed in the running-inspection shed. There is, however, a contact device which consists of an insulated pipe hung by offset brackets from a board, which is in turn attached to the roof trusses. The pipe contains a cable carrying 600-volt current, and the cable is bonded to the pipe at frequent intervals. On the pipe runs a small trolley with two wheels above and one below the pipe, and from this hangs a flexible cable incased in rubber hose. At the end of the cable is a long wooden handle with an iron shoe at the end that is connected to the flexible cable by means of a wire run through the center of the handle. This device is used for moving the locomotives in the running-inspection shed, the iron end being placed in contact with the third-



Harmon Shops—General View of Main Shop Building



Harmon Shops—Cross-Sectional Elevation of Main Shop Building, Looking North

rail shoe on the locomotive, thus supplying it with power. Two of these trolleys and cables are installed in the shed.

GENERAL SHOP ARRANGEMENT

As shown in an accompanying line cut, the shop arrangement is a transverse one with yard tracks extending direct between the running-inspection shed and a ladder track that serves the various doors in the main shop building, which houses all of the departments under a single roof. It should be noted that a large part of the work done in this shop is necessitated by the 192 motor cars and nineteen trailers used for the local trains on the electric zone, and that the work on the fifty-seven electric locomotives necessitates only a small portion of the shop area actually provided.

As shown in the general plan, the building includes a paint shop at the east side which is provided with three longitudinal tracks and has space for eighteen cars. Next to the paint shop is the locomotive repair shop, provided with four tracks extending through the building, and beyond the locomotive shop is a car shop which has ten tracks, both shops being 182 ft. long. All of these tracks are provided with pits and the floors are depressed 12 in. Passageways extend along the doors at both ends of the building. The floor here is at the elevation of the top of the rail, being connected by ramps to the depressed portion of the floor. West of the car shop is a machine shop 182 ft. long and 66 ft. wide, and south of the latter is an addition 140 ft. long and 66 ft. wide which houses the storeroom, oilroom and blacksmith shop.

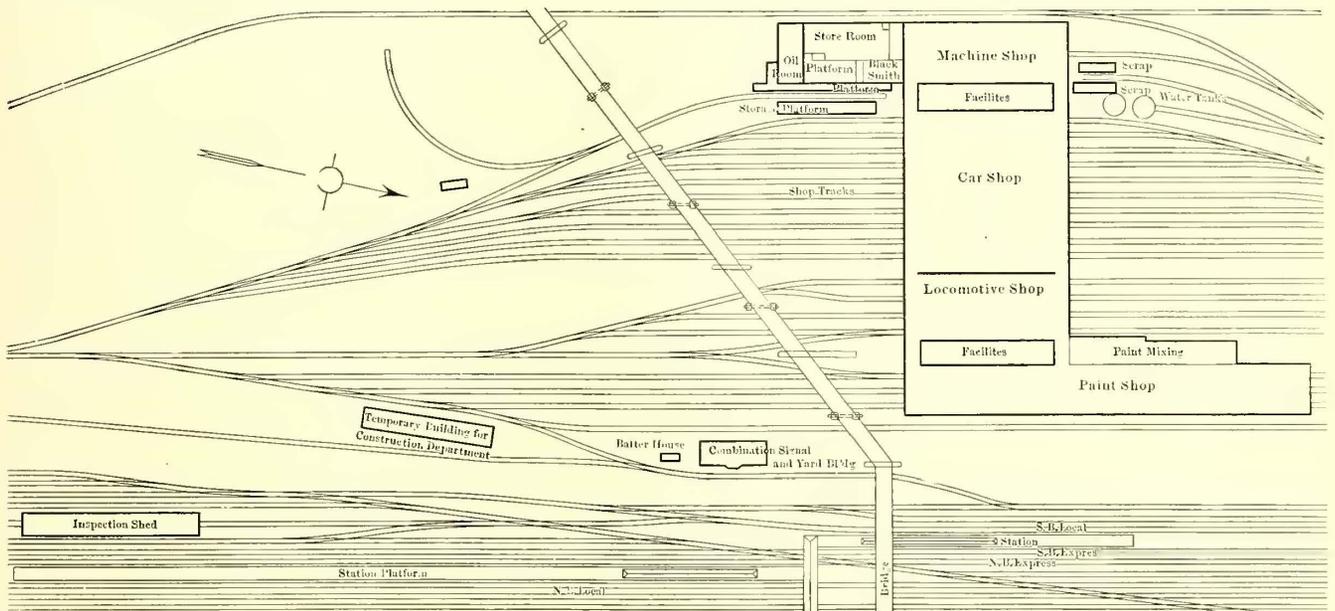
The various shops are heated by an indirect, hot-air system which has two separate fan and steam-coil rooms located at different ends of the structure. The artificial lighting is effected by tungsten lamps, and ample natural lighting is provided through the saw-

tooth roof construction that is a characteristic of all the buildings. Steam for heating is furnished from a power house located to the west of the main shop building. This supplies steam also to the steam locomotive roundhouse, in which are housed the locomotives for handling trains north of Harmon. There are no third-rails in any of the shops, but overhead trolleys with flexible hanging connections similar to those used in the running-inspection shed are installed for all tracks, including the transverse track in the passageway at the north side of the locomotive and car shops.

In the locomotive shop the two tracks at the east side are used for inspection only. The two tracks at the west side of the shop are provided with transfer pits in which are jacks that travel on rails under the floor to the car shop. The jacks are thus served by an overhead electric crane which is in the east bay of the latter shop.

Facilities for transporting material to the various pieces of apparatus between the different shops are provided by the passageways that extend along the north and south sides of the locomotive and car shops as these are continued into the machine and paint shops. Over the south passageway a 5-ton telfer track is installed, and this is connected in the machine shop through a switch to another track running longitudinally through the machine shop and storeroom. In the passageway at the north side of the locomotive and car shops there is a standard gage track. This extends into the machine shop across a turntable 13 ft. 8 in. in diameter and furnishes a means for handling wheels and trucks between the machine shop and the various tracks in the other shop buildings.

In the paint shop, which is 448 ft. long, are installed the customary adjustable scaffoldings for the use of the painters. Along the west side of this shop are a series of rooms providing employees' facilities, a small wood-



Harmon Shops—General Plan of Shop Buildings and Tracks

mill, space for the fan and coils of the heating system, for paint mixing, and for sash and door storage.

The storeroom, which is located south of the machine shop, is of moderate size although all stores required for the electric equipment are maintained at this point, except a small stock at North White Plains and another still smaller stock at the Grand Central Terminal. At the north end of the machine shop are two scrap platforms each elevated 2 ft. above ground level and both served by a single track between them which is depressed about 2 ft. below ground level. Each platform is 30 ft. long x 10 ft. wide but the amount of scrap on hand is normally small in amount, the material consisting mainly of old tires, brakeshoes and resistance grids.

SHOP EQUIPMENT

No overhead cranes are installed in the locomotive repair shop, but as previously mentioned there are two transfer jacks in deep pits. One of these is of 40 tons capacity and it has a short platform for use in dropping single pairs of wheels. The other is a 75-ton jack with a platform long enough to handle the truck of one of the new type of articulated locomotives. Both of the transfer-jack pits are carried under the wall between the locomotive and car shops, and they extend for 10 ft. into the east bay of the car shop so that wheels or trucks may be transferred by the jacks into this bay, picked out of the transfer jack pit by the 18-ton, overhead traveling crane and placed on the transverse track at the north side of the car shop for transfer into the machine shop.

In each of these jacks the platform under normal conditions is locked in place on cast-steel guides that hold the platform at the ends, so that the rails crossing the platform surface are maintained in line with the rails at each side of the pit. On the under side of each platform is a cap into which fits the top of the ram on the jack when the platform is to be dropped, but when the jack is not supporting the platform the latter is supported at floor level by hand-operated dogs that lock into the vertical guides.

The rams of the jacks telescope in three parts and are operated by water supplied from the shop system at a pressure of 100 lb. per sq. in. The ram is carried on a truck which has one of its axles geared to a driving mo-

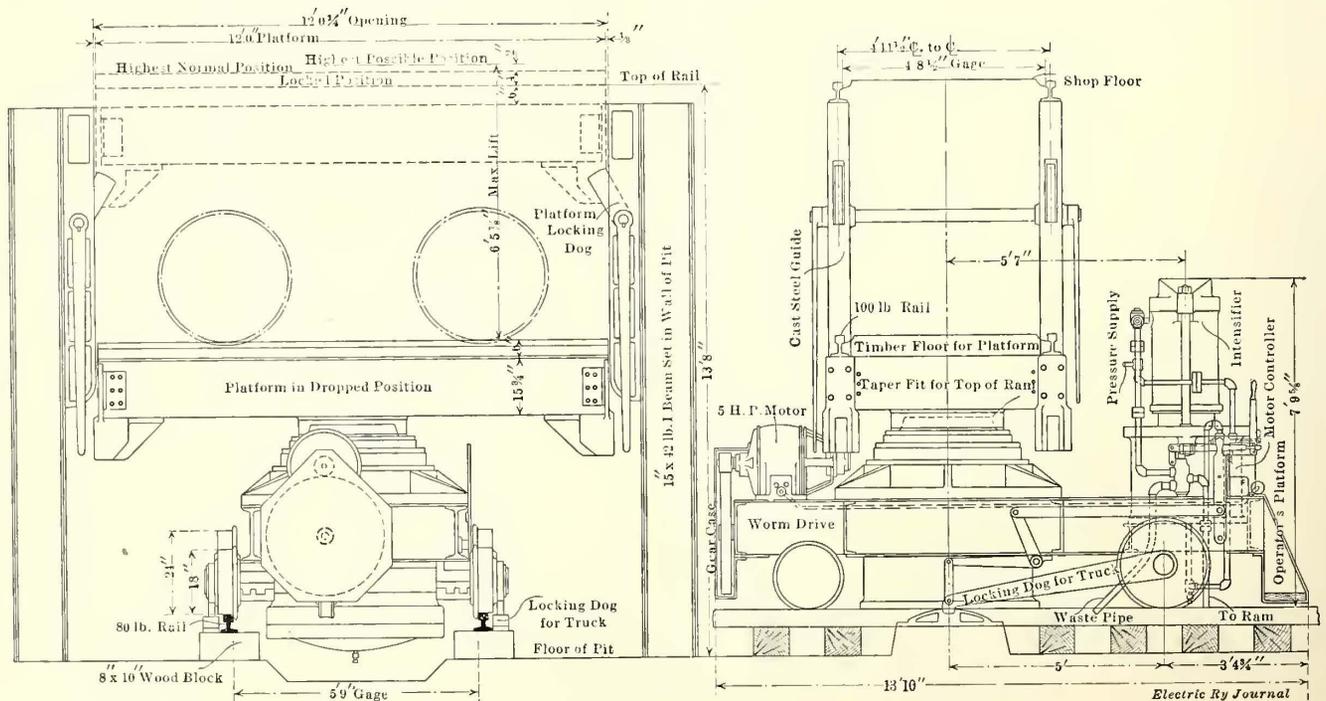
tor so that the truck may be moved along the pit as desired. Current is supplied to the motor by a flexible cable which can be connected to the lighting circuit by plugs in the sides of the pit. The transverse movement of the jack is effected at the low speed of 9 ft. per min., and the motor is geared to the truck axle through a worm. The truck is locked in position for operating by dropping a dog connected to one of the axles into a notched shoe alongside of the track, the cast-steel guides above mentioned extending only part way down into the pit so that when the platform is fully lowered the guides do not prevent its horizontal movement in the pit.

These jacks enable the shop force to remove and replace a pair of wheels in about three hours. Each of them is equipped with an intensifier that triples the pressure on the ram when desired, so that the springs of the engine from which the wheels are removed may be compressed 6 in. and blocked. In consequence, provision is made for the platform to be raised 6 in. above the shop floor level. The normal pressure is, however, used for all ordinary movements of the ram, which are made at high speed without use of the intensifier. The arrangement of the 40-ton jack is similar to that of the 75-ton jack shown in an accompanying line cut.

Overhead, 18-ton, traveling, electric cranes are provided in alternate bays of the car shop. These are operated by pendant cords from the floor. Crane girders are, however, provided in all bays so that those bays not now equipped may be provided with cranes in future. All three cranes travel for the full length of each bay and include the wheel track at the north end and the space served by the overhead trolley at the south end of the shop.

In the machine shop there are two turntables. One of these, as previously mentioned, connects with the track extending along the north side of the car shop. The other is used for handling wheels between a short storage track to the wheel press and to the wheel lathe, and it also provides a passageway for trucks carrying material along a track that extends longitudinally with the machine shop.

The previously mentioned overhead trolleys with flexible connections carry 600-volt current at all times except in the case of the line serving the transfer track



Harmon Shops—Front and Side Elevations of 75-Ton Drop-Pit Jack

at the north side of the locomotive and car shops. This line is sectionalized and supplied through switches mounted on the north building wall, the voltage being cut down by two 110-volt incandescent lamps in series with the switch. This arrangement is used for moving trucks along the transfer track to and from the machine shop, as connections can be made at the truck motor leads to the flexible cables depending from the trolleys and the trucks moved by power whenever the wall switch is thrown. The same scheme is used for moving trucks from under motor cars, and a great deal of heavy manual labor is thus eliminated.

DETAILS OF CONSTRUCTION

Ample provision for future extension has been provided for in the building arrangement. It is the plan to extend toward the west from the paint shop a second transverse shop similar to the present locomotive and car shop. This will be separated from the present locomotive shop by a transfer table and its construction will double the capacity of the shop in general. As shown in the illustration on page 244, the present paint shop at the east side of the main shop building is lighted by a saw-tooth roof, so that an extension can be made on the east side of this building without interfering with painting operations. This addition, when installed, will be used for a motor-car inspection shed. Extension of the present machine shop may, of course, be effected by making additions either at the north end of the present machine shop or at the south end of the present store-room.

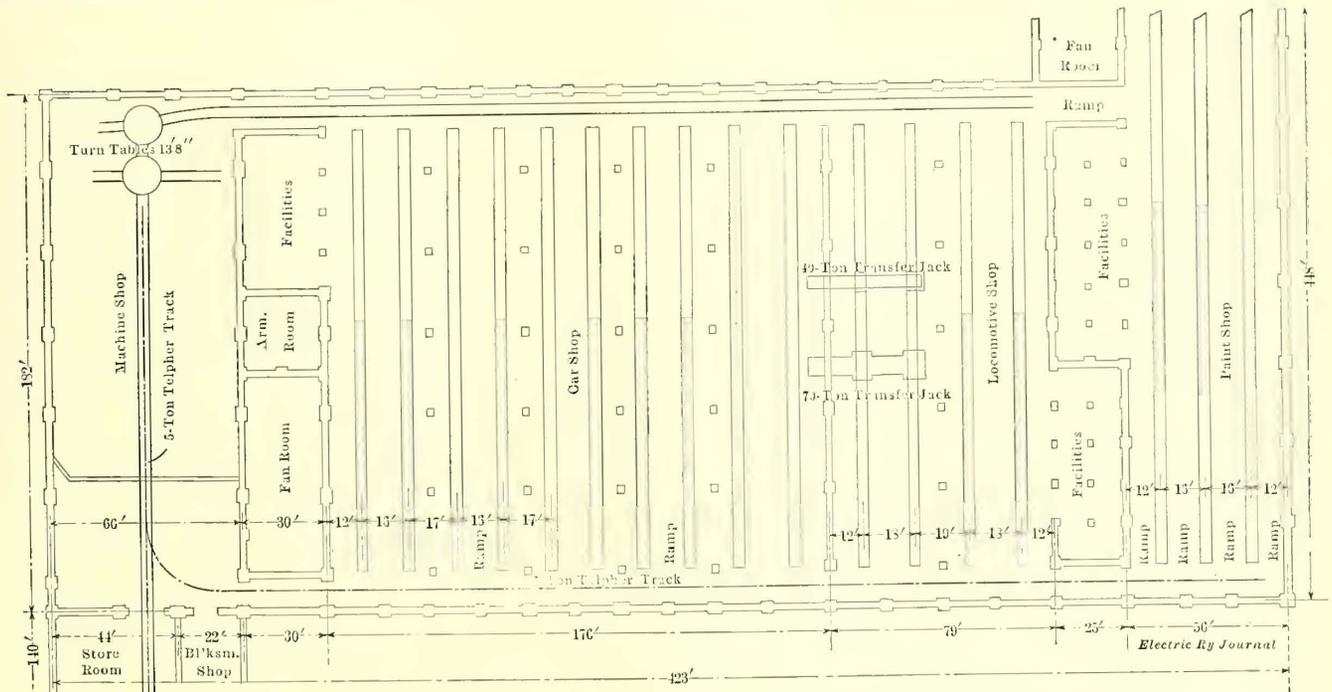
One of the most ingenious of the novelties introduced in the details of construction of the building will be found in the arrangement of the rails for the various shop tracks. In every case the concrete that forms the floor surface is beveled off so that for about 3 in. back from the rail there is a slight downward slope. The concrete at the side of the rail is therefore about 1/4 in. below the rail tread, and in consequence a truck or wheelbarrow passing across the track does not touch the concrete adjacent to the head of the rail, this being the point at which chipping or crumbling is most likely to start. Therefore, the floors along the shop tracks are in perfect condition to-day notwithstanding the seven years of service since the installation of the shop.

Flangeways for the track rails are formed in all cases by pieces of old rail set in a horizontal position with the head against the vertical web, the flange of the horizontal rail forming a guard for the flange groove. The horizontal rail is set at such a height that the top of the flange is at the same level as the top of the rail for the shop track. The plan of beveling off the concrete floor finish, so that the metal extends 1/4 in. above it, is used also in the case of the guard as well as for the outside of the shop-track rail.

The doors for the ten tracks extending through the locomotive and car shop are all of the swinging wooden type similar to those used in standard steam round-house practice. They are held open by latches on posts set in the ground or are held closed by wooden bars extending across the doorways. This type of door was adopted in preference to the rolling or lifting type because it was believed to be much more effective in case a fire should necessitate quick movement of equipment out of the shop. At the same time the simplicity of the design was considered to be an advantage from the standpoint of maintenance. The objection to the design which is most commonly made, namely, the difficulty of opening and closing the swinging doors when snow is on the ground, is of minor importance at Harmon on account of the small annual snowfall.

As mentioned before, the floor in the locomotive and car shop is depressed 1 ft. alongside of the track pits. This is a great convenience for exterior inspections and repairs to the trucks. However, the space between two of the tracks in the car shop was left at rail level for experimental purposes, but the experience of several years has gone to prove that the depressed floor is much more convenient in every way for both inspectors and repair men. The overhead cranes in the car shop and the transfer jacks in the locomotive shop naturally eliminate practically all of the necessity for using hand jacks. Nevertheless, to provide for emergencies jacking stringers have been installed alongside of each rail. These are set level with the depressed floor and are made up of wooden stringers resting upon a bed of sand to distribute the concentrated load.

On the second floor of each of the two low bays provided at each end of the locomotive and car shop are located the offices for the various foremen. The gen-



Harmon Shops—Plan of Main Shop Building, Showing Arrangement of Various Departments

eral foreman is located at the west side of the car shop so that his office overlooks the car shop and machine shop as well. In the offices in the low bay at the east side the building are the locomotive inspection foreman and the paint-shop foreman, a location which enables them to overlook their departments direct.

Contrary to the usual custom of having a single crane which spans the complete machine shop, a system of several small cranes has been installed. In general the facilities for transporting material in the machine shop consist of a longitudinal, 5-ton, telfer track hung from the roof trestle above it, together with a series of transverse 2-ton electric cranes of short span. The latter are installed over those machines that require crane service and they transport material between the center aisle and the machines as required. All are operated from the floor by pendant cords. The obvious advantage of this arrangement is that where each of the small transverse cranes serves but one or two machines it is always available for use when needed, and the machine operators never have to wait for crane service. When a single crane is installed to serve the whole shop the opportunity for lost time from this cause is, of course, greatly increased. The longitudinal telfer track, and a standard gage track which is installed beneath it, run through the machine shop into the storeroom so that raw material may be handled from the storeroom to the various machine tools, and on the other hand finished material handled from the machines direct to the storeroom.

The floor in the machine shop, in accordance with the usual custom, has been surfaced with wood to provide an easy footing for the machine tool operators. This floor has been constructed with spruce stringers set in tar-concrete and with spruce planking nailed on top of the stringers. Above the spruce planking a finish of maple has been nailed and the results of the con-

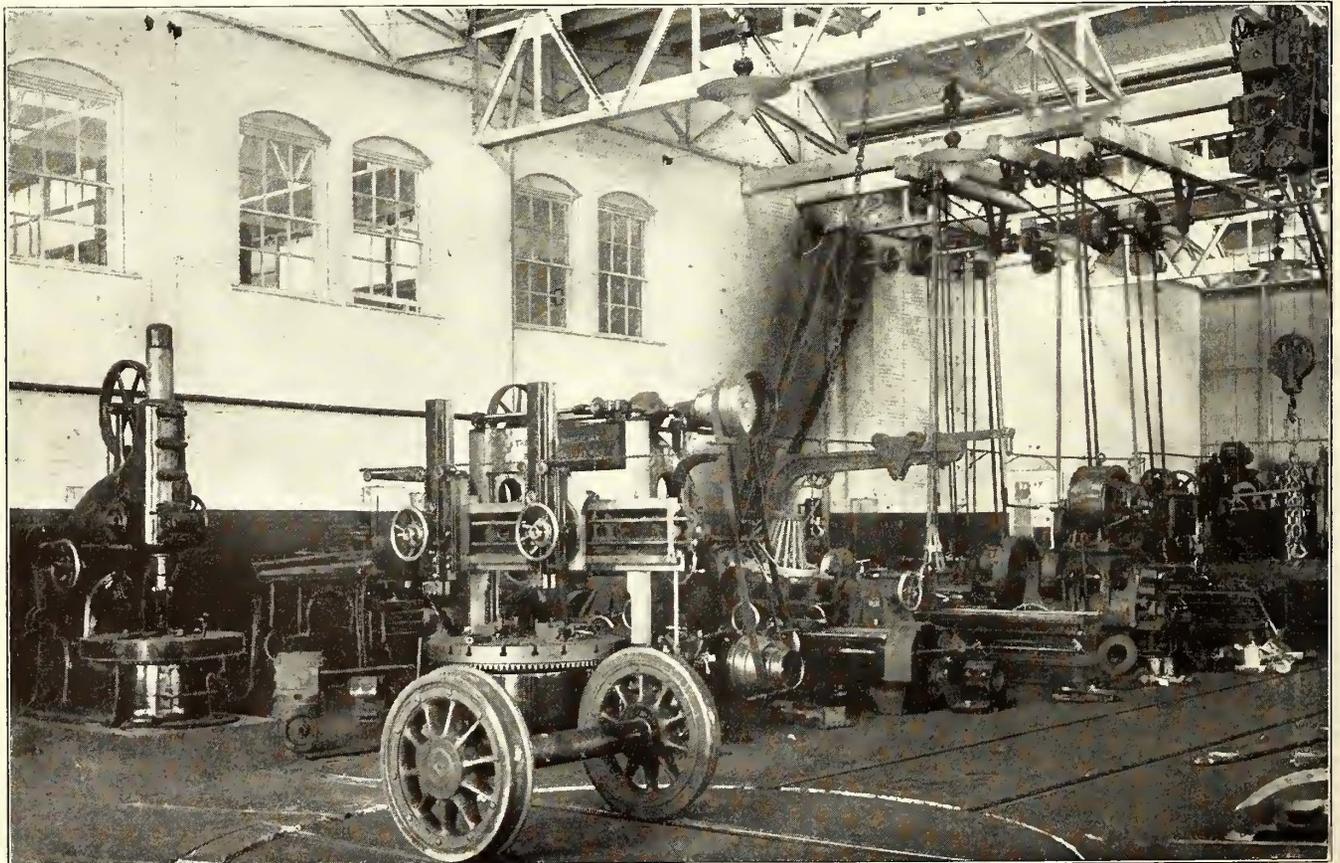
struction are shown by the fact that the floor is still in excellent condition notwithstanding its seven years of use. At the time when the floor was laid conduits were placed under it to provide for future installations of electric-driven machine tools. The ends of the conduits are located by circles of nails in the floor, and in case it is desired to make use of these electrical connections at any time all that is necessary is to cut a hole at the points indicated by the circle of nails. Another feature in the construction of the machine shop is the use of corrugated glass windows at the west side of the building. This is exposed to the afternoon sun, but the special glass diffuses the light so that no direct rays of sunlight enter the shop.

#### MACHINE SHOP EQUIPMENT

The machine shop is small when judged by steam railroad standards and the machine tools installed in it are limited in number. The list includes the following:

- 42-in. end-drive, hollow faceplate, carwheel lathe
- 60-in. old-style driving-wheel lathe for banding armatures
- 60-in. radial drill press
- 36-in. plain drill press
- 4-spindle sensitive drill
- Grindstone
- 51-in. vertical boring mill
- Carwheel borer
- 400-ton wheel press
- 30-in. planer
- 24-in. shaper
- Center-drive axle lathe
- 30-in. patent head engine lathe
- Centering machine
- Bolt drilling machine
- Single-head bolt cutter
- Double-head bolt cutter
- 15-in. Dill slotter
- Large punch and shear, 36-in. gap
- 24-in. engine lathe
- 16-in. engine lathe

A section of the shop is partitioned off by wire netting for a toolroom and this contains a toolmaker's lathe, a small drill press, a flat grinder, a universal grinder and a tool grinder. This department supplies



Harmon Shops—Interior View of Machine Shop, Showing 5-Ton Telfer at Right

only the incidental needs of the shop at Harmon, as the manufacture of tools is carried on in one of the larger shops on the railroad.

At the present time the armature room is also partitioned off from the floor of the machine shop. However, space for this department has been provided in the bay between the machine shop and the car shop. In the armature room is a coil winder and the usual benches and tools, although in general the electrical parts for replacement in the armatures and fields are purchased from the manufacturers, and only assembly work is carried on except in the case of air compressor motors.

The storeroom is provided with an elevated section which extends over approximately one-third of the floor space. This section is at the side of the storeroom adjacent to the loading platform along the storehouse track, and, in consequence, incoming material is handled from the car across the loading platform and into the storeroom without change of elevation. This elevated section, it should be said, is served by the same telpher track that extends longitudinally through the machine shop. Provision has been made for a mezzanine floor in case the future growth of the shop requires additional floor space. This floor will be hung from the roof trusses of the building, as these have been designed with sufficient strength to carry the additional load.

The blacksmith shop, which occupies a corner of the addition in which the storeroom is housed, contains four forges, a 1200-lb. steam hammer, a double dry grinder and an air-operated bulldozer. There is also a small furnace for use with the latter machine.

Originally a set of straightening rolls was installed as it was thought that when the steel motor-car equipment and the steel-housed locomotive cabs were placed in service much plate work would have to be done. However, it was found that there was very little work that involved the use of the rolls and for this reason they were taken out. A 36-in. center-drive carwheel lathe was also installed, but because this naturally cannot be used for turning tires on wheels that have armatures mounted upon the axles it is available only for turning tires for the motor cars and engine trucks. As the end-drive carwheel lathe is capable of turning out all the work required at the present time the old machine will be removed and set up in one of the other shops on the system, where the demand for a center-drive machine is sufficient to keep it in use all the time.

The vertical boring mill mentioned in the list above is kept fairly busy boring tires, and in addition it is used for a considerable amount of job work. The carwheel borer is not operated to any great extent, although it is used, of course, whenever wheel centers require boring. The same thing applies to the axle lathe, although this machine can only be used for axles upon which no wheels are mounted. In consequence, the installation of a 42-in. engine lathe which will swing a pair of mounted wheels has been considered owing to the fact that such a machine would not only provide a means for turning journals but would be, also, a substantial tool for heavy miscellaneous work. The Dill slotter mentioned in the list is used only on occasional jobs and for this reason its universal features and ease of adjustment for the work are obvious advantages.

The machine shop, it may be said, does a considerable amount of outside work in addition to that involved by the repairs to motor cars and electric locomotives. All of the machine work for the car-axle lighting systems on the through passenger trains of the New York Central which would ordinarily be done at Mott Haven is transferred to Harmon. In addition the machining of third-rails required by the third-rail department is carried on and also general work for the contractors who

have been occupied for several years past in various pieces of construction work on the line. This includes drill press, planer, punching shear and bolt threading work.

#### ACCOUNTING FOR POWER IN CHICAGO

An interesting consideration of the plan for accounting for power in Chicago is contained in the recent statement made by B. J. Arnold in regard to the methods of keeping the books of the Chicago City Railway according to the provisions of the 1907 franchise ordinance. Some other portions of this statement were published in the issue of this paper for May 23.

The accountants criticised the removal of \$230,208 from the renewal and depreciation fund, the main item being a proportion of the payment to the Commonwealth Edison Company for power, amounting to \$199,278. The 1907 ordinances contemplated that the company would build and maintain its own power plants and that renewal and depreciation upon the entire property, including power plants, would be covered by the 8 per cent of the gross receipts. Prior to the expiration of the rehabilitation period, the Chicago City Railway Company found it more economical to purchase its power than to manufacture it, and accordingly on June 1, 1908, the company entered into a power contract with the Commonwealth Edison Company to furnish its entire supply. The cost of the power, according to the contract, was composed of two items—the "primary charge" representing the investment cost of the plant producing the power, such as interest, taxes, insurance, renewals and depreciation, and the "service charge," covering the cost of producing the power.

Inasmuch as the power bill rendered to and paid by the company included this "primary charge" composed in part of the renewal charge, it was deemed equitable by the board that the company, in lieu of renewing its own power plant, was entitled to charge to renewals such a proportion of the power bills as the company would have had to pay for renewals and depreciation of its own power plant had such been built. This amount was ascertained by the board and the company was authorized to charge that proportion of its power cost against the renewal fund. The question remained in abeyance until the ordinance for the unification of the surface lines was taken up, and now it is considered that the passage of the unification ordinance by the Council has confirmed the basis of accounting adopted by the Board of Supervising Engineers.

Another aspect of the accounting for power criticised by the public accountants was the fact that a portion of the power purchased by the Chicago City Railway was sold to the Calumet & South Chicago Railway at the same price paid for the power by the Chicago City Railway, but that the sale of the power was credited to the income account rather than deducted from operating expenses. In answer to this, Mr. Arnold states that the board followed the standard practice approved by all other accountants employed by the city since the 1907 ordinances and also approved by the Interstate Commerce Commission as set forth in Case 433. If, as the accountants intimate, this item should not be credited to the income account, Mr. Arnold remarked that they should deduct from the amount paid by the company for the renewal fund 8 per cent upon the cost of power so sold. In other words, under the practice followed by the board, the result is to place in the renewal fund annually 8 per cent upon the cost of the power sold by the Chicago City Railway to the Calumet & South Chicago, resulting in an increase each year to the renewal fund of the Chicago City Railway of approximately \$16,000.

# Publicity Forum in Toledo

### An Account of How Mr. Doherty Has Appealed to the People—Criticisms Requested and Answered in the Daily Papers and Through Leaflets in the Cars

The "publicity forum," as adopted by Henry L. Doherty to bring out every phase of the street railway situation at Toledo, Ohio, is attracting the attention of public utility men throughout the country. When Mr. Doherty went to Toledo to negotiate for a renewal of the franchise for the Toledo Railways & Light Company, he found that the people had, through continuous pounding by politicians and newspapers for the past twelve years, been almost completely converted to the 3-cent fare idea, without giving any thought to the class of service that can be offered at this rate in a city located as Toledo is. Looking upon the street railway business as entirely different from any other in existence, they had taken it for granted that 3 cents is sufficient because they had been told so over and over again through all these years, although nothing has been done to prove the truth of the assertion. They had simply taken it for granted.

Mr. Doherty realized that a franchise on any other basis would be difficult to secure, with the people holding

this belief. He, therefore, studied the situation carefully and analyzed the conditions existing, not as respects the city officials and the administration in general, but surely as regards the people. After all, he knew they hold the balance of power and have the final approval or veto of every proposition, and he determined to go to them directly with this question. The problem was how to reach them in the most effective manner and lay before them the facts for their consideration, rather than mere assertions, such as they had been accustomed to read and hear from the other side. That they could not digest pages of figures he knew very well, but if something could be presented that would excite their interest and cause them to take up the different phases of the business and study them, the rest would be easy.

#### COMMENTS AND CRITICISMS REQUESTED

Mr. Doherty reasoned that the methods used to impress the 3-cent idea so firmly upon the people could also be used more effectively than anything else in laying before them the facts regarding the main issues. He knew that the time at his disposal would be very much shorter than that used by the politicians and that it would be necessary to find something that would

## SO THE PEOPLE MAY KNOW

### CRITICISM No. 1.

"We don't want to give a franchise to anybody who won't obey the city ordinances. The city says you must run your cars for 3 cents and you are a law-breaker if you don't do it."

If we are law breakers because we do not comply with the city ordinance that attempts to compel us to carry passengers for three cents, then if the council were to pass an ordinance requiring us to carry passengers for two cents, one cent, or for nothing, we would still be law-breakers.

**Can Any Sane and Reasonable Person in Toledo Believe the Council Can Pass an Ordinance Requiring Us to Carry Passengers for Nothing?**

No rate of fare can be made binding on us unless it is a reasonable rate.

A city ordinance that provides unreasonable rates is in conflict with common honesty and with the constitution of the United States.

A city ordinance—and especially one like this—passed for political purposes, can neither override the principles of common honesty nor the constitution of the United States.

To prate about this ordinance as being binding on us IS EITHER A BAD Joke OF IGNORANCE OR PURE "BUNK."

The City Solicitor knows this or ought to know it.

We have tried our best to get the City Council to demand a written opinion from the City Solicitor.

If the legal department wants to be fair and if they still maintain that this ordinance is binding upon us, then they ought to give a written opinion to that effect and pledge their professional reputation to that effect.

But in addition to its being self evident that the ordinance is not binding upon us, the matter has already been passed upon by the United States Federal Court.

In the opinion handed down by Judge Kullbitt on March 31 he says:

"That the company shall lose its right to question the reasonableness of the conditions imposed upon it on the assumed interest of the public, because it serves the public, is intolerable."

"If these ordinances are unreasonable exactions, they are as if they never had been passed by the council, and the company is not affected by their presence on the ordinance books. It may continue to operate its cars until the city ejects it, without reference to them. They are not self-enforcing."

"The fear (of the company) also takes no account of the obvious duty OF THE PEACE OFFICERS OF THE CITY TO PROTECT THE COMPANY IN ITS RIGHT UNTIL THE ORDINANCE, WHICH IT QUESTIONS, IS TESTED AND DETERMINED."

But let us go further and point out that we have leaned backwards in our desire to earn the reputation of law-abiding citizens.

Instead of demanding our legal rights we have allowed those to ride free who have refused to tender more than three cents.

We have an abundance of letters to prove that our method of handling this matter has earned us the commendation of a large number of the honest, law-abiding citizens.

We believe that our policy will sooner or later earn us the unqualified support of all lovers of law and order and fair play.

**Every Man and Woman Who Believes in Fair Dealing Is Either Paying the Fare Requested by Our Conductors or They Are Acting Under a Misunderstanding of the True Facts.**

We ask those who understand the facts and believe in fair play to help convince those who want to be fair, but are misinformed.

We want to win out here by securing the good will of the people and not by an appeal to courts or the police.

Low fares can only be secured by cutting out unnecessary expense.

In some important matters this can only be done with the assistance of the city authorities.

Low fares were secured in Cleveland by constructive action of the city authorities.

We will tell you later some of the steps that were taken.

As an example, over 1200 stops were eliminated.

You could not have produced the flying machine by drastic regulation NOR CAN YOU GET LOW FARES AND GOOD SERVICE BY THAT METHOD.

Yours for Law and Square Dealing

**Toledo Railways & Light Company**

## So the People May Know

### Criticism No. 5

**"The Street Railway Company Should Be Owned by the City or a Corporation Whose Stock Is Owned by Toledo Citizens. We Don't Want New York People to Own Our Street Railways."**

Our critic either wants the city to own the street railway company or Toledo citizens to own it. He doesn't want New York people to own it.

Well, New York people don't own it. Henry L. Doherty & Co., with headquarters in New York City, own it.

Of more than 300 people who make up the owning force of the New York office of Doherty & Co., not over 5 per cent are native born New York people.

They have been drawn into the organization from various municipalities and the various properties controlled by the Doherty organization.

No doubt as the New York organization grows, a number will be taken to New York from the Toledo property.

WHILE DOHERTY & CO. CONTROL THE PROPERTY, THE REAL OWNERS ARE THE STOCKHOLDERS.

**Army of Small Stockholders.**  
Nearly all of the stock of the Toledo company will sooner or later come into the ownership of our clients.

WE REPRESENT AN ARMY OF SMALL STOCKHOLDERS. Not over 2 per cent of them belong to New York. They represent practically every State in the Union.

**Over Half Are Wage Earners and Half of That Half Make \$500 Per Month or Less.**

So that dozens of the New York citizens own shares for MUNICIPAL OWNERSHIP.

We don't believe in municipal ownership, but risky as you about this.

The city can take over our street railway system tomorrow if it wants to, by condemnation proceedings.

WE HAVE MADE IT STILL EASIER FOR THE CITY TO HAVE MUNICIPAL OWNERSHIP, IF IT WANTS IT.

**Easier to Get City Ownership.**  
We have provided for municipal ownership by arbitration. The city, therefore, can acquire the street railway property by either condemnation or arbitration.

In other words the great old franchise makes municipal ownership easier.

So that ought to dispense of the municipal ownership feature. Probably no city can ever provide the necessary capital among her own citizens to finance all the great enterprises in that city.

Your Commerce Club and other civic organizations have as their chief undertaking, attracting new capital to Toledo.

If that organization knew tomorrow that it could secure several outside capitalists to locate a factory in Toledo, the officers would have no stone unturned to get them here.

Isn't it even more essential that capital already located in Toledo be treated in a way that will in itself be the means of inviting others to locate here?

We have already spent over a million and a half dollars in new improvements in the year we have been here.

IF WE CAN AGREE WITH THE CITY ON THE FRANCHISE QUESTION WE WILL HAVE TO SPEND AT LEAST TWO MILLION IN IMPROVEMENTS THE VERY FIRST YEAR.

**All Toledo Benefits.**  
Is there any man in Toledo who will say that an influx of foreign capital into the city will not benefit every avenue of trade here?

Where will all this money go?

There is hardly a merchant in Toledo who won't get some of it. The old Pope Toledo plant lay idle in Toledo for a long time. Local capital could have secured it for little outlay.

BUT IT TOOK AN OUTSIDE CAPITALIST WHO HAD BIG VISIONS, DREAMED GREAT DREAMS, TO MAKE POSSIBLE ONE OF THE WORLD'S GREATEST INDUSTRIES.

Foreign capital poured into Toledo, advanced the city to world-wide made it an industrial leader.

Was that a good thing for Toledo?

Does anybody suppose that such a great industry as the Ford Motor Works could ever have been built at Toledo on local capital?

Suppose the electric light company had been owned by Toledo people.

Does anyone think that over 80,000 Mazda lamps would have been added to the illumination situation within one year?

It is only a large company, operating many utilities, such as ours, that can employ the most skilled experts that no local company, or a company operating only one plant could possibly afford.

In every city there is constantly a multiplicity of things that call for local capital. Now industries would often locate in a city if they could get financial assistance from the people of that city.

SUPPOSE YOU TAKE TEN MILLION DOLLARS OUT OF THE CITY OF TOLEDO TO INVEST IN A STREET CAR SYSTEM.

**Need Outside Capital.**

HOW MUCH IDEAL CAPITAL DO YOU THINK THERE WOULD BE LEFT IN THE CITY TO TAKE CARE OF THE MANY WORTHY PROJECTS THAT CONSTANTLY REQUIRE THE HELP OF A COMMUNITY?

Any community that tried to depend entirely on its own resources that tried to finance every detail itself and did not go on the outside and induce capital to come in, would never get very far.

OUTSIDE CAPITAL MEANS NEW BLOOD, NEW LIFE—MORE PEOPLE AND MORE MONEY IN THE CITY.

The great cities of the world have been built because the eyes of custom capital were turned towards them.

TOLEDO HAS MANY AND VARIED INDUSTRIES BECAUSE HER WONDERFUL GEOGRAPHICAL LOCATION HAS ATTRACTED THE EYES OF OUTSIDE CAPITAL.

Whereas the more or the company who have faith enough to come into your city to furnish the money to make your transportation system a great credit to your city.

The street railway system is the main artery of a city. It can not give the severe Toledo needs without the help and co-operation of all, and there should be encouragement on every side.

Make Toledo a place where all honest outside capital is not only where profitable investments are not placed in the gateway at projects where prejudice against men of business is not allowed to poison the minds of the people, and then see whether Toledo will not take the place among the great cities of the world, that she should have occupied long ago.

**Capital Develops Industry.**

TOLEDO MUST HAVE CAPITAL TO DEVELOP HER MARVELOUS RESOURCES. WHERE ELSE CAN SHE GET IT UNLESS THE INDUSTRISTS HELD OUT ARE STRONG ENOUGH TO ASSURE THOSE WITH MONEY THAT TOLEDO STANDS READY TO HELP THOSE WHO HELP HER?

That should dispose of the contention that the street railway system should be owned by Toledo citizens.

But it does not let us add this:

If the Toledo citizens want the street railway property we will sell it to them by arbitration.

THE ONE THING TOLEDO CAN'T AFFORD TO DO IS TO MAKE IT IMPOSSIBLE FOR ANYONE TO PROVIDE THE FUNDS NECESSARY TO KEEP PACE WITH THE GROWTH OF THE CITY.

If Toledo suffers for many years because it lacks adequate transportation, it will not be our fault.

That is a matter which concerns the welfare of the city of Toledo and every citizen.

THINK IT OVER AND THEN

**Judge for yourself.**

Henry L. Doherty & Co.

attract attention quickly. After careful consideration, he concluded that criticisms of the company and the proposition it had to make to the city would at once attract the attention of almost every citizen of the municipality. He, therefore, published a request in the newspapers for criticisms, favorable or unfavorable, as the case might be, of any point in the proposition the company had made to the city, or of anything else in connection with the company and those connected with it. He promised to publish these criticisms in large type in the papers, together with his replies and comment upon them, however bitter they might be.

Space was secured in the two leading newspapers of the city, the *Toledo Blade* (evening) and the *Toledo Times* (morning), and as soon as the first criticism arrived, it was published, together with the reply, which was couched in language that was blunt and to the point. The second criticism received the same treatment, and this plan has been continued right along until the number on May 27 had reached thirty-five. The caption over most of these discussions, printed in large letters, is "So the People May Know." The space has varied from five columns to a page, but it is always sufficiently large to bring out the matter in good style.

In addition to the two daily papers, the company is using twelve weekly publications for this publicity. It

has been found that they reach people who are particularly interested in them and often they are read in the evening, on Sunday or some other time when the reader has plenty of time to digest the statements and arguments they contain.

In a brief manner this describes the publicity forum. Mr. Doherty desired to adopt a plan which would give him the largest audience, and he felt that greater interest could be aroused in this way than by public speaking, and that people would remember more of it than from merely hearing it repeated. In many ways this work has been supplemented. Mr. Doherty has taken advantage of all opportunities to speak to societies and organizations, in this way becoming personally acquainted with many of the city's people.

Within the past few weeks attention has been called to the forum by a large electric sign placed at a vantage point in the city. Billboards have also been used for the same purpose. The large bills, printed in colors, may now be seen in many parts of the city, all of them urging people to read the publicity forum.

Feeling that many people had not read the first criticisms printed in the newspapers, the company began placing reprints of them in the car boxes some time ago. At first 10,000 of them were printed every two days, but later on 30,000 were required to keep the boxes

TIMES 4-24

# SO THE PEOPLE MAY KNOW

CRITICISM No. 6.

**"A Franchise Should Not Be Given to Any Private Corporation. Private Corporations Are for Private Profit."**

As long as capital can be invested with the expectation of profit, it will be so invested.

When a profit is denied capital in one line of business, it will leave that business and go to some other line.

**WHEN CAPITAL IS DENIED A PROFIT IN ONE CITY, IT WILL GO TO SOME OTHER CITY.**

When capital is denied a profit in one country, it will go to another country.

Trying to make capital take less than it can command elsewhere is the chief occupation of a large group of mis-informed reformers.

Often they carry it to such an extent that for EVERY DOLLAR THEY SAVE THEIR COMMUNITIES THEY CRUCIFY A THOUSAND DOLLARS' WORTH OF OPPORTUNITIES.

This is a policy that saves at the spigot and wastes at the bung.

This country needs half again as much mileage of steam railroads as it now has.

### But Remember This

As long as the public insists that a railroad system can never be worth more than it costs to build, we are not likely to get the railroads we need.

If some of these railroads were built, it would add to the adjacent land value alone at least \$3 for every dollar that the railroad would cost.

Men and capital could probably be found to build these railroads if they could have some of the profits they would create; BUT THEY ARE TOLD BY SELF-STYLED DICTATORS OF PUBLIC THOUGHT THAT THEY CAN HAVE NOTHING BUT A NOMINAL RATE OF INTEREST ON THE ACTUAL PHYSICAL VALUE OF THEIR PROPERTY.

And then we wonder why the country don't grow and prosper as it should.

### Isn't It Plain?

We wonder why business is not better.

We wonder why there is a large army of unemployed.

I wonder why we wonder.

I can't see the riddle.

The country cannot grow and prosper without railroads.

**WHY SHOULD ANYBODY BUILD THE RAILROADS AND ACCEPT THE RISK OF LOSING THEIR CAPITAL IF IT PROVES A BAD INVESTMENT, WHEN THEY ARE DENIED A PROFIT IN IT PROVES A GOOD INVESTMENT?**

Every day this country is losing brains, industry and capital to other countries.

When I go out to raise money for my public utility enterprises, I often find myself in competition for capital with Dr. F. S. Pearson and Percival Farquhar.

These two men are empire builders.

They are both Americans.

They have probably raised two hundred and fifty million dollars of new capital in the past five years.

Very little of this capital is used to develop the United States.

### Driving Capital Away.

There are building railroads in other countries, principally in Brazil and Argentina.

IT IS, INDEED, TO BE RECORDED THAT AMERICAN BRAINS, AMERICAN ENTERPRISE AND CAPITAL THAT SHOULD AND COULD BE USED TO

DEVELOP OUR COUNTRY IS USED ELSEWHERE, BUT CAPITAL TENDS TO GO WHERE IT IS THE MOST SOUGHT.

If Pearson and Farquhar were operating in this country, they would probably be confronted at every turn with drastic criticisms and drastic legislation.

I sometimes envy them the praise, support and encouragement they get in the other countries.

**BUT I HAVE UNBOUNDED FAITH IN THE ULTIMATE GOOD SENSE OF THE AMERICAN PEOPLE.**

I cannot believe that the word promoter, as applied to the man who creates and builds, the man who stimulates business and industry, will always be used as a slur.

Let us hope that instead of driving more men of brains and enterprises out of our country, that we will even bring back those who have left us.

### How to Do It.

**THE BEST WAY TO DO THAT IS TO ENCOURAGE AND STIMULATE THOSE WE HAVE STILL WITH US.**

Drastic legislation can easily keep capital out of any community.

Drastic legislation cannot compel capital to come into any community.

Toledo should have a minimum of 200,000 more people in the next twenty years.

There should be an increase of at least 50 million dollars in real estate values, exclusive of improvements.

**THE GREATEST FACTOR IN CREATING THESE VALUES WILL BE AN ADEQUATE TRANSPORTATION SYSTEM.**

No one can provide such a system on a day-to-day basis.

Capital cannot be found to develop the street railway system of Toledo if it cannot be safely and profitably invested.

### Cheapness Often Costly.

**THE GROWTH OF TOLEDO AND THE MILLIONS OF INCREASED VALUES THAT MIGHT BE CREATED CAN BE MADE LARGELY IMPOSSIBLE BY THE FALSE ECONOMY OF SHAVING STREET RAILWAY FARES JUST THE FRACTION OF A CENT THAT MAY MEAN THE DIFFERENCE BETWEEN SUCCESS AND FAILURE—CREDIT OR BANKRUPTCY.**

Don't say, "Why should we worry!"

The solution of this matter is important to every citizen.

The people of this country think that the only people who need worry over the lack of new railroad building are the railroad builders.

Just as long as they think that way they won't get the railroads they need.

Yes, "private corporations are for private profit;" or, to be more correct, capital is wanted in many places, and a liberal reward will be paid.

**Therefore, HOW LONG CAN WE EXPECT CAPITAL TO SERVE OUR NEEDS WITHOUT PAYING IT SOME REWARD!**

Think it over and then  
**JUDGE FOR YOURSELF.**

Yours cordially,  
**HENRY L. DOHERTY.**

TIMES 4-24

# SO THE PEOPLE MAY KNOW

CRITICISM No. 7

**"You Are Simply Hired to Get the Franchise and at the End of Five Years You Must Turn the Property Back to the Old Owners and We Don't Want Anything More to Do With Them."**

There is nothing true in the above statement.

How long we remain in Toledo is a matter between the people of Toledo and ourselves.

Nobody else will ever attempt to say whether we shall stay here or not.

**AS FAR AS WE ARE CONCERNED, WE ARE HERE TO STAY.**

If the people of Toledo prefer someone else rather than us, then this property would be worth more to that someone else.

### Good Will Business.

A public utility has a certain value for its monopoly business.

Monopoly business is the kind that the public utility gets whether their patrons like them or not and only that much. In other words, it is the very least amount of business the public utility can possibly get.

The old school of public utility people thought this was all the business that could possibly be secured.

**THE NEW SCHOOL KNOWS THERE IS A WORLD OF BUSINESS THAT IS NOT MONOPOLY BUSINESS.**

IT IS GOOD WILL BUSINESS.

Good will means more business—more profits, less trouble and more happiness.

So a public utility business has an added value if it has the public good will.

### Electric Signs Good Will Business.

A year ago you would have laughed at us probably if we had told you there was a world of electrical business in Toledo that could only be had as a matter of good will.

And yet we are getting it every day.

Watch the new electric signs that are going up every day week in and week out.

Watch the brilliant illumination of store windows, the outlining of buildings in light.

Everyone can see this for himself, and yet there is a most important part that you cannot see.

### Electrifying Homes.

Hundreds and hundreds of modest homes are being equipped with the comfort, convenience and elegance of electric service.

Shops and factories are every day being equipped with Central Station electric power.

So you can see by this that a public utility has an added value if it has the good will of the public.

### Are Largest Stockholders.

While we do not own an actual majority of the capital stock of the company, we are the largest single stock holders.

There are nearly five hundred outside stockholders scattered all over the country.

They are plain people and just the kind that ride on the Toledo street cars every day.

**IF SOME OF THE OLD CROWD WERE TO ATTEMPT TO GAIN CONTROL OF THIS COMPANY, WHO DO YOU THINK THESE OUTSIDE STOCK HOLDERS WOULD SUPPORT, DOHERTY & CO OR THE OLD CROWD!**

Correct. You're a good guesser.

### Control Voting Trust.

The majority of the capital stock is held by a voting trust for five years.

We control the voting trust.

As a rule we own a majority of the stock of the other public utilities we control.

But you have to make a bargain somewhere, and in many of these other utilities we started with an ownership of only 5 or 10 per cent of the capital stock.

Regardless of the ultimate ownership of the control of the capital stock of this company the result will be the same.

### Employes Will Prefer New Methods.

Long before the expiration of this five year period the plans and ideas of the Doherty Organization will be come second nature to all employes.

Every employe will prefer to do business on the plan of the best of our private merchants.

Depend for patronage upon good service, square dealing and the friendship of the patrons.

This lesson, once learned, is not soon forgotten.

It pays when judged even from a dollars and cents standpoint alone.

But, better still, it "PAYS A DIVIDEND IN HIMSELF HAPPINESS" that no rate-making body can take away from you!

### Make Business Pleasant.

Our fundamental idea is to make business as pleasant as possible.

The man who can get both his living and happiness out of his business is indeed fortunate.

Lots of them could do it if they just thought so and would try.

**SO, WE ARE HERE TO STAY, AND NO POWER IS GOING TO GET US OUT UNTIL WE ARE CONVINCED THE PEOPLE OF TOLEDO DON'T WANT US.**

Sticking on the job is one of the best things we do.

Yours cordially,  
**HENRY L. DOHERTY & CO.**

supplied. It is interesting to watch patrons take them from the boxes and read them. They are accomplishing their purpose and will be furnished until it is certain that they are no longer needed.

THE EFFECT

The publicity thus given has caused wide discussion

of the street railway question. This has been noted in all public places, even in the poorest saloons. The explanations have continued to win friends by their simplicity and frankness. It is believed to be the most efficient method of attracting public attention to a subject of this kind and it certainly is a source of education to all who have followed it.

Henry L. Doherty has written the greater part of the matter that has been used so far, but he has had able aids in George Williams and E. R. Kelsey.

Among the illustrations shown herewith are both the original criticisms, as they appeared in the newspapers, and the reproductions of the early issues, which are now being distributed on the cars. Criticisms 1, 4, 5, 6 and 7 are from leaflets; No. 35 from the *Times*.

**SO THE PEOPLE MAY KNOW**

CRITICISM No. 4.

**"We Don't Want to Give a Franchise to Wall Street Concern."**

That is a criticism of the Doherty Organization and not at the Rail-Light Company and so I am going to answer it personally.

If a man wanted to deal in Alaskan furs he would not locate in El Paso, Texas. A man who wanted to go into the tropical fruit business would be foolish to locate in Ashland, Wisconsin.

We chose Wall street as the best location for our business. My home was originally in Columbus, Ohio. Afterwards it was in Madison, Wisconsin, St Paul, Minnesota; Quebec, Canada; Denver, Colorado, and elsewhere.

Promotions in our business frequently require a change of residence. As a rule there is but one company of each kind in a city. If you want to go forward quickly, you can't always wait for promotions in one company—wait for competent men ahead of you to grow old and die—before you're getting old yourself all the time.

**GO WHERE OPPORTUNITY WAITS.**

So as I progressed from workman to foreman, from foreman to superintendent, from superintendent to manager, and from manager to president, I HAD TO GO WHERE THE OPPORTUNITY OFFERED.

I wanted to go into business for myself and build and operate hydro-electric power plants, street railways, gas companies, etc.

I had to locate some place.

Where would you have gone?

Columbus, Ohio? Not on your life.

I WANTED TO GET FIRST CHANCE TO BUY ANY GOOD PROPOSITION THAT CAME INTO THE MARKET.

IF THERE WAS A BIG HYDRO-ELECTRIC POWER PLANT TO BE FINANCED AND BUILT IN SOME WESTERN STATE DO YOU THINK THE PROPOSITION WOULD BE BROUGHT TO COLUMBUS OR EVEN TO TOLEDO?

Not much.

It would go to New York City and not much time would be lost in up-town New York, either.

**WALL STREET WOULD BE THE OBJECTIVE POINT.**

**WALL STREET IS THE BEST KNOWN STREET IN THE WORLD.**

I figure that a well known location was a good asset to a new concern.

When I say my office is at 60 Wall street everybody knows where that is without thinking of any other address.

Wall street is the best known, but the least understood, street in the world.

The popular idea is that Wall street consists of the Stock Exchange, a herd of bulls and bears and a few brokerage houses.

**NEVER IN STOCK EXCHANGE.**

I pass the Stock Exchange twice a day when I am in New York and I was never even inside of it.

**I NEVER BOUGHT A SHARE OF STOCK ON MARGIN IN MY LIFE.**

No company that I control ever had its stock listed on the New York Stock Exchange except the Toledo Railway & Light Company.

ONE OF THE FIRST THINGS I DID WAS TO APPLY FOR THAT LISTING TO BE CANCELLED.

There is a great big army of joss men in Wall street who have about as much connection with the Stock Exchange and stock speculation as I have.

Curiosity has drawn most of them ultra visit to the Stock Exchange. Curiosity has caused many of them to speculate from time to time, but their real business has nothing to do with the Stock Exchange, stock speculation or things of that sort.

In the Wall street district, or within easy call will be found world famous experts in every branch of business and the sciences relating to business and industry—Chemists, Physicists, Engineers, Accountants, Lawyers, etc.

All of the big machinery and equipment manufacturers have their principal office or an important sales office there.

**WALL STREET NOT ALL SPECULATION.**

The newspapers tell you of the bombs and stocks sold each day, but tell you nothing of the machinery that is purchased, the steel rails, the car equipment, etc., etc.

The equipment and commodities bought and sold each day for exportation to all parts of the world is alone enormous.

The Wall street district is 75% ordinary constructive business and 25% dealing in securities. Certain kinds of business can only be conducted the most efficiently in New York and in the Wall street district.

To attempt to do business like ours elsewhere is to accept an unnecessary handicap.

**CONTROL OF BIG BUSINESS.**

Big business is always going to exist.

ONES IS A BIG COUNTRY AND DEMANDS BIG RAIL ROAD SYSTEMS AND BIG INDUSTRIES.

We have big cities and they demand big power and street railway systems.

**SOME ONE MUST CONTROL EACH BIG BUSINESS.**

That somebody or somebodies can just as well come from the wage-earning classes.

Of course, the man born to the position of control is not going to lay awake nights to help the wage-earning class climb in.

But it's pretty tough on the wage-earner who wants an equal chance to control big business when he is opposed not only by those already in control, but by his own class as well.

**PLEASED WITH TREATMENT HERE.**

On the whole, I have received splendid treatment here.

Now and then some harsh comment is made.

CONSTANT EFFORT IS MADE BY SOME OF MY OPPONENTS TO PREJUDICE AND POISON THE MIND OF THE PLAIN PEOPLE AGAINST US.

Bryan would say, "The Common People."

Well, I'm one of them myself.

I HAVE CARRIED MY DINNER IN A PAIL AND EATEN IT WITH THE OTHER WORKMEN.

And I could do it again.

The men in my organization are the same type.

We have no bone to pick with those who were born rich.

We have sought to build an organization of men of vigor and vitality AND WE HAVE HAD TO FIND THEM AMONG THE PLAIN PEOPLE.

If we cannot have the support of the plain people we have no right to expect it elsewhere.

**PLAIN PEOPLE SHOULD SUPPORT OWN CLASS.**

If the plain people will not assist and support the people of their own class who aspire to the control of big business, then they deserve to have big business become a matter of heritage rather than a matter of merit.

Most men think that when they have made a little money they must have a country house, a town house, a yacht and a flock of automobiles.

WELL, I HAVE NONE OF THESE THINGS—NOT EVEN AN AUTOMOBILE. NO, SIR, NOT EVEN A FORD.

I live in the same apartment I had when I worked as an engineer on a small salary.

It still has the same old furniture in it.

WALL STREET!!

FORGET IT!!

I am there because I have to be there.

IF A SETTLEMENT OF THE STREET RAILWAY PROBLEM IS REACHED, I WILL MAKE WALL STREET WORK FOR THE BENEFIT OF TOLEDO.

Yours Cordially,

**HENRY L. DOHERTY**

**So the People May Know**

CRITICISM NO. 35

"It is easy to see that you mean to defeat the honest trial of a 3-cent fare by doing this at a time when you are buying new cars and laying new tracks and in every way have your heaviest expenses."

The purchase of one car or one hundred cars would not change our expense account in any way.

The laying of one foot of track or ten thousand feet of track would not affect our expense account in any way.

These expenditures which are charged to capital account and are no part of the expenses of operation.

It requires several years of study and practice to learn the science of accounting.

We cannot hope to tell you in a short talk how accounting is done so that operating expenses show their true value, regardless of the amount of construction work which is being carried on.

Therefore, the best answer we can give is the short statement made at the introduction of our answer.

If you doubt our statement, we suggest that you go to some local accountant for your explanation.

There are many men skilled in the science of accounting in Toledo. If you want to know just how accurate reports are made up, you can get the explanation from any of your friends who are skilled in this work.

Street railway accounting is done under standard systems.

Rules are laid down in books known as Classification of Accounts.

The so-called books of Classification lay down detailed rules of just how every item of expenditure shall be charged.

Expenditures for construction work are kept separate and distinct from the expenditures for operation.

There is no one single book of classification in universal use but the differences are small and only relate to details.

A great many states have Public Service Commissions and the accounts in each state must be kept according to the rules of each Commission.

**WE ARE NOT TRYING TO DEFEAT 3-CENT FARES.**

If we can give the service the people want and only charge 3-cent fare, no one will be more pleased than ourselves.

The whole trend of agitation has been directed to the matter of low fares.

**SERVICE HAS BEEN LARGELY FORGOTTEN.**

Each day more people are demanding that the plan of settlement must not prevent the company from providing good service.

If a fare is fixed for the full period and fixed at too low a point, then good service is impossible.

If we did not want to give a fair trial of 3-cent fare we would not have suggested that the city should appoint a commission or commissioner to direct operations, accounting, etc., during the period 3-cent fares are in operation.

And don't forget that we agree to pay the expenses of this commission.

**COULD ANYTHING BE FAIRER THAN THAT?**

So even if we did not want to give a fair trial of 3-cent fare, it would not make any difference.

**But we do want a fair trial.**

The people of Toledo have been fed a lot of incorrect information about the street railway situation for years.

**We want them to know the facts.**

We know we will be better off if the people of Toledo know the true facts and conditions.

**So for selfish reasons, we want real publicity.**

We want to publish our receipts and expenditures and the condition of operation to the people of Toledo.

We want a commission or a commissioner appointed by the city to vouch for the accuracy of our figures.

And we are willing to leave it to the people of Toledo to say whether ANYTHING COULD BE FAIRER THAN THAT.

Cordially,

TOLEDO RAILWAYS AND LIGHT CO.

Tomorrow we will answer Criticism No. 36, "You have no right to spend money on advertising. The money should be spent to provide better car service."

# Question Box at Galveston

An Abstract Is Published of the Answers to the Questions of Electric Railway Interest at the Recent Convention of the Southwestern Electrical & Gas Association—The Topics Considered Included Timber Preservation, Fuels, Publicity and Wood-Block Paving.

At the convention of the Southwestern Electrical & Gas Association held recently at Galveston, Tex., and reported in the last two issues of the *ELECTRIC RAILWAY JOURNAL* the "question box" proved to be the source of much valuable information. That portion which was most directly applicable to electric railway work is abstracted in the following paragraphs:

## TIMBER PRESERVATION

In reply to questions as to the causes of timber decay and the effect of painting poles above or below ground line the fundamental principles of timber preservation were pointed out. The deterioration of timber is caused by the growth, in the cells and fibers, of parasitic fungi, plants of the order of mildew and mold and, ordinarily, microscopically small. These live on the sap and tissue of dead wood, and by the chemical action accompanying their growth destroy fiber tissue and cells. Perfectly dry woods will not rot or decay. Moisture, heat and air are absolutely necessary to the growth and action of the fungi that cause decay. If they are deprived entirely of any one of these necessities, decay will not ensue.

The seeds or spores from which these fungi are propagated are microscopically small and very light, so that they float in currents of air like dust. These spores are given off by the fungi in countless numbers so that the air in the vicinity of decaying wood is apt to contain them and to deposit them on and in dead wood where conditions for growth may be favorable. Many of the spores have great vitality and longevity and it takes great heat or intense cold to kill them, although they may lie dormant in wood for many years awaiting favorable conditions for growth.

To protect timber from decay several things are necessary: *a*, all spores or plants already in the timber must be killed; *b*, the entrance of new spores must be prevented; *c*, the growth of new spores which enter must be prevented, and the spores must be deprived of air and moisture or warmth.

The mere painting of timber even with the so-called creosote brush treatment does not kill spores already within the timber, nor does it give effectual and lasting repellent of air and moisture. It does not effectually prevent the entrance and growth of new spores. This is especially true of ordinary oil paints as applied to timber. These are not as a rule poisonous to the spores already within the wood, nor do they make an absolutely airproof and waterproof covering for any length of time, no matter how well applied. Painting with compounds, such as creosote, which are actually poisonous to the spores is more efficient in two ways; the vapor and fumes may be drawn into the wood and tend to kill the spores or to retard their growth, and any new spores trying to enter will be killed by coming in contact with the outer coat of the poison. It is for these reasons that certain active mineral poisons, such as compounds of zinc, copper, lead and arsenic are used as wood preservatives; not for their effect on the wood itself, but simply as "fungus poisons."

Nearly all mineral poisons are more or less soluble in rain water or in the moisture contained in the ground and they are, therefore, leached out into the surrounding soil or by rain and fog until they become

so diluted as not to be fatal to the spores or sufficiently strong to retard their growth. Ordinary creosotes and many of its adulterants have also a certain solubility in water and are driven off as vapor under high sun heat. A thin outside coating of such material, therefore, is liable to furnish only temporary protection.

If, in connection with the brush treatment, some fine and permanent neutral matter, such as slaked lime, dead cement, barytes, fullers' earth, etc., is rubbed in so as to completely fill the outside pores of the timber, the effect of the brush treatment will be more lasting. The weakness of the treatment, even with this improvement, is that nearly all timber has cracks and crevices which it is not possible to fill by surface application, and such cracks and crevices may develop after treatment.

The ordinary painting of poles, even with good quality of creosote, is only a temporary remedy and it is entirely a question of local conditions as to whether or not it pays for the labor and materials involved. Any considerable number of poles can be treated by the open-tank method profitably if there is time enough to use it. The apparatus need consist only of a shell of an old boiler, 8 ft. long, made water-tight and sunk into the ground; a tripod of three 40-ft. poles firmly erected over it, and a tackle for lowering the poles in the tank. With this equipment two, or at most three, men can haul up any poles under 45 ft. long, set them into the tank and take them out again with fair speed and without danger.

The time necessary for a useful absorption of the creosote varies with the size and character of the timber, its freedom from sap and moisture and its fluidity, which often depends on its temperature. In very cold climates or in cold weather it may be necessary to heat the creosote, which can be accomplished by steam coils or by the introduction of masses of heated metal. Open fires are not to be recommended, as creosotes are often very inflammable. In all treatments the timber must be free from moisture; the nearer it is to bone-dry the quicker and greater the absorption of the compound. In poles the absorption will be quicker if the portion to be treated is shaved.

## VALUE OF VARIOUS FUELS

In reply to questions as to the relative values, as boiler fuels, in dollars and cents, of bituminous coals, lignite, fuel oil and natural and manufactured gas, the following suggestions were given.

The heat value of each fuel should be determined by analyses, and the cost of delivering a quantity of the fuel sufficient to contain 1000 B.t.u. to the fire room should be estimated. In comparing the quantities of heat available for steam-making, a combined boiler and furnace efficiency of 75 per cent may be assumed for fuel oil, of 70 per cent for gas, of 68 per cent for coal and of 55 per cent for lignite. Furnace repairs will average 25 per cent higher for oil and coal than for gas and lignite. The character of grates is also important, as proper air space and the use of rocking grates facilitate economical combustion of lignite. It must be remembered that the draft required for lignite and coal is greater than that for oil and gas. The cost of labor for handling coal and ashes must be

taken into account. Among other factors involved in the question are the conditions of operation, that is whether the load is intermittent or continuous, how great the value of the peak load is, etc. Cleanliness of plant is also often important. Finally the character of coal must be considered, particularly as some coals which show a relatively high heat value by calorimetric tests tend to fuse and clinker badly in the furnace, rendering the cost of extra labor to handle them no inconsiderable item.

#### PRESERVATION OF PIPE

A member asked if there was any method of coating or covering iron and steel pipes to prevent rusting, corrosion, splitting or electrolysis when used under ground or water or when exposed to dampness, smoke or acid fumes.

The reply stated that there is not yet any absolutely dependable covering, although perfect galvanizing probably comes nearer to it than any other process. This, however, is a protection only against moisture and certain acids and only as long as the zinc covering is absolutely intact. So-called protective coverings are more or less failures in absolutely preventing corrosion or rusting for any length of time because a pinhole orifice is just as liable to cause pipe to be rusted to destruction as if it were not protected at all.

The great difficulty in the use of all protective coatings is to obtain absolutely perfect contact between the clean surfaces of the body metal and the coating. Mill-scale, rust, grease and moisture all tend to prevent such perfect contact without which cracking, blistering and peeling will inevitably ensue. One manufacturer has attempted to obviate the difficulty by wrapping pipe tightly with two layers of burlap impregnated with a waterproof and acidproof compound and then applying by dip or brush a filling coat of the same compound. The joints of such pipe, when laid, are also wrapped by hand with the impregnated burlap and painted with the compound over all. This method of protection would seem to have mechanical as well as chemical advantages, but sufficient data are not yet available to warrant one in specially recommending the method.

#### FEED WATER PURIFICATION

In response to a question as to whether or not a feed-water heater will purify any kind of water for boiler use, the answer is made that it will not, even when the feed water is brought to 212 deg. Fahr. in the heater, for two reasons: First, there are some substances, deleterious to the interior of a boiler that are not precipitated at or under boiling point; second, there are other substances on which the heat possible to give water even under boiler pressure has no effect.

If the feed water foams, deposits extra scale inside the boiler, pits the metal or opens up leaks in the boiler after such water has been preheated to boiling point, or near it, and has been given ample opportunity to deposit its impurities, then it is necessary to treat it chemically, so as to disperse, filter out or deposit the injurious matter. Chemicals may be injected into the water while it is being preheated, or even afterward. The use of soda ash, lime water, crusted soda, sodium fluoride, bi-sodium phosphate, compounds of tannin and starchy materials, are all examples of the methods of aiding free heat in freeing the water from injurious qualities. It must be remembered, however, that the ordinary boiler is built to generate steam and not intended to play the part either of an experimental chemical laboratory or a precipitation plant. All purifying should be done outside of the boiler.

No rule-of-thumb for water treatment is possible and the first thing necessary is the correct qualitative, quan-

titative and combinative analysis. The results of this analysis should then be placed in the hands of a reliable expert in water purifying, one who is not tied up to any system or patent method of purifying. The most economical way of handling this matter is to first find out what is really wrong with the feed water and then to treat it specifically and intelligently so as to neutralize or to get rid of the destructive matter before it goes into the boiler.

#### NEWSPAPER ADVERTISING

A correspondent asked if it is advisable to advertise in local papers when a public utility is the only one of its kind in the city, especially if it owns or operates all or most of the different utilities, such as electric light and power, gas and railway. The answer is given that it is always safe to advertise in the right way. There are more reasons why a utility should advertise than a private business. The latter has only one reason for advertising, namely, the direct increase of its sales. The public utility has four reasons: increase of sales, public policy, publicity and education of the public. The utility must bring its service to the attention of the public, and in addition to making this service complete, continuous, uniform, prompt and courteous it should advertise freely in the local press, paying for everything that it desires to have published that inures to its personal benefit. Not only does the fact of such advertising favorably affect the local press but it also has a favorable effect on the general public. It tends to take away from the utility its isolation. Every public utility should make itself one of the group of commercial businesses of its community in everything, newspaper advertising among the rest.

A utility should court favorable publicity and should accustom its community to believe that it has nothing to hide. Secrecy always begets curiosity, while candor prevents or allays it. The public may not always agree with the utility as to action, cause or reason, but it will be much less liable to antagonize and interfere than if an action has been sprung upon it without previous explanation. The utility should use the same vehicle as does its enemies and detractors and it should explain to its community what it really is, what are its rights, its limitations, its duty. A major portion of the present hostile attitude of the public toward its utilities is because it is really ignorant of what they are, of the real relation between them and it, of the actual mutual benefits that can accrue to each by a greater understanding, a wider tolerance, a more mutual co-operation.

In its dealings with its local press, the utility should be liberal, standard and courteous. It should ask no favors because, if properly operated, it can give none, for it must never even hint that it advertises as a favor to the paper. It should give the paper everything publishable and it can then ask that, for good reasons given, certain matters be not published or be not published in a certain way or at an inopportune time.

#### WOOD-BLOCK PAVING

The Association was asked to learn what has been the experience with wood-block paving in street railway work. In reply the statement is made that wood-block paving of proper materials, properly prepared, and properly laid on proper foundation has given more satisfaction than any other kind of pavement laid between or among street railway tracks in paved streets. The proper requisites seem to be: that the rails be of such section and depth as to allow the use of a block not less than 3 in. deep when new, that the rail be of such section as to allow rigid paving up to and against its sides, that the wood be of such a kind that

it will not swell or readily decay and that it be so treated as to avoid these faults; that any treatment for this purpose be such as to tend to preserve the wearing qualities of the wood and, if possible, to increase its holding properties for animal or vehicle traffic; that a sufficiently strong and rigid foundation or base be made under the block so that the block itself can be considered as simply a travel cushion and not as a weight-supporting or resisting portion of the pavement; that the block be so laid as to equalize the weight thrust of animal or vehicle in the direction of maximum traffic, and that the separate blocks be bound together and surrounded by some binder or filler. Nothing less than a 6-in. depth of rail should be used, and the filler blocks should be cut to provide a rigid vertical surface to pave against. The kind of wood to be used seems to be an entirely local matter. No convincing data have yet been collected as to the advantage of any particular kind of woods.

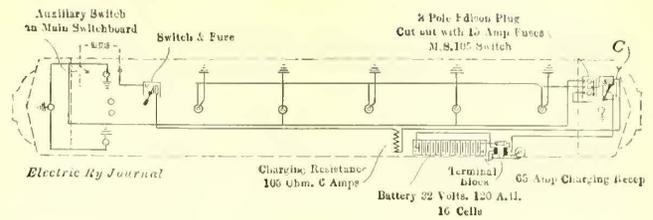
The advantages claimed for proper wood-block paving are elasticity, noiselessness, adaptability to the inequalities of varying types of rail and structural work and comparative ease and cheapness of maintenance, repair and renewal. Against it are urged its original cost when properly laid, its tendency to swell and its further tendency to become dangerously slippery to animal and vehicle in extremely hot or cold weather unless covered and kept covered with some frictional material like sand or fine gravel or fine crushed rock.

### STORAGE BATTERY LIGHTING ON NEW YORK CENTRAL CARS

The New York Central & Hudson River Railroad has recently put into service a straight storage battery lighting system on a number of the multiple-unit cars operating over the electric zone between New York City and Croton. The reason for using this novelty in lighting equipment is found in the fact that while the electrified track ends at Croton the extreme end of the commuting zone is at Peekskill, about 7 miles further north. To the latter point several trains are run each day, and since there is no third-rail between Croton and Peekskill the multiple-unit cars are hauled over this section by steam locomotives. The regular electric lighting system for the cars, in which current is obtained from the third-rail, is not available, therefore it is necessary to provide some other means for lighting cars over this part of the route.

The use of Pintsch gas, a small turbo-generator lighting set in the baggage car, the axle-lighting system and the extension of the third-rail for the 7 miles between Croton and Peekskill were each considered, but were rejected in favor of the storage battery system.

The installation on each car consists of an auxiliary system of five 32-volt lights placed along the center line of the ceiling, 50-watt tungsten lamps being used. The original Pintsch gas fixtures were completely removed. Twenty-five-watt tungsten lamps are also placed over each vestibule and in each of the two saloons. All of these lamps are connected in multiple across a sixteen-cell pasted-plate battery. Current for charging the battery is obtained direct from the third-rail through a fixed resistance of 105 ohms. In the vestibule is a two-position inclosed switch with magnetic blow-out, which in one position connects the battery with the lighting circuit, and in the other position connects the battery to the third-rail through the charging resistance. When the car is in the third-rail zone this switch is kept in the charging position and the batteries are charged continuously. But when the cars leave the third-rail at Croton the trainmen throw the switches to



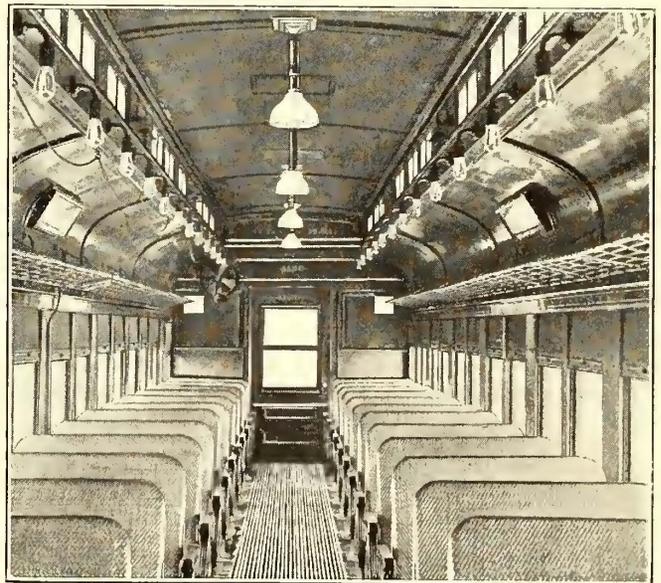
New York Central Car Lighting—Wiring Diagram Showing Arrangement of Auxiliary Lights and Storage Battery Equipment

discharge position on all cars in the train so that the batteries discharge through all of the nine lights of the auxiliary lighting system.

No automatic device is used for cutting the battery in or out, because this was considered to be unnecessary. The battery and resistance were designed to operate automatically in accordance with calculations which were made to determine the average amount of time that the car was in service within the third-rail zone and the amount of time during which the lights had to be operated. To prevent overcharging of batteries when cars are laid up in electrified territory the battery charging connection has been made on the negative side of the main switch. As this is always opened when the car is standing idle, the battery is cut out while the car is laid up.

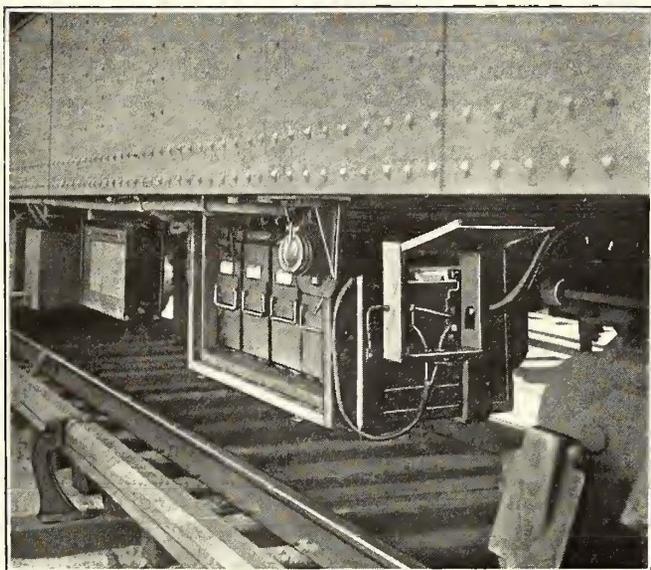
The run to Croton is made in about seventy-eight minutes, and, including say twelve minutes in which the car is under power at the New York terminal, the charging period may be said to be ninety minutes, or one and a half hours. During this time the batteries are being charged at a rate of about 5.4 amp, this being based on a third-rail voltage of 600 and a charging voltage of about 2.5 volts per cell, giving a net voltage across the 105 ohms resistance of 560. This gives a battery input, during the charging period, of 8.1 amp-hr. At an ampere-hour efficiency for the battery of 90 per cent this is the equivalent of 7.3 amp-hr.

The battery supplies five 50-watt lamps and four 25-watt lamps, making a total of 350 watts for the battery output. This at a voltage of 2 volts per cell, or 32 volts for the battery, gives a discharge rate of 11 amp. As the run from Peekskill takes about eighteen minutes and as there is an average lighting period during the



New York Central Car Lighting—Interior View of Car, Showing Auxiliary, Storage-Battery Lights Along Center Line of Ceiling

lay-over of some six minutes in addition, the trips when lights are required have a discharge period of twenty-four minutes. About half of the round trips made by each of the twenty-one cars in the service to Peekskill occur during the time of day when lights are required, so that the average daily discharge period per trip amounts to twelve minutes. In addition there is a period during the night when the cars are cleaned that averages about eight minutes when prorated against each one-way trip made by the cars. Therefore the total discharge period per one-way trip averages twenty minutes, or 0.33 hr., and at the discharge rate of 11 amp the output of the batteries per trip amounts to 3.3 amp-hr. The equivalent input per trip of 7.3 amp-hr. exceeds, in consequence, the output by 4 amp-hr. per single trip, or an average of 16 amp-hr. per day, about



New York Central Car Lighting—Exterior View of Car, Showing Storage-Battery Box and Charging Receptacle Hung from the Sills

29.2 amp-hr. being put in and 13.2 amp-hr. being drawn out of the battery. This amounts to a daily overcharge of 13 per cent of the battery capacity, but in view of the fact that the charging rate is only 5.4 amp, whereas the normal charging rate is 15 amp, it is expected that no harmful effects will result. On the other hand, the excess charging period eliminates the possibility of the batteries becoming damaged by exhaustion, a much more serious matter than the effect of overcharge.

Owing to the fact that the battery is supplied from a 600-volt line, the influence of the increase in charging voltage that occurs as the battery becomes charged is almost negligible. Only 1 per cent less current is put through the battery when it is fully charged than when it is practically exhausted. As outlined above, however, the batteries will be kept continuously but slightly overcharged, and a limit is placed upon this by the fact that the storage battery connection is made on the negative side of the main switch on the cars. An operating rule has been established whereby motormen throw this switch whenever the cars are laid up in the terminals, so that the batteries are not being charged except during the known time that they are running on the road. This is the important feature of the whole scheme.

The wiring arrangement is shown in the diagram on page 1255, the vestibule switch for connecting the batteries either with the lights or with the third-rail being indicated by the letter "C." This shows that the original series wires to the electric lights on the ceiling

which were located between the Pintsch gas fixtures in the center of the car have been changed over to the 32-volt multiple system. Two main circuits are thus provided, one of which includes two of the 50-watt interior lamps and the vestibule and saloon lights at one end, and the other includes three of the 50-watt interior lamps. A third circuit is provided for the vestibule light at the No. 2 end of the car. It should be noted from the drawing that this makes what might be called a "one-wire" system, each lamp being separately grounded to the framing of the steel car.

The sixteen cells composing each of the batteries, which were furnished by the Gould Storage Battery Company, are arranged in four crates each having four cells with lead-lined tanks. The four crates are carried in a wooden box that is supported in a strap-iron frame under the car. The capacity is 120 amp-hr. The total weight of the battery is 900 lb. and its normal charging rate is 15 amp, although, as mentioned before, it is actually charged at about 5.4 amp, the charging resistance being 105 ohms and the line voltage 600. The charging resistance also is carried under the car, and there is an Anderson standard swivel charging receptacle for use in cases of emergency to charge the battery from some external circuit.

A set of instructions has been prepared and issued to the motormen, in which is included a description of the apparatus and an explanation of the connections and the operation of the system. Precautionary advice is given to the effect that the change-over switch in the vestibule must be kept in charging position whenever the car is in the third-rail zone and that the battery lights should not be used longer than absolutely necessary. In order to prevent exhaustion of the batteries a caution is also included that if the battery lights burn dim they are to be reported. Another caution to the effect that the handle of the change-over switch must not be left in middle position is included, so that the battery is always connected either to the lights or to the 600-volt third-rail from which it is charged. The standard operating rule for motormen with regard to opening the main switch on the car whenever the car is standing in the terminal is also included.

#### HANDLING WASTE PAPER AT DETROIT

With a large street and interurban railway system the handling of waste paper may be made a source of income if carefully supervised. The Detroit (Mich.) United Railway has solved this problem in the following manner. At all carhouses or other points where large quantities of waste paper accumulate, sheet-metal receptacles are provided in the shape of 36-in. cubes with counterbalanced lids and one side which may be opened. These fireproof receptacles are fitted with hooks in the four corners at the top. Heavy canvas bags, also in the form of 36-in. cubes and each provided with four loops to correspond with the four hooks in the metal receptacles, are placed in these fireproof metal cases. As paper accumulates it is deposited in these bags, and from time to time thoroughly compressed by hand until the bag is full. Then a rope is passed through the four loops in the bag and tied, after which the lid is raised, the side dropped and the filled bag rolled out. These bags are carried to the repair shops by the supply cars, where all paper is compressed in 300-lb. bales by a machine. The bales are held until there are enough to make a carload, at which time bids are obtained and then the paper is shipped to the highest bidder. Paper baled in this manner usually brings about \$6 a ton, and considerable money is saved each year in this way.

# Time-tables and Track Construction

The Construction of Time-tables on the Boston Elevated Railway Described by Timothy Connell at a Meeting of the New England Street Railway Club—This Paper Followed by an Extended Discussion of Track Construction by Martin Schreiber

A large and enthusiastic attendance enjoyed the last meeting this season of the New England Street Railway Club at Boston, Mass., on May 28, the principal topic of discussion being "Track Construction and Maintenance," and the chief speaker Martin Schreiber, engineer of maintenance of way, Public Service Railway Company, Newark, N. J. President John T. Conway occupied the chair and in the half-hour prior to the usual dinner, an informal discussion was held upon the topic of "Car Schedules and Time-Tables," led by Timothy Connell, superintendent of time-tables, Boston Elevated Railway, and Prof. Albert S. Richey, head of the time-table department of the Bay State Street Railway, Boston, Mass. Thirteen new members were elected at the business session. Abstracts of the discussions are given below.

## CAR SCHEDULES AND TIME-TABLES

Mr. Connell explained the difficulties under which the Boston Elevated Railway is forced to operate on account of the working agreement with the carmen's union and exhibited typical time-tables. During the past month time-tables have been completed in which 40,600 trips were used, involving 5177 scheduled and extra runs. Sixty per cent of the latter must be completed in 11½ hours outside time; 40 per cent cannot exceed sixteen hours total time, and of the foregoing 60 per cent, two-thirds must be completed inside of a nine and eleven-hour period. Traffic counts are made whenever necessary, usually two or three per month on the heaviest riding side of lines to be investigated. In making such counts the routes are usually divided among the observers, and as a rule one man can make an accurate record of cars running on a headway of from thirty to forty-five seconds. A. W. Senter, superintendent of the Charlestown division, Boston Elevated Railway, said that at the Sullivan Square terminal one observer can count traffic in about 100 cars per hour. Mr. Connell said that in laying out runs the day is made as short as possible with both early and late runs, viewing the problem from the aspect of total elapsed time. The mid-day runs are laid out so as to include the forenoon and afternoon peaks so far as possible. Thus, a run starting at 4:50 a. m. will have a lunch relief at 10:15, lasting until 11:45, when duty begins again and extends until 3:02 p. m. Another run at the other end of the day may be from 3:25 p. m. to 6:32 p. m., and from 8:15 p. m. to 1:32 a. m. The company operates mainly a double-track service, a line 2½ miles long on North Beacon Street, Brighton, representing the maximum single-track length on any existing route.

The Boston Elevated has no straight tours of duty of nine hours without a break, the longest run being six hours twenty minutes. As a rule, the men prefer a short noon relief and a correspondingly short day. Recently the time-table department has had prepared some 11-in. x 14-in. photostat copies of its regular 19-in. x 30-in. time-tables, for office and other reference work, and the reduction in size seems to be most convenient.

Professor Richey outlined the methods of plotting car runs against elapsed time familiar to train dispatchers, and exhibited printed time-tables supplied to car service employees on the Bay State system. In the

latter, meeting points are printed in heavy-faced type. Each man receives a time-table showing the car movements in and out of the carhouse in which he makes his headquarters, signing for the time-table, which is carried in a specially designed leatheroid case. The company tries to keep down its longest continuous runs to six and one-half hours, although this has to be exceeded in a very few instances. Requests to work nine hours straight have not been granted. Dead mileage is cut down as much as possible by taking passenger traffic counts and cutting off route ends where feasible. Professor Richey said that on occasion a lengthening of a four-minute headway to eight minutes can be done with less trouble than an extension of a fifteen-minute to one of thirty minutes. In certain parts of the day a line having a ten-minute service can have a twenty-minute schedule at the ends, without serious difficulty.

John T. Conway, Bay State Street Railway, described the peak-load conditions at Brockton and Quincy, Mass. At the former city, which is a large manufacturing center, a 120 per cent increase in service is given to meet the peak traffic, which lasts from thirty to thirty-five minutes in Brockton and which is over between 7:20 and 7:30 a. m. Between 7:30 and 4 o'clock all kinds of trades with respect to afternoon runs are made between the men at the various carhouses, with the consent of local operating officials. A similar policy of give-and-take is successful at Quincy, where 3300 employees of the Fore River Shipbuilding Company leave the plant at one time, requiring the running of extra trips lasting from one hour to one hour fifteen minutes. Closing, the speaker pointed out the convenience of indicating turning points of extra cars on dispatching diagrams by appropriately curved arrows. Printed time-tables rather than graphic schedules are given to the men on the Bay State Street Railway.

## TRACK CONSTRUCTION

BY MARTIN SCHREIBER

The subject of track construction covers an extensive field. It appeals to us when we consider that some of our modern straight track is costing as high as \$48,000 per mile of single track with special work as high as \$150,000 per mile of single track. Anyone who has made a careful study of this subject could easily divide it into many parts and each would require more than we have available. For example, spiking constitute about 0.3 per cent of the cost of maintaining tracks in city streets. On recent investigation I find that there were some fifty varieties which were being used by different companies, and each company thought it had good reasons for using a particular type.

I shall limit the discussion to track construction in city streets under four general divisions: (1) plans and specifications, (2) facilities for carrying on the work, (3) inspection and (4) special work.

## PLANS AND SPECIFICATIONS

Every railway company should have approved plans and specifications for all the different elements that enter into track construction, as well as a proper organization. The Public Service Railway, through its

monthly engineers' meetings, developed such standard specifications, and now has the following printed sets, which accompany orders and requisitions and are a matter of record: open-hearth T-rail; open-hearth girder and high T-rail; joints; rail fasteners; track bolts; nut locks; tie plates; spikes; tie rods; ties; creosote oil; cement and paving.

#### RAIL

The rail question has been well covered by the American Electric Railway Engineering Association, for both high T and grooved types. An important work was done at the last Atlantic City convention in the final development of standard girder rail for tangent and curved tracks in city streets. The Lorain Steel Company has already prepared rolls for the new 7-in. rail recommended by the Association, and it will be known as Section No. 122-467. Slot rail construction or ordinances may require the use of special rail in some locations, but the new standard rail may be easily substituted in a large number of instances. Our modern present rails all conform in a way to the new design, as in their tendency to offset the gage line to the center of the web, thereby causing the rail to be better balanced when under the influence of wheel loads. The reason for increasing the thickness of the web and the depth of the groove is apparent. The new 7-in. rail closely follows the standard section of the Public Service Railway, and has recently been adopted as a standard by the Boston Elevated Railway surface lines. It also closely resembles the Montreal standard.

When the committee of the Association first began to introduce standard rails for paved streets, it felt the need of considering no less than sixteen standards, including 7-in. and 9-in. rail in grooved and T sections, for both straight track and curved. At that time some 200 rail sections were in actual use. The new standards are only four in number, and it is the writer's belief that the industry will see a further reduction in the types of rail used on account of the tendency to eliminate the 9-in. rail. Primarily the demand for the latter was caused by the use of deep paving blocks and mechanical joints. Both of the latter are disappearing in modern practice, and there is no good reason why the 7-in. rail with welded joints and the more shallow paving will not answer just as well as the 9-in. rail, and the 7-in. construction is unquestionably less expensive. With regard to composition, it is now recognized that the use of open-hearth steel is the best practice, and here again the American Electric Railway Engineering Association has done good work in formulating standard specifications for open-hearth steel girder rail, which have been ratified by the American Society for Testing Materials. These specifications provide for two schedules for carbon content. Many engineers are now strongly indorsing the higher schedule for carbon, but it seems that when welded joints are used, it is better practice to use 0.6 to 0.75 per cent carbon content to prevent breaking near the joint. It might also be well to refer to certain alloys which are now added to the rail to produce a more uniform texture of the metal, titanium for example.

#### JOINTS

The subject of rail joints is one of the most difficult related to track work, but it has been greatly simplified by the success obtained through modern welding processes. About fifteen years ago there was a general stampede for welded joints, but on account of the large number of breaks, the welds were abandoned to a considerable degree and mechanical joints substituted. To-day welded joints are coming back but with considerable improvement, and more is known about their

proper installation. The effect of many of the welds in the past was completely obliterated by failure to grind the joints after the completion of the welds. Good success has also been attained with certain combination welded and riveted joints, and now the industry sees a new joint coming from Europe that consists of ordinary plate electrically welded at the edges. To date, the Public Service Railway has installed about 66,000 welds, and generally these joints have given good satisfaction. Another advantage of the welded joints is the elimination of the bond, the return circuit now being generally recognized as important as the overhead feeder system, not only from an economical standpoint, but as a preventive of electrolytic troubles.

#### RAIL FASTENERS

With a 7-in. rail the Public Service Railway uses a combination rail brace and tie plate, along with the 5½-in. cut spike. Some electric railways follow too closely the practice of the steam roads, as in the use of the screw spike, and there is a tendency to overlook the differences in loading conditions between a rail exposed to the air and carrying a 200-ton steam locomotive and one carrying a 50-ton car operating on a track which is not only spiked down but which also has a solid incasement of paving.

#### TIES

Most electric railways now appreciate the economy of using treated ties and other timber. For permanent track construction, the 6-in. x 8-in. x 8-ft. yellow pine tie, treated with 10 lb. of creosote oil per cubic foot, seems to cover the requirements very well, and ties so treated will probably last twenty-five years. If this treatment seems too expensive, at least a superficial treatment with some high-grade oil like Carbolineum should be used. The steel tie is a good competitor of the wood tie, but it is more expensive, and in loosely ballasted track it is necessary to place the ties as close as when wood is used. The wood tie has an advantage in its cushioning effect and in connection with shifting and aligning the rail. These points are very important in the practical side of track construction. A number of concrete ties have been introduced, but so far experience has not demonstrated their practicability. The author has always taken the stand on concrete ties that if enough reinforcement is put in to make the tie stable, one might as well go to the all-steel tie, and if enough concrete is put in the tie and it will not disintegrate, a large expense for foundation is entailed.

#### TRACK FOUNDATION

In place of the concrete wave, as it were, that swept over the electric railway field a few years ago, we find some companies which formerly laid track on a concrete foundation going back to broken stone, because they find that broken-stone ballast lasts about as well, is just about as satisfactory and is a good deal cheaper than concrete. Broken stone provides an excellent drain for the track, which is an important point in paving maintenance and, on account of being less rigid, is easier on the rolling equipment than the concrete foundation. Last, but not least, a track with broken-stone foundation may be installed under traffic, which is a great advantage. Further, any shifting and alignment of tracks in the future is less expensive with broken stone. In some kinds of soil a sort of beam support must be provided the track through the foundation, but in most cases the sub-grade which has been properly rolled, with stone ballast rolled and carefully tamped under traffic will provide a satisfactory electric railway foundation. About 357 miles of track of this

kind has been built by the Public Service Railway in the past eleven years.

#### PAVING

Although the paving in city streets is often beyond the control of the electric railway management, most municipal engineers now recognize the wisdom of omitting any monolith pavement, such as concrete or asphalt, next to the rail. Experiments have absolutely demonstrated their unsuitable character for this class of construction. If a perfectly smooth pavement is required, it is better to use wooden block in preference to any manufactured block, brick or others. For life and ultimate economy, the granite block appears to stand alone. Although this has been criticised as being too rough to accommodate modern travel, the carefully clipped block, laid with narrow joints, has gone far toward eliminating this complaint. The granite paving which is laid in connection with the track work in Newark is from 8 in. to 12 $\frac{1}{2}$  in. long, 3 $\frac{1}{2}$  in. to 4 $\frac{1}{2}$  in. wide and 4 $\frac{3}{4}$  in. to 5 $\frac{1}{4}$  in. deep, laid thirty per square yard, with a  $\frac{3}{8}$ -in. joint. In connection with pavement a concrete foundation is required up to at least the top of the ties.

#### FACILITIES FOR CARRYING ON WORK

It was not long ago that the view was held, even by many officials, that any kind of equipment was good enough for track construction. Absence of adequate storage yards, work cars built out of old and dilapidated rolling stock which can only carry half a load and which is out of order a large part of the time, etc., are still obstacles to success. If the proper facilities are not within the control of the engineer, it is better to do the track work by contract. Proper accounting is greatly neglected. Few companies know just what the track work costs them. Seldom are the cost of power, interest on equipment and overhead expenses taken into consideration, as they should be in comparing costs with contractor's expenses. Even if good construction equipment is available it is well to consider the advisability of contracting out the work, especially where any portion requires skilled labor, such as paving. Ordinarily the railway company has the advantage over the contractor through its improved facilities for hauling material. But aside of this feature, the contractor can economically build the track just as well as a sewer or other structure.

The track work of the Public Service Railway, outside of paving, has been done mainly by the company. Special study has always been made of having the best storage yard and facilities for receiving and delivering materials. Power machinery is used for loading and unloading, and crane cars are employed in delivering rail and special work on the streets, eliminating manual labor wherever possible. The work cars are the best the company can make and are specially designed for their service.

#### INSPECTION

Adequate inspection is essential to getting the best value for the expenditures along construction lines. All materials used in track work should be carefully inspected. It is surprising how a manufacturer on an order will omit the little things to save a few cents, which materially affects the efficiency of the item. Thus, on a recent track spike order, although printed specifications showed just what was wanted, the manufacturer omitted the flare on one side of the spike; on the other side the reinforcement was obtained by squeezing the metal out of the shank of the spike proper. The excuse for doing this was that if the specifications were followed, two machine operations in

place of one would be necessary. Another reason advanced was that no set rules had been observed on previous orders.

When ties are treated it is necessary not only to select the timber but to make a thorough analysis of the oil. A sample tie of each charge that goes into the cylinder should be analyzed; first, for moisture, then the separate oil analysis for proper constituents, including a moisture investigation. Then after the charge is taken out of the cylinder a sample tie should again be analyzed to determine the amount of moisture present and also the number of pounds of oil. If this is not done, it may not be possible to ascertain whether the extra weight gained by the ties is due to moisture caused by the steaming process rather than the creosote oil. Usually the cost of inspection of paving is a paltry sum compared with the gain in usefulness of the final product. Poor inspection is worse than none, however, as more or less responsibility is taken from the manufacturer. It is not to be inferred that generally all those furnishing goods are dishonest, as the manufacturer may be perfectly sincere in his intentions, and the only reason he does not do things in the required way is that he does not appreciate the importance of it, or that the matter is being handled by a representative who is taking unwarranted individual responsibility.

#### SPECIAL WORK

From experience, the author sees no grounds for the contention that solid manganese special work is not superior to manganese inserts, if it is properly applied. It does not pay, however, to buy solid manganese at a possible increase of 30 per cent in price over the inserts, if traffic does not require it. A great deal of the solid manganese which has been cited as not coming up to expectations, as in Chicago, was the crop of first experiments. The pieces are now made up in sections, instead of the tendency toward a unit casting, so that if a part fails it is not always necessary to throw away the entire piece. At Broad and Market Streets, Newark, one of the busiest electric railway crossings in the country, about 5000 30-ton cars pass over the intersection every twenty-four hours. Previously insert crossings were good at this location for sixteen to twenty months. The first solid manganese crossing which was installed stood about three and a half years. The author has found that a very economical construction for steam road crossings is to use the old bolted type with solid manganese running and bearing rails. This crossing is easy to repair under operation. Nevertheless, the most vulnerable point is of the best known material, as the running and bearing rails in steam track are rolled manganese, and here in the old type breaks generally occur.

The way engineer is much hampered by variations in equipment design: first, by city and interurban flanges; second, old and new cars with wheelbases from 4 to 6 ft.; and third, steel wheels. An ideal curve design is one which is traversed only by cars with the same sized wheel flanges and the same wheelbase. The proper groove of the curve is a function of the contour of the flange, length of the wheelbase and the radii of the curves. Theoretically, the design of the groove should vary with these factors. Again, most modern special work is to-day designed for flange bearing, and it is not possible properly to design special work for two depths of flanges, although the engineer is constantly called upon to do this. Special work designed for a  $\frac{3}{4}$ -in. flange will have the floors of frogs, switches and mates cut out by a  $\frac{7}{8}$ -in. flange; whereas if one designs for a  $\frac{7}{8}$ -in. flange and operates a  $\frac{3}{4}$ -in. flange upon it, the wheel treads pound and destroy the points in frogs,

switches and mates. It is important that the management have a thorough understanding of these points so that all possible difficulties may be eliminated.

#### MUNICIPAL CO-OPERATION

In closing the formal portion of his paper, Mr. Schreiber emphasized the value of such gatherings as the New England Street Railway Club, and referred to the benefits of association work. He cited the advantages of municipal co-operation, illustrating his point by a meeting called at Philadelphia last month by the Director of the Board of Public Works to consider the proposition of snow removal. The author was impressed that the director sought the opinion of all the representatives of interests concerned with snow removal before making his recommendations to the board. Meetings of such kinds are of much value in the public relations of utilities.

#### ILLUSTRATIVE FEATURES

A large number of lantern slides was displayed at the end of the paper, showing maintenance of track facilities on the Public Service Railway. Among the points brought out by the speaker in showing the views were that the tie-treating plant of the company handles about 1000 ties per day when in service; that all scrap material as well as rail is handled by electric crane cars and that manual labor is cut to the minimum on the streets, and that labor-saving devices are used wherever possible in the work of the department. Electric drills perform at least four times as much work as can be done by hand. Drills costing about \$1 each were formerly sharpened unsuccessfully by hand on an emery stone, there being numerous breakages. A machine now does this work and its cost, about \$250, has been more than covered in less than six months. The present average cost of sharpening is from 2 to 3 cents per drill. The company considers all-steel, side-dumping cars better than the bottom-dumping type. Sand is economically handled by clam-shell buckets, and other heavy materials are transported about the system with fullest regard to economy of distribution.

#### DISCUSSION

H. M. Steward, chief engineer maintenance of way, Boston Elevated Railway, favored the use of screw spikes with a clip, taking care, however, not to let the rail cut the spike. He described the arrangements for adzing ties on the Boston system, as recently outlined in this journal, and spoke of the excellent results attained at Boston by the use of the Indianapolis welding outfit on special work and cupped rail, the life of special work being materially prolonged by this process. Mr. Steward said that in place of twist drills, which made no impression on manganese steel, the company uses a flat drill made of high-speed steel, which is cheaper, stronger and more easily reshaped than a twist drill, doing ten times the work of the latter. Closing, the speaker referred to the so-called frictionless rail as a desirable equipment for sharp curves subjected to heavy traffic.

Frank A. Barbey, Boston, then spoke informally of the successful use of the frictionless rail in steam railroad service, emphasizing the absence of flange wear secured by the installation of a specially proportioned narrow and deep head on the inside of curves. Not only has the life of curves thus equipped been increased, but the resistance of the track to the passage of locomotives and long trains has been greatly diminished. At the speaker's request, further details are omitted pending a full presentation of the subject at a later time.

The remainder of the discussion was chiefly devoted

to the answering by Mr. Schreiber of questions bearing upon road department work. The speaker said that economical temporary maintenance seems to be the best present policy. No trouble of moment has been experienced with driven spikes on the permanent track of the Public Service Railway, and the benefits of the more costly screw spike are not apparent to the company. The heavy annual cost of modern track, including maintenance and depreciation, was touched upon. He did not consider a monolithic construction next the rail desirable, and municipal engineers in the New Jersey territory rarely require such construction, even where the city or town has entire control of the paving. Heavy cars with 6 ft. wheelbase are troublesome to operate on curves of 35-ft. inside radius, and the company does not now install curves of less than 40-ft. inside radius. A brief description was also given of the organization of the Public Service Railway, emphasis being laid upon the good results secured by separating the engineering and construction departments and placing a division engineer and a division roadmaster in charge of way matters in each of the five main districts covered by the system. By this arrangement the division roadmaster is able to spend the greater part of his time outside the office, but the success of the organization depends upon real co-operation. The viewpoint is the essential thing, and the realization that all departments are greater than any one department is the cornerstone of successful service to the company's best interests. Mr. Schreiber said that in his opinion the present standardized girder rail with the gage offset from the web and with a deep groove and welded joint comes close to the T-rail in value to the electric railway. No known mechanical joint is free from pounding after service of four or five years in a paved street, and the welded joint seems to be best adapted to such conditions. Twelve 60-ft. rails can be carried on the Public Service work car, and the crane cars are now designed so that the crane can be swung over the top of the rail, greatly increasing the convenience of the equipment. The Public Service Railway favors the use of broken and suspended joints in track construction.

#### SWISS STREET RAILWAY REPORT FOR 1912

The railway department of the Swiss Federation has recently issued its steam railroad and street railway statistics for the calendar year 1912. As usual, the report gives very elaborate data on the individual installations. The number of street railway systems was thirty-eight and their combined single-track mileage, 389. The gage was usually 1 meter (39.37 in.). The Altstätten-Berneck (7.5 miles) and the Lugano Tramways (5 miles) were operated at 1000 volts d.c., the Mendrisio Tramways (7.8 miles) at 800 volts, the Lausanne Tramways (51 miles) at 675 volts d.c., the Locarno Tramways (2.3 miles) at 200 volts single-phase, and the Rheinecker Riffelalp and Schwyzer lines (totaling 3.3 miles) at 500 to 550 volts three-phase. All other lines were operated at 500 to 600 volts. The total number of passengers carried was 141,113,028 and the tonnage hauled was 188,243 metric tons.

The earnings from the passenger service were \$3,347,178 and from freight \$76,653, plus earnings from miscellaneous sources to make a total of \$3,463,159. The total operating expenses were \$2,739,962, equivalent to 79.1 per cent of the gross earnings. The surplus was \$725,898. After making various allowances for depreciation, amortization, etc., \$149,084 remained to pay 3.98 per cent on the capital invested. Many of the smaller roads which do not operate throughout the year paid no dividends at all.



One other structural condition had to be met, namely, that of concentrated wheel loads. The Brooklyn elevated lines had been reinforced, beginning in the year 1904, for a maximum wheel load of 10,500 lb. In the succeeding year the wheel load on some cars had risen to 12,900 lb. As time went on the structures had to be reinforced for loads of 14,000 lb. per wheel, as imposed by the company's own rolling stock. A still higher load, 15,000 lb., is imposed during the summer months on certain routes by the Rockaway Beach through cars of the Long Island Railroad.

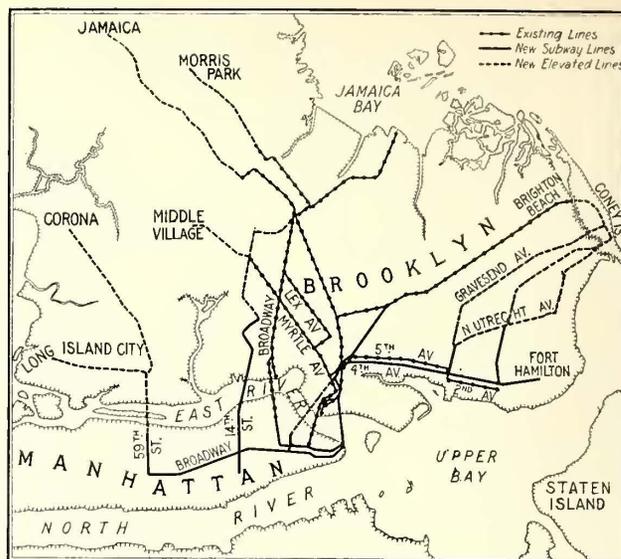
Since 15,000 lb. per wheel, or 30,000 lb. per axle, is also the limit set by the city of New York for its own structures, it was necessary that the loads per wheel of the new car should approximate this figure. Here the problem was solved by a better distribution of weight throughout the car, including the use of eccentrically-loaded trucks. Roughly speaking, the 1400 series B. R. T. elevated car, with its two 200-hp motors on one truck, has a maximum load of 13,500 lb. per wheel; the longer and wider N. Y. M. car with but one 140-hp motor per truck imposes a corresponding load per wheel of 14,950 lb. At the assumed total weight of 122,800 lb. (85,000-lb. car plus 270 passengers at 140 lb. each), the weight per wheel will be 627 lb. (15,577 lb.-14,950 lb.) less than that of a driving wheel on the much smaller Interborough motor car owing to the fact that the two 200-hp motors of the latter car are on one truck. Since every car is a motor car, it was found possible to provide for a higher percentage of weight on drivers than is usual in trailer operation. The rate of acceleration will be 1.25 m.p.h.p.s.

#### STUDIES OF PREVIOUS DESIGNS

Before deciding on a standard car, the New York Municipal Railway Corporation made a most painstaking study of the constructional, seating and cost features of existing electric rapid transit cars. This study extended even to the seating plans of the suburban cars of European steam railroads. However, one important point which was realized in reviewing the rolling stock of steam or electrified suburban lines was that the operators of such service must perforce give a higher ratio of seating to passenger capacity than operators of short-run city high-speed lines. The suburban passenger pays a fare reasonably proportionate to the distance traveled, and he usually rides an hour or more. Furthermore, as the headway of steam or electrified suburban lines is rarely less than ten minutes, there is generally no reason why a seat cannot be supplied to every passenger at all times.

The seat-use conditions on city rapid transit lines are fundamentally different. The passenger pays a single 5-cent fare for practically any distance he chooses to ride. Although in point of time the average trip may last only half an hour, an equivalent ride on the steam suburban lines would cost two to four times as much. But still more important is the fact that under such conditions as obtain in New York's present subway, it is physically impossible to seat all rush-hour passengers throughout the trip, despite the operation of the maximum train length (ten cars totaling 520 ft. 7½ in.) and the shortest possible headway, ninety seconds. Since, therefore, a city rapid transit line cannot emulate steam suburban roads in supplying seats to all rush-hour passengers, the designers of the present car evolved an arrangement which in providing the maximum standing and seating room for the heavy and light hours respectively would give a most logical and flexible means of handling the variations of city traffic.

To appreciate this real innovation in floor use it will be necessary to look backward over the changes made in the original subway cars of the Interborough Rapid



N. Y. M. Car—Relation of Old Rapid Transit Lines of Brooklyn Rapid Transit System to the Additional Lines, All to Be Operated by the New York Municipal Railway Corporation

Transit Company. As first built these cars had longitudinal seating except at the center which was provided with pairs of the orthodox back-to-back transverse seats. Although these cars were but 52 ft. 0¾ in. over all, it soon became apparent that end-door passage was insufficient to permit short station stops. Beginning in 1910, after six years of operation, the transverse seats on each side were removed to make way for a center door of 4 ft. 2 in. opening. The efficiency of the vestibule doorways, which were also of this width, was improved by the practical removal of bulkheads. Thus the Interborough car of to-day has none but longitudinal seating, and the loss of the cross seats has been compensated only in small part by the use of hinged seats which are lowered alongside of idle center doors in line with the other seating. The total passage space per side of these rebuilt cars amounts to 24 per cent of the total length. The conditions of door operation, however, do not permit all openings to be used to the best advantage. The guard must stand with one foot on each platform of adjacent cars as he opens the heavy vestibule doors by hand, and he is therefore in a position unfavorable for controlling the movement of passengers at the air-operated center door. With this knowledge of the Interborough Company's experiences, it will be easier to appreciate the radically different plan which the New York Municipal Railway Corporation has devised for the same public and for much the same speeds and schedules.

The fundamental principle of the N. Y. M. design is to attain maximum seating capacity during hours of normal traffic and maximum standing room plus a reasonable proportion of seating capacity during the rush hours. As the accompanying plan indicates, this has been attained by the use of folding seats just as in the revised Interborough car, but on a wider scale because of the greater number of doors. Furthermore, a great part of the seats are of the more comfortable transverse type. As shown on the plans dated July 15, 1911, the original intention of the New York Municipal Railway Corporation was to use only the center doors during the hours of light traffic, thereby making available for folding seats the space alongside of the end-side doors. Owing to the length of the car it was decided eventually to use during light hours one of the two 32-

in. doors forming each pair of side doors. Consequently, the average walk of the passenger during normal hours will not be much different from that during the rush hours.

HOW MORE CAPACITY WAS OBTAINED

In working out a plan for maximum capacity, the company took a leaf from the book of electrified steam railroad practice in determining to use the widest and longest car possible. The constructional feasibility of such cars was unquestionable, for the Southern Pacific Railroad was using 72-ft. x 10-ft. 6-in. cars on its Oakland (Cal.) suburban lines, while the Long Island Railroad was operating into Brooklyn cars of 65-ft. x 9-ft. 11½-in. body. The point in which the N. Y. M. car differs from these and other designs lies in the better exploitation of the width, due partly to lesser wall thickness but chiefly to seating layout. In the usual suburban cars all but the corner seats are transverse. Each seat cares for two passengers but with several inches to spare, and the aisle is also wider than necessary. In the Brooklyn car, the clear inside width of 9 ft. 15⁄8 in. is enough to permit the placing of a triple cross-seat opposite every double cross-seat. As the seating plan shows, the triple seat has 52½-in. clearance for seating while the double seat has 34 in. This space of at least 17 in. per passenger is actually 1½ in. greater than the double cushions of some surface cars. The aisle between the transverse seats is only 21⅓ in. wide but it will be observed that it is hardly an aisle in the usual sense of the word. This arrangement will be referred to later.

The second means adopted to secure greater seating capacity per car was to use three pairs of side doors and thus eliminate vestibules. These doors take up 24 per cent of the car length, which is practically that of the

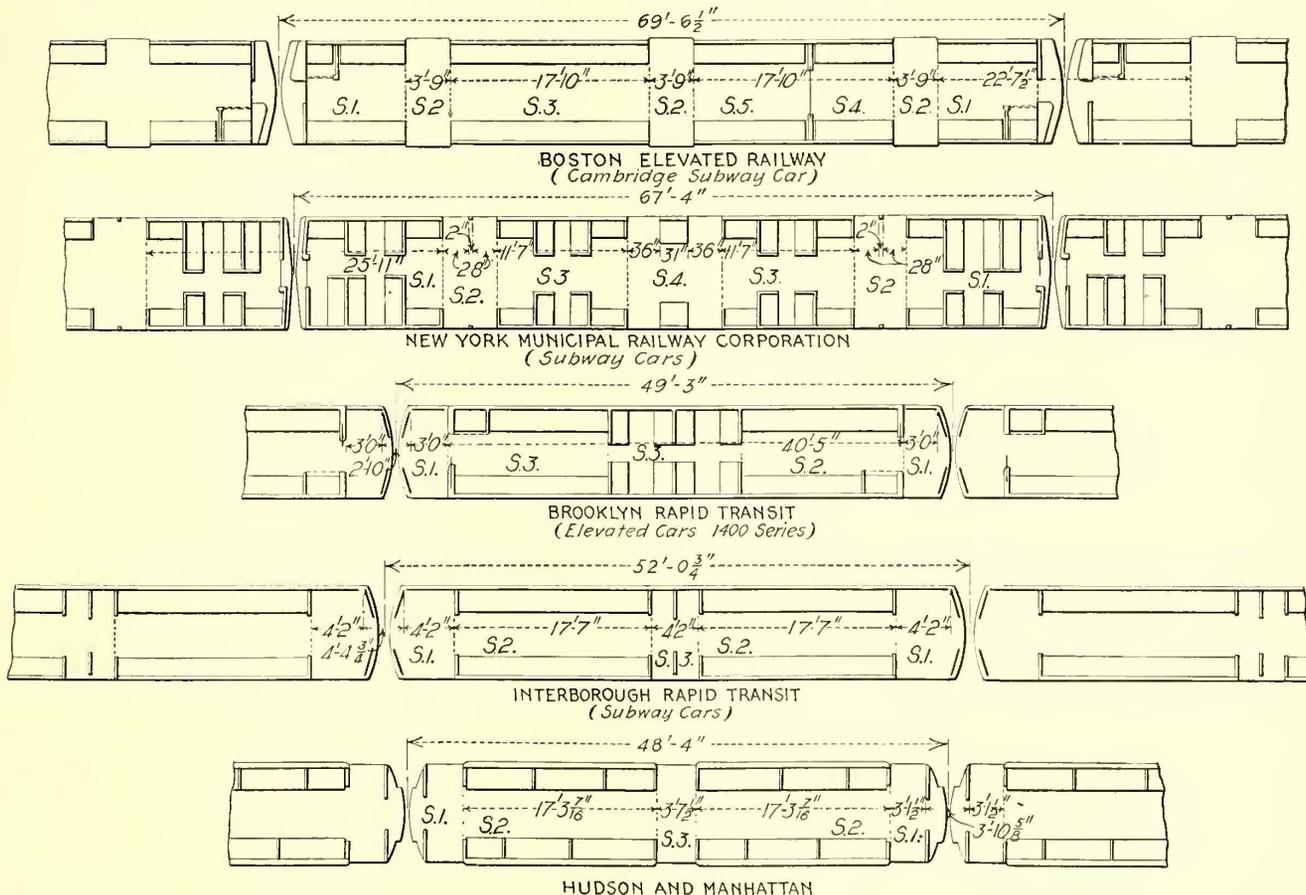
present Interborough cars. Their efficiency for passenger movement should be greater, however, because

N. Y. M. CAR—ANALYSIS OF DOOR LOCATION RELATIVE TO PASSENGER MOVEMENT

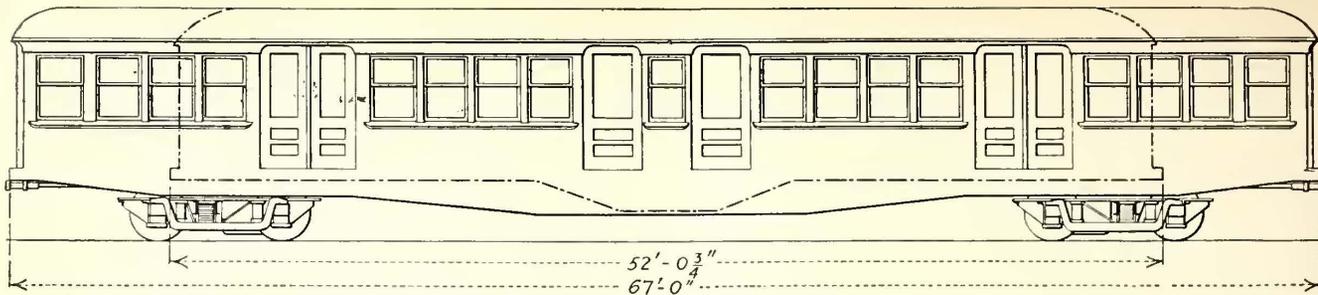
$\frac{nd}{N}$  =  $D$  = Average distance to doors per passenger in inches.  
 $N$  = Total number of passengers (seated and standing).  
 $n$  = Number of passengers in sections indicated.  
 $d$  = Average distance of sections to doors in inches.

Road	$N$	Per Cent Door Opening per Length of Train	Section	$n$	$d$	$n \times d$	Average Distance to Doors per Passenger $\frac{nd}{N}$
Boston Elevated Railway...	266	16.2	1	66	96	6,336	91.6
			2	68	57	3,876	
			3	66	114	7,524	
			4	27	90	2,430	
			5	39	108	4,212	
Total						24,378	
New York Municipal Railway.....	270	22.8	1	80	114	9,120	82.5*
			2	56	60	3,360	
			3	92	78	7,176	
			4	42	62	2,604	
Total						22,260	
Brooklyn Rapid Transit Elevated.....	154	12.2	1	40	50	2,000	146
			2	86	151	12,986	
			3	28	270	7,560	
Total						22,546	
Interborough Rapid Transit.	169	24	1	42	51	2,142	90.5
			2	106	114	12,084	
			3	21	51	1,071	
Total						15,297	
Hudson & Manhattan.....	158	20.4	1	28	53	1,484	87
			2	110	102	11,220	
			3	20	53	1,060	
Total						13,764	

\*Revised to 83.6 in.



N. Y. M. Car—Comparisons of Door and Seating Layouts of Leading Types of City Rapid Transit Cars Which Were Studied to Work Out the Equal Use of All Side Doors of the New York Municipal Car. (See Table Above in Connection with Division of Cars into Sections)



N. Y. M. Car—Comparisons of Side Elevations of the Standard Cars of the Interborough Rapid Transit Company and of the New York Municipal Railway Corporation to Show Differences in Length and Depth

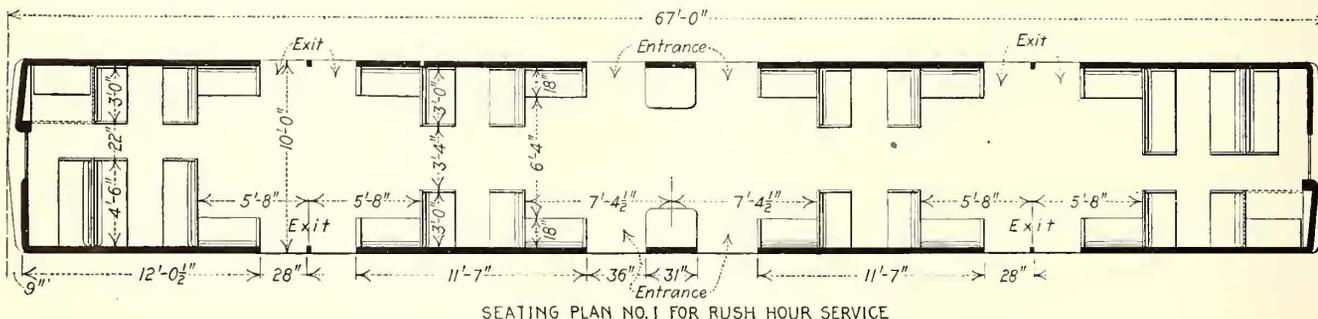
the guard will stand in the center of the car. Further, he will operate all doors pneumatically, so that his attention will not be distracted by the manipulation of heavy door levers. The maximum distance from the guard's position to the end side-doors is about 17 ft. Had end instead of side doors been used on a car of this length, the time of passenger interchange would have been prohibitive.

The use of side doors made it possible to divide the car into sections of such capacity that each doorway will do its fair share of work. As the result of this analysis of door location, the average walk of a passenger during the rush hours will be 83.6 in. compared with 90.5 in. on the Interborough center-door car, 91.6 in. on the Cambridge subway side-door car of the Boston Elevated Railway, 87 in. on the Hudson & Manhattan center-door car, and 146 in. on the B. R. T. end-door elevated car. These figures indicate clearly the superiority of side doors as compared with end doors alone, or with end doors plus center doors. The Cambridge car,

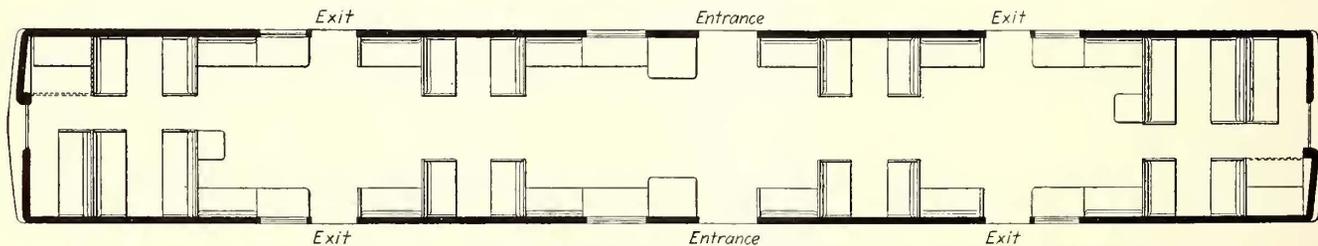
which also has three doorways per side, is naturally the nearest to the new N. Y. M. design, and the difference against the Cambridge car is due chiefly to its greater length. The method of obtaining this comparison of passenger movement is shown in an accompanying series of plans with its table of passenger capacities according to car sections and the simple formula of  $\frac{nd}{N} = D$

where  $N$  equals total seated and standing load,  $n$  equals number of passengers in each section indicated on plans,  $d$  equals average distance of each section to door in inches, and  $D$  equals average distance to doors per passenger in inches.

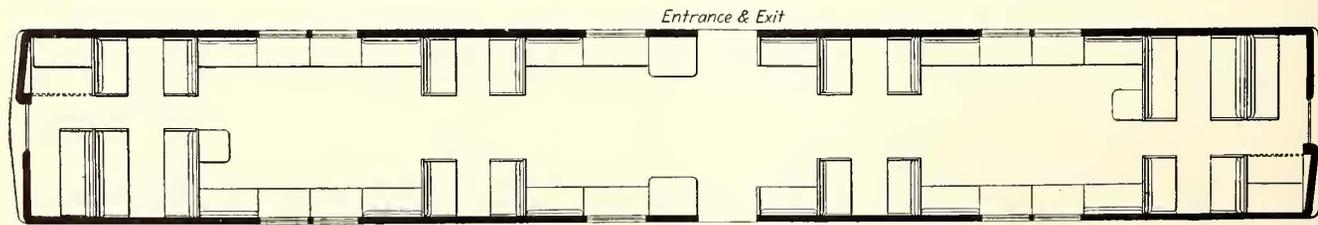
The seating, standing and door layout complete of the new car is intended to meet the essential condition of short station stops on a line with headways as short as 90 seconds. The space opposite each active doorway is free except for vertical stanchions to accommodate standing passengers and for a 34 1/16-in. seat along-



SEATING PLAN NO. 1 FOR RUSH HOUR SERVICE



SEATING PLAN NO. 2 FOR MEDIUM TRAFFIC



SEATING PLAN NO. 3 FOR LIGHT TRAFFIC

N. Y. M. Car—Seat and Door Use Studies Recorded under Date of July 15, 1911, Showing that the Original Idea Was to Permit Separate Full-Width Entrance and Exit in Rush Hours, Half-Width of the Same Passages for Medium Hours and One Central Passage for Light Hours

side one-half of the opposite doorway. Contiguous to this section are facing pairs of 4-ft. 4½-in. longitudinal seats with a 5-ft. 6⅝-in. space between. The triple and double back-to-back cross-seats follow. At the ends of the car, transverse and short side seats are arranged to the best advantage. When not in use the motor-man's seat is folded against the wainscoting at the window sill, thereby permitting a two-passenger rattan seat to be drawn forth from beneath an adjoining seat.

In general, the plan of grouping standing passengers on wide square areas is considered more effective than to have them crowd into a long narrow aisle. While end doors are provided, it is expected that the better distribution of the load due to the use of entrances at each end of the station platform and to automatically operated side doors at three points per car length will minimize "bunching" of passengers on station platforms and their later pushing through a car or cars for a seat.

COMPARISONS OF SEATING CAPACITY

The foregoing paragraphs have explained the reasons for adopting a wide, long car with a combination of transverse seats, short longitudinal seats and standing areas for rectangular groups rather than for narrow files of passengers. It is now in order to see what this plan means in actual figures when compared with the car and train capacities of other city and suburban rapid transit companies. The basic figures will be found in the accompanying table of comparative data.

The first point to be noted in this table is that the Interborough and the N. Y. M. cars are the only ones which have some temporary seating. The variation of the Interborough center-door car from minimum to maximum is forty-four to forty-eight seats, while that of the N. Y. M. side-door car is from seventy-eight to ninety. Even under the conditions of minimum seating, the N. Y. M. car will seat 28.8 per cent and the Interborough car 26 per cent of the passengers. In these and any other comparisons for this side-door car, standing capacity is figured on the basis of 9 in. knee room for passengers in the longitudinal seats and a free area of 1½ sq. ft. per standing passenger.

Generally speaking, both the seating and standing capacity of the new car exceed that of all the other cars shown in the table. It is particularly interesting to make a comparison with the Interborough car because the latter design is the one which would naturally be studied most carefully by a neighboring railway. Car for car this comparison will show that in maximum seating and standing capacity the new car exceeds the Interborough by about 60 per cent on the basis of greatest load. The influence of greater width and difference in seating appears by a comparison of the total seated and standing load per running foot of car which gives a figure of 4.0 passengers for the N. Y. M., 3.25 for the Interborough and 3.12 for the B. R. T. elevated car.

A comparison of the cars in the New York metropolitan district was also worked out on the basis of areas as follows:

New York Municipal car, 67 ft. long, equals net area 590 sq. ft.

Long Island car, 64 ft. long, equals net area 544 sq. ft.

Interborough car, 52 ft. 0¾ in. long equals net area 373 sq. ft.

Hudson & Manhattan car, 48 ft. 4 in. long, equals net area 362 sq. ft.

Thus the area of the New York Municipal car is 8.5 per cent greater than the new Long Island car, 58 per cent more than the Interborough car and 63 per cent more than the Hudson & Manhattan car. It should be understood that the areas given are net, namely, they

include only the space bounded by the inside dimensions of the car. Taking the maximum seating arrangement of each, the following areas per seated passenger result: Long Island, 7.6 sq. ft.; Interborough, 7.8 sq. ft.; Hudson & Manhattan, 8 sq. ft.; New York Municipal Railway, 6.5 sq. ft.

PLATFORM SAVINGS OF LONG WIDE CAR

It has been stated previously that the gain in track capacity due to adopting the new car would readily outweigh the cost of any structural changes. An enormous saving in platform expense also will follow from using a wide car of great length and with side-door passages exclusively. The following comparison made with the present B. R. T. elevated cars shows this feature in a most interesting manner:

PLATFORM COSTS PER ANNUM	
Present elevated equipment—	
Number of cars .....	928
Average seating capacity per car .....	53
Maximum capacity seated and standing per car .....	152
Average cars per train .....	3
Proposed N. Y. M. equipment—	
Average seating capacity per car .....	84
Maximum capacity seated and standing per car .....	270
Average cars per train .....	3
Operation of Present Elevated Equipment for One Year	
Car hours .....	2,850,296
Wages of motormen .....	\$315,698.36
Wages of conductors and guards .....	\$593,594.20
Total platform expense .....	\$909,292.56

From this table it was determined that if 600 of the larger cars were used for the same number of car hours (3071 per car a year), the platform cost would be about \$700,000 per annum, or a saving of more than \$200,000 per annum.

Another advantage which will accrue to the transportation department from the operation of these cars as motor cars only is the simplification and reduction of yard labor concurrent with far more flexible train combinations than are possible with the use of trailers.

COMPARISON OF WEIGHTS AND MOTOR CAPACITIES

As noted in the earlier paragraphs relative to weights on structure, the concentrated loads of the new car will not greatly exceed those of the much shorter elevated cars now in service. The total weight of the N. Y. M. car, of course, is greater, but the advance in design is indicated by the fact that this all-steel side-door car weighs 1268 lb. per running foot (light) of motor car compared with 1455 lb. per running foot (light) of the narrower Brooklyn 1400 series elevated motor car with steel underframe but wooden superstructure. The 1268 lb. per running foot of the N. Y. M. all motor-car train is also much less than that of the other end-entrance and center-entrance shown in the table of comparative data. The end-entrance motor cars are highest with a top figure of 1620 lb. Then follow center-entrance cars with a top figure of 1533 lb. The remodeled Interborough all-steel motor car shows 1496 lb. per running foot, while even its lowest train weight of 1292 lb., obtained by averaging three motors and two trailers, is more than the N. Y. M. all-motor-car train. The Cambridge side-door design of the Boston Elevated Railway is apparently the lightest per running foot (1235 lb.) but actually it is slightly heavier when its lesser width is considered.

On the basis of weight when maximum capacity is carried, the N. Y. M. car shows a saving of 83 lb. to 145 lb. per passenger over the Interborough, depending upon comparison with different combinations of motor and trail cars or straight motor cars. In the new car the estimated weight per passenger on the basis of 270 passengers is the astoundingly low figure of 315 lb. or

but 11 lb. more than the Interborough trailer. Likewise the weights per seated passenger, namely, 1089 lb. and 944 lb. (corresponding to the minimum and maximum seating layouts) are actually below the unit weights of many surface railway low-speed cars. The advance in design and difference in seat arrangement are so great that the new motor car weighs 580 lb. less per seat under minimum and 678 lb. less per seat under maximum seating conditions than the motor car of the Interborough Rapid Transit Company.

Because of the enormous savings in weight and the

use of a tap field motor for the varied service conditions, this 67-ft. car will carry only two 140-hp motors, whereas the Southern Pacific cars have four 125-hp motors and the shorter Long Island, Hudson & Manhattan and Interborough cars two 220-hp, two 225-hp and two 200-hp motors respectively. Compared with the Interborough operation, it will be found that the new car's figure of 1.04-hp per passenger on the basis of maximum loading is much below that of the Interborough. Nevertheless, the N. Y. M. all-motor train will amply meet the speed conditions mentioned in the

N. Y. M. CAR—TABLE OF COMPARATIVE DATA FOR VARIOUS ELEVATED AND SUBWAY CARS

Road and Class of Service	NUMBER OF CARS IN TRAIN			TOTAL CAPACITY				WEIGHT IN POUNDS					HORSE-POWER (Note 2)					PER CENT WEIGHT ON DRIVERS						
	Motor	Trailer	Total	Seated				Total		Per Foot of Train (Light)	Per Pas. Seat Li't			Per Ton		Per Passenger Seated			Total per Train	Light	Loaded (Maximum Capacity)			
				Minimum (Rush Hour)	Medium (Medium Traffic)	Maximum (Light Traffic)	Maximum (Seated and Standing)	Light	With Maximum Pass. Load (Seated and Standing)		Rush Hour Service (Minimum Seating)	Medium Traffic (Medium Seating)	Light Traffic (Maximum Seating)	Per Maximum Pass. Capacity (Seated and Standing)	Loaded Max. Capacity (Seated and Standing)	Rush Hour Service (Minimum Seating)	Medium Traffic (Medium Seating)	Light Traffic (Maximum Seating)				Per Maximum Pass. Capacity (Seated and Standing)		
																							Ft.	In.
Interborough Rapid Transit Subway—Latest steel cars.	**	*	*	44	46	48	169	77,870	1496	1769	1693	1622	460	10.27	7.88	9.09	8.70	8.33	2.37	400	59.5	57.3		
	**	**	**	44	46	48	169	51,410	75,070	987	1168	1118	1071	304	10.27	7.88	9.09	8.70	8.33	2.37	800	59.5	57.3	
	2	0	2	132	138	144	507	207,150	278,130	1324	1568	1500	1439	403	7.73	5.75	6.06	5.80	5.55	1.58	800	44.8	41.8	
	3	2	5	220	230	240	845	336,430	454,730	1292	1529	1462	1403	398	7.13	5.28	5.45	5.22	5.00	1.42	1200	41.4	38.3	
	4	2	6	264	276	288	1014	414,300	556,260	1324	1568	1500	1439	408	7.73	5.75	6.06	5.80	5.55	1.58	1600	44.8	41.8	
	5	3	8	352	368	384	1352	543,580	732,860	1305	1543	1476	1416	402	7.35	5.46	5.68	5.43	5.21	1.48	2000	42.6	39.7	
7	3	10	440	460	480	1690	699,320	935,920	1343	1589	1520	1457	414	8.02	5.98	6.36	6.08	5.83	1.66	2800	46.4	43.5		
New York Municipal Railway Corporation—Subway.	***	***	***	78	90	270	85,000	122,800													280			
	2	0	2	156	180	540	170,000	245,600													560			
	3	0	3	234	270	810	255,000	368,400													840			
	4	0	4	312	360	1080	340,000	491,200													1120			
	5	0	5	390	450	1350	425,000	614,000	1268	1089			944	315	6.6	4.5	3.3		3.1	1.04	1400	50.1	49.9	
	6	0	6	468	540	1620	510,000	736,800													1680			
	7	0	7	546	630	1890	595,000	859,600													1960			
	8	0	8	624	720	2160	680,000	982,400													2240			
Brooklyn Rapid Transit—Elevated, series motor car and standard trailer.	**	*	*	50	154	71,660	93,220	1455		1433			465	11.15	8.58		8.0		2.59	400	60.4	57.9		
	**	**	**	48	148	34,500	55,220	719		719			233	11.15	8.58		8.0		2.59	800	60.4	57.9		
	2	0	2	100	303	143,320	186,440	1455		1433			465	11.15	8.58		8.0		2.59	800	60.4	57.9		
	2	1	3	148	456	177,820	241,660	1213		1200			390	9.01	6.62		5.41		1.75	800	48.6	44.7		
	3	1	4	198	610	249,480	334,880	1274		1260			409	9.62	7.16		6.07		1.97	1200	51.8	48.4		
Boston—Cambridge Subway.	3	2	5	246	758	283,980	390,100	1164		1153			375	8.46	6.15		4.88		1.58	1200	45.6	41.6		
	4	2	6	296	912	355,640	483,320	1213		1200			390	9.0	6.62		5.41		1.75	1600	48.6	44.7		
	***	***	***	72	266	85,900	123,140														400			
	2	0	2	144	532	171,800	246,280														800			
	3	0	3	216	798	257,700	369,420														1200			
	4	0	4	288	1064	343,600	492,560														1600			
Hudson & Manhattan—Original type. Tunnel service.	5	0	5	360	1330	429,500	615,700	1235		1193			323	9.3	6.50		5.55		1.50	2000	58	55.6		
	6	0	6	432	1596	515,400	738,840														2400			
	7	0	7	504	1862	601,300	861,980														2800			
	8	0	8	576	2128	687,200	985,120														3200			
	***	***	***	44	158	73,000	95,120															320		
	2	0	2	88	316	148,200	192,440															640		
Hudson & Manhattan—New Pennsylvania Newark service.	3	0	3	132	474	222,300	288,660														960			
	4	0	4	176	632	296,400	384,880														1280			
	5	0	5	220	790	370,500	481,100	1533		1684			469	8.64	6.65		7.27		2.02	1600	56.4	54.9		
	6	0	6	264	948	444,600	577,320														1920			
	7	0	7	308	1106	518,700	673,540														2240			
	8	0	8	352	1264	592,800	769,760														2560			
Long Island Railroad Subway—Suburban Flatbush Avenue Division.	***	***	***	44	158	73,000	95,120														320			
	2	0	2	88	316	146,000	190,240														640			
	3	0	3	132	474	219,000	285,360														960			
	4	0	4	176	632	292,000	380,480														1350			
	5	0	5	220	790	365,000	475,600	1510		1658			462	12.33	9.46		10.2		2.85	1800	54.1	53.1		
	6	0	6	264	948	438,000	570,720														2250			
Long Island Railroad Subway—Suburban Pennsylvania Station.	7	0	7	308	1106	511,000	665,840														2700			
	8	0	8	352	1264	584,000	760,960														3150			
	*	*	*	52	154	79,564	101,124	1550		1530			516	10.05	7.91		7.7		2.59	400	61	58.6		
	**	**	**	56	136	40,000	59,040	860		715			294	10.05	7.91		7.7		2.59	800	61	58.6		
	2	0	2	104	308	159,128	202,248	1550		1530			516	10.05	7.91		7.7		2.59	800	61	58.6		
	2	1	3	140	444	199,128	261,288	1335		1245			448	8.04	6.12		5.0		1.80	800	48.7	45.4		
Long Island Railroad Subway—Suburban Pennsylvania Station.	3	1	4	212	598	278,692	362,412	1390		1315			466	8.62	6.64		5.66		2.01	1200	52.2	49.2		
	3	2	5	268	734	318,692	421,452	1290		1190			434	7.54	5.70		4.48		1.63	1200	45.6	42.2		
	***	***	***	71	186	104,400	130,440														470			
	2	0	2	142	372	208,800	260,880														940			
	3	0	3	213	558	313,200	391,320														1410			
	4	0	4	284	741	417,600	521,760														1880			
5	0	5	355	930	522,000	652,200	1620		1470			562	9.0	7.21		6.62		2.52	2350	58.7	56.4			
6	0	6	426	1116	626,400	782,640														2820				
7	0	7	497	1302	730,800	913,080														3290				
8	0	8	568	1488	835,200	1,043,520														3760				

\*Single motor car. \*\*Single trailer car. \*\*\*Single car.  
 NOTE 1—Projection of couplers beyond buffers in case of Brooklyn Rapid Transit, Boston, and Hudson & Manhattan, assumed to be 2 in., and for New York Municipal Railway 1½ in.  
 NOTE 2—The horse-power per car of New York Municipal Railway Corporation proposed subway cars, 280 hp.  
 NOTE 3—The weight of each passenger assumed to be 140 lbs.  
 NOTE 4—Standing capacity figured at 1½ sq. ft. per passenger, allowing 9 in. at longitudinal seats for knee room.  
 NOTE 5—No deduction made for motorman's cab in calculating passenger capacity.  
 NOTE 6—For latest weights per driving wheel see text.

following paragraph. While the percentage of weight on the drivers is below that of an Interborough motor car (never operated singly in passenger service) it exceeds that of all Interborough train combinations of motor cars and trailers.

Fully loaded trains, according to the specifications of the Public Service Commission, must operate at the required speeds over 3 per cent grades and at reasonable speeds over the 5 per cent grades on the bridge approaches. The motor equipments will permit a schedule speed of 25 m.p.h. for express trains between the terminals of express stations and a schedule speed of 15 m.p.h. for local trains between terminals. The motor specifications provide for a maximum speed of 50 m.p.h.

COSTS

Through the courtesy of several of the electric railway operators previously mentioned detailed total and unit costs of various types of modern steel passenger cars were obtained. These figures are presented in the accompanying table without any identification except that the last set of figures relate to the estimated cost

COMPARATIVE COSTS—VARIOUS STEEL PASSENGER CARS

Type of Car	Total Cost Completely Equipped	Cost Per Passenger Seat	Cost per Passenger Capacity Seated and Standing	Cost per Lineal Foot
A .....	\$12,236.97	\$169.95	\$46.00	\$175.98
B .....	18,500.00	260.56	99.46	287.09
C .....	13,000.00	250.00	84.41	253.25
D .....	14,500.00	329.54	93.54	300.00
E .....	12,500.00	284.09	80.64	258.62
F .....	14,000.00	318.18	76.92	268.91
New York Municipal (estimated)	15,000.00	166.66*	55.55**	223.88

\*On basis of ninety seats.  
\*\*On basis of 270 passengers.

of the N. Y. M. car. This estimate shows that the estimated cost per passenger seat of the N. Y. M. car ready for service is less than of all other designs, and the cost per passenger capacity seated and standing less than of all others but one. Even the cost per running foot is less than that of the Interborough and Hudson & Manhattan motor cars of lesser width. The parallel would be still more favorable to the N. Y. M. car if it had not been equipped with so many new safety and operating features, all of which naturally add to the cost of the car.

Particularly careful comparisons were made with the latest B. R. T. elevated car and Interborough subway car. It was found that the maximum capacity of 600 N. Y. M. (270-passenger) cars, costing \$9,000,000 would call for 1070 Brooklyn Rapid Transit (152-passenger) cars at a cost of \$13,414,590. The cost of a standard Interborough train of seven motors and three trailers is \$234.33 per running foot, while that of the wider N. Y. M. train of any length will be \$223.88 per running foot. Assuming the Interborough train make-up stated, the 600 N. Y. M. cars would cost \$1,980,000 less than 900 Interborough cars. The N. Y. M. cars would also carry 162,000 instead of 152,100 passengers.

CONCLUSION

The adoption of a car 67 ft. long x 10 ft. wide instead of the smaller type now used by the Interborough Rapid Transit Company on the New York subway system will increase the ultimate carrying capacity of the track by 20 to 25 per cent, save about \$200,000 a year in platform costs, save about \$2,000,000 on an order for 600 cars and save another \$1,000,000 to \$2,000,000 in power system capacity because of the decreased energy consumption per passenger carried.

NEW OFFICE BUILDING AT LEXINGTON

The Kentucky Traction & Terminal Company of Lexington, Ky., has recently moved into a new office building which has been specially fitted up for its electric lighting and railway business. The area of each floor is 40 ft. x 110 ft. The first floor is devoted to a general waiting room, display room for electric lighting features, check room and cashier's office. Half of this floor is rented for outside purposes, so that this room is only



Passenger Waiting Room in New Office Building—Lexington, Ky.

19 ft. wide. The second floor is of the same size and is devoted to the quarters of the men. On this floor are located the reading room, billiard and pool room, and in the rear a lunch room and lavatory. The third floor, which has a total width of 40 ft., is occupied by the general offices of the company, including the dispatcher's office.

A view of the ground floor is shown. A large board containing four dials occupies a prominent position and shows when the next interurban car will leave on the four principal lines of the company, namely, those to Frankfort, Paris, Georgetown and Nicholasville.

CONVENTION OF THE MISSOURI UTILITIES ASSOCIATION

The annual meeting of the Missouri Electric, Gas, Street Railway & Water Works Association was held on a steamboat on the Mississippi River May 21-23. A number of papers were presented, for the most part on affairs of public utilities other than electric railways. The following officers were elected: President, A. C. Einstein, St. Louis; first vice-president, G. E. Hayler, Joplin; second vice-president, J. R. Woodfill, Aurora; third vice-president, Hugo Wurdack, St. Louis; secretary and treasurer, F. D. Beardslee, St. Louis. The public affairs committee as elected consists of P. J. Kealy, Kansas City, chairman; C. C. Barnard, Marshall; E. R. Locke, Mexico; L. D. Kelsey, Brookfield; Richard McCulloch, St. Louis; A. Harbut, Kansas City, and S. E. Bronson, Ozark.

The first annual dinner of the official staff of the London Underground Railways was held on May 2, at the Imperial Hotel, London. A. H. Stanley, managing director, presided. Mr. Stanley announced the granting of free passes to all the employees of the system on the lines under control of the superintendent.

# American Association News

Plans are Presented of Young's Million Dollar Pier and an Account is Published of the Arrangements for the Exhibits—Meetings of the Committee on Public Relations and of Power Distribution—  
Committee Appointments of the Accountants' Association

H. G. McConaughy, secretary of the American Electric Railway Manufacturers' Association, has just issued a circular giving the rules and other data in regard to exhibit space at the October convention of the American Electric Railway Association. All manufacturers who intend to make exhibits at Atlantic City this year are urged to put in an application promptly. While October is some months away, Mr. McConaughy says that the Manufacturers' Association must know the needs of the manufacturers promptly if it is to make the necessary arrangements.

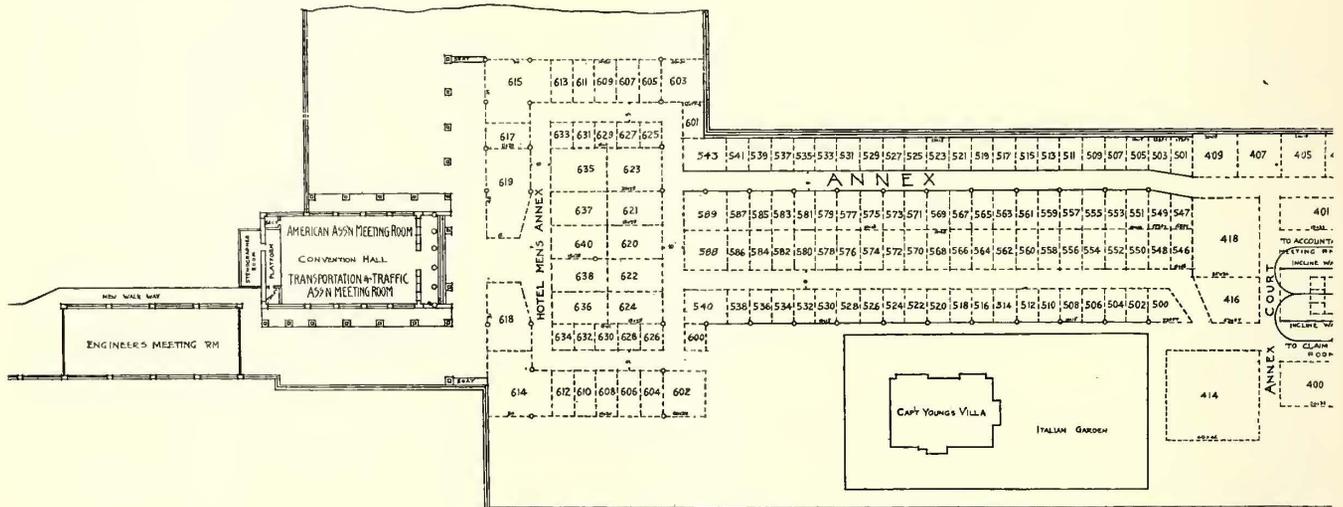
The exhibit, as last year, will be held on Young's Million Dollar Pier. This pier has been renovated both inside and outside during the past year and has been repainted. New solid roofs have also been placed on the pier and new side curtains have been purchased for the annex.

large demand for space is that the 1915 railway convention will be held in San Francisco at the time of the Panama-Pacific Exposition, and probably there will be no arrangements there for any exhibits other than those contained in the Exposition itself.

For this reason he suggests that those manufacturers who wish to have all the space they require and have it where they want it should apply before June 20. Those manufacturers who have not received the blanks from the Manufacturers' Association can obtain them by applying to the secretary at 165 Broadway, New York.

### PUBLIC RELATIONS COMMITTEE

A meeting of the committee on public relations of the American Electric Railway Association was held at the headquarters of the association in New York on June 2. The following were present: Thomas N. McCarter,



from October 12 to 16. The code, however, will be printed and submitted to member companies before that time in order that they may have an opportunity to consider the principles.

The report of the sub-committee also outlined a definite program for the prosecution of publicity and educational plans in the interest of the members of the association. It is the desire to conduct a systematic and thorough campaign for the purpose of giving publicity to the affairs of the companies engaged in furnishing electric railway service. Full details of the plan which received the approval of the members of the sub-committee were laid before the full committee.

As addenda to the report there were included some extracts from the address of President Black of the association at the midyear banquet held on Jan. 29, 1914. In that address Mr. Black sounded a call to arms and served notice that any man who failed to volunteer promptly would be drafted without delay. The report of the sub-committee quoted at length from the remarks of President Black on the subject of public relations.

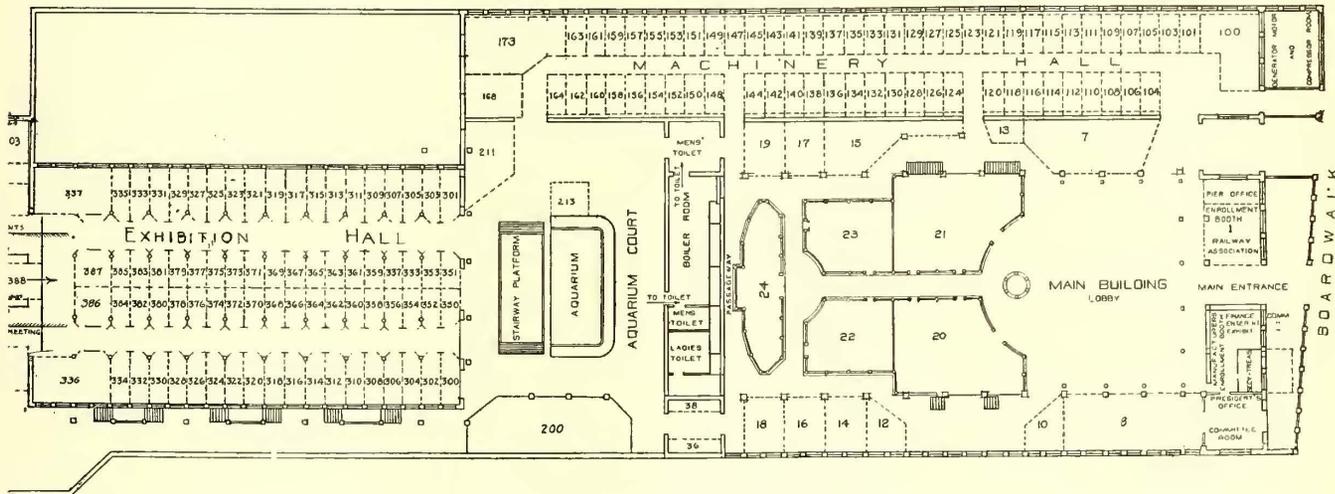
The sub-committee also quoted in its report the fol-

adoption by the association. In the meanwhile the sub-committee was directed to make such elaboration of its plans as the members thought desirable. The sub-committee will also consider the report again with the idea of effecting the best possible plan of co-ordination between the ideas outlined and the other active work in which the association is now engaged. It was also decided by the committee that the full report should be printed and placed in the hands of member companies before the convention in order that abundant opportunity for study of the matter may be given.

COMMITTEE ON POWER DISTRIBUTION

The power distribution committee met at Association headquarters on June 4, those in attendance being G. W. Palmer, Jr., Boston, Mass.; A. S. Richey, Worcester, Mass.; Gaylord Thompson, Trenton, N. J.; Charles R. Harte, New Haven, Conn.; R. H. Rice, Chicago, Ill.; J. H. Barnard, New York, N. Y.

The report of the sub-committee on specifications for hard-drawn copper trolley wire was presented by Prof. A. S. Richey. The report stated that the sub-committee had conferred with a corresponding sub-com-



Plan of Inner End of Convention Pier

lowing extracts from the report of the public policy committee of the National Electric Light Association which was presented at the convention held in Chicago in June, 1913.

"Public opinion to-day is largely shaped by the public press. This, of course, is directly accomplished by the men responsible for the preparation of the articles through which public opinion takes shape. There is an undoubted responsibility resting upon the corporations engaged in public service to see that these men of the pen, these writers of our newspapers and magazines, are adequately informed upon the subjects in which we are interested. Any information with which they are furnished should be adequate and truthful. No element of misrepresentation should be allowed to creep in.

"To accomplish this end your committee urges as a definite responsibility that every member of the association have at least one writer—or preferably all writers—upon the local press, newspaper or magazine, receive the publications relating to this subject which we have at our disposal. If each of our members would see that this information were placed in the possession of every local writer, its effect would quickly extend over the entire continent."

After careful consideration of the report of the sub-committee, the committee approved the steps recommended and decided to present the entire plan to the convention in October with a recommendation for

mittee of the American Society for Testing Materials and the two sub-committees had agreed on a set of specifications. The full committee of the A. S. T. M., however, decided not to recommend the new specifications this year but to secure further data. The A. E. R. E. A. committee then voted to recommend to the association as standard the specifications as reported by the sub-committee. These are a substitute for the present specifications for 00 round wire and cover also 000 and 0000 round wire and all three sizes of grooved wire.

The chairman reported in relation to the proposed national joint committee on overhead line construction to be composed of representatives of the National Electric Light Association, American Institute of Electrical Engineers, the American Telephone & Telegraph Company and the American Electric Railway Engineering Association.

The sub-committee on copper wire tables recommended certain changes in the wire tables to conform them to the tables of the National Bureau of Standards. This was approved. Changes in the standard wire and cable terminology, definitions 1 and 9, were also recommended to conform them to the definitions in Circular No. 37 of the Bureau. The definitions of all wire and cable terms are to correspond with the recommendations of the Bureau and of the A. I. E. E. The present sag tables and charts are also to be extended to cover a somewhat wider range. In the mat-

ter of span-wire sags it was recommended that the factor of safety in span wires be not less than 2.

Certain minor changes in the specifications for galvanizing were recommended to permit the inclusion of sherardizing.

#### ACCOUNTANTS' ASSOCIATION COMMITTEES

M. W. Glover, president of the American Electric Railway Accountants' Association has announced the following appointments:

Committee on a standard classification of accounts, R. N. Wallis, treasurer of the Fitchburg & Leominster Street Railway, vice W. B. Brockway, resigned.

Committee on accounting definitions, George A. Harris, general auditor of the Fonda, Johnstown & Gloversville Railroad, vice W. B. Brockway, resigned.

#### "SAFETY FIRST" FOR KANSAS CITY PUBLIC

After a prolonged and painstaking campaign among its own trainmen, the Metropolitan Street Railway, Kansas City, Mo., has extended its "safety first" work to the general public. Each of the 600 cars operated by the company has been equipped with "safety first" placards, urging patrons and pedestrians to regard personal safety before all other considerations. A series of twenty-five cards has been arranged, and a new sign will be placed on each car every few days.

While the "safety first" idea is perhaps a bit trite in view of the recent publicity given the work by public and private corporations of all descriptions, the Metropolitan's campaign is notable because of the care with which it has been planned and worked out. Despite the fact that it has only now reached the general public, it has been under way in the company's own organization for more than a year. The movement for "safety first" and a reduction of accidents began with weekly meetings of the trainmen at all division points

casualties were the result of the passenger's own indiscretion, the employees were urged to do their share toward educating the public, being assured that a reduction in the importance and number of accidents would put the company in a position to do more for its own men.

"Safety first" also has been emphasized at the training school for new men and in every other legitimate way. The question books which must be studied thor-



Specimens of Additional "Safety First" Dashboard Signs in Kansas City

oughly by applicants for positions are examples of the company's efforts to impress on its men the new idea. Mottoes aiming at this end are scattered throughout the books, and every employee has thus been sympathetically allied with the company's policy almost without exception.

As the employees have been made acquainted with the details of the movement, the Metropolitan company now has concentrated its efforts on the public. The placards mentioned are placed in frames on the front of each car. Cards may be slipped in or out in a moment's time. The cards, which are 22 in. x 22 in., are paraffined and thus are impervious to weather conditions. Red is the dominating color in all displays, though green, blue and black are utilized frequently. The first placard shown was one of the most attractive, bearing merely the words, "Safety First," the lettering being white on a red circle. Those to follow are somewhat more elaborate in wording and coloring. Each sign is numbered so that no danger of confusion in changing them is likely. All shifts from one sign to another will be made simultaneously. Several of the placards are reproduced in two accompanying half-tones.

Commercial organizations of Kansas City have viewed the Metropolitan company's efforts with enthusiasm, and many leading bodies will collaborate. It is planned to have competent men lecture in the schools and otherwise carry out the fundamental ideas of the campaign.

More recently, the company has ordered 50,000 buttons for distribution among employees, to school children of the city and the general public. The buttons will say merely, "Safety First," while in smaller letters will be the name of the company. In addition to the buttons and the signs utilized on the front of street cars, the company has issued 2000 booklets to go to trainmen. "Accidents and How to Prevent Them," is the title. The volume is unusual in many respects.



Specimens of Earlier "Safety First" Dashboard Signs in Kansas City

of the company. The trouble sheets for each past week were read to the assembled crews by a company official who had made a study of this particular line of statistics. Instead of merely calling off the number of accidents and their nature, however, a good deal of time was spent on each by the officer in charge. Each accident, regardless of its size and importance, was analyzed carefully, and the trainmen shown how it might have been avoided by care on their own part. Where the

# N. E. L. A. Convention at Philadelphia

The Thirty-Seventh Convention Was Held in Philadelphia June 1 to 4—Abstracts of a Number of Papers and Reports Having Relation to Electric Railway Work Are Given

The thirty-seventh convention of the National Electric Light Association was held at the Bellevue-Stratford Hotel in Philadelphia from June 1 to 4. A comprehensive program covering the technical, commercial, accounting and public policy phases of the industry was presented. Several parallel sessions were held, but an endeavor was made to so arrange these that conflicts would not occur in subjects of general interest.

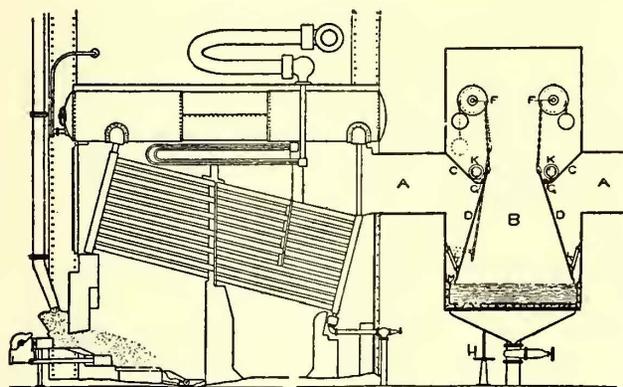
A number of the reports and papers are abstracted in the following paragraphs.

## POWER STATION PRACTICE

Some of the papers and reports covering power station practice and tendencies are given below.

### REPORT OF COMMITTEE ON PRIME MOVERS

The report of the committee on prime movers, of which I. E. Moulthrop is chairman, occupied more than ninety printed pages and treated the topics of steam-power, water-power and internal-combustion engines. For stand-by service at St. Louis the scheme of building



N. E. L. A. Reports—Device for Removing Cinders from Flue Gas

rapid-kindling coal fires was found quicker and cheaper than oil-burning. At Boston steam blowers have been used with advantage to secure forced draft on boilers during peak periods, raising the steaming output quickly by 150 to 200 per cent. Cinder particles discharged from the stacks at high draft are collected at New York by impinging the flue gases against a wet baffle plate, the cinders being caught in a water trough. Several stokers have now been in successful use for burning pulverized coal, and in the opinion of the committee deserve greater attention. In view of the high cost of the pit necessary for under-water coal storage and the security of properly selected storage coal against ignition, the committee considers the construction of special pits unwarrantable. A more refractory fire-brick is needed, as modern boiler practice has already approached the limit of temperatures for clay products.

In condenser design the committee is gratified at noting the larger steam passages allowed. Open-hearth seamless-steel boiler tubes are now being largely specified and are used with success. The application of "efficiency instruments" has not been attended by the results contemplated, for the reasons that the instruments themselves easily get out of order and careful study and comparison of the records is required in

order to diagnose troubles. Letters from manufacturers describing recently developed apparatus formed a supplement to the section on steam-power practice.

Under the heading of water power reference was made to the paper by O. B. Coldwell presented before the convention. Methods of measuring flow at water-power plants were also tabulated and discussed. While center bearings between runners on waterwheel sets permit of smaller shaft sections, they introduce the disadvantage of inaccessibility and involve the danger of not sharing the bearing load. Forced lubrication is required where bearings cannot be reached. The Kingsbury type of thrust bearing has been giving excellent service at the Keokuk plant.

During the past year there has occurred a continued recedence of the gas engine and producer plant in contrast with the remarkable growth and development of the steam-turbine plant. On the other hand, many prominent engine builders have taken up the manufacture of oil engines. European practice is markedly reflected in American oil-engine design. A commercially practicable gas turbine is shortly to be marketed abroad. Five American firms are now making Diesel-type oil engines, and half a dozen others have acquired rights to other types of similar engines. Appendices to the internal-combustion section of the report give information concerning the location of oil engines in the United States, prices of oil, petroleum production, etc.

### ELECTRICAL APPARATUS

The committee on electrical apparatus, of which L. L. Elden was chairman, presented an eighty-two-page report on the design of recent types of generating and converting apparatus, air-cooling devices, switchboard equipment and protective devices. The design of outdoor and indoor stations, and the elimination of personal and fire hazards in electrical systems were discussed. Important advances in the developments of temperature-measuring devices suitable for use in connection with electrical apparatus were also mentioned. Details of standardization work in general, including the N. E. L. A. participation in the revision of the A. I. E. E. standardization rules, were treated at some length in the report.

### SELECTION OF HYDRAULIC TURBINES

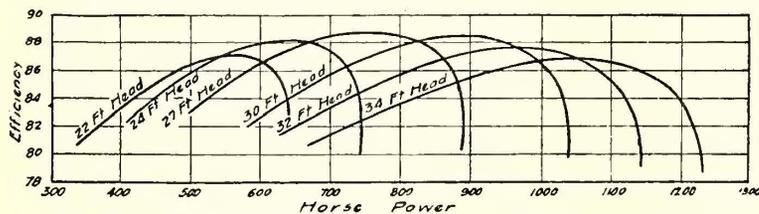
It was pointed out in the paper on "The Selection of Hydraulic Turbines," by Charles V. Seastone, that lack of proper data on the characteristics of different types of waterwheels has, to a certain extent, been the cause of installing turbine equipment which is unsuited to the conditions under which it operates. Tests on the smaller-sized waterwheels compared with the actual results of large installed units indicate that the characteristics of different sizes of machines having homologous parts are essentially the same. Ordinarily turbine units rated at 1.25 per cent of their connected generator should be selected so that they can be operated at about eight-tenths of full gate opening. Careful consideration should also be given to selecting units which will operate at high efficiency under a range of heads. Curves were shown indicating how two machines having the same efficiency at a definite load might have widely differing efficiencies above or below this particular load. Other curves showed how machines made by different manufacturers behave under varying heads. (See figure.)

An interesting method of operating five four-runner turbines was described which allows very flexible operation. The gates of two pairs of runners are operated either individually or together by separate regulating shafts which extend outside the bulkhead wall and are connected to the gate-operating mechanism. These gates may be operated by hand without interfering with the governor control. It will thus be seen that with such an arrangement the number of hydraulic units is practically doubled, with a consequent increased flexibility of operation and efficiency, and without any appreciable sacrifice in efficiency, except in the generators, which is but a small percentage.

#### WATER-POWER PLANT ECONOMICS

In a paper on "Water-Power Plant Economics" O. B. Coldwell presented curves on investment charges and operating costs for steam and hydroelectric generating plants, and discussed stream and watershed, various types of hydroelectric plants, headwork and intakes, types of conduit, penstocks, pondage, main units and generators, and draft tubes and tailraces.

If there is any choice it is generally preferable to select a stream with a low ratio of flood discharge to minimum flow in order that as much power can be developed as possible without having a large proportion of the equipment lying idle during minimum stream flow. Inasmuch as the majority of streams deliver considerably more water throughout the greater part of the



N. E. L. A. Reports—Efficiency Curves of Hydraulic Turbines

year than is available during minimum stream flow, generating equipment in excess of that capable of utilizing the low flow should be installed. As a valuable treatise on hydroelectric plant economics, Mr. Coldwell recommended Dr. Cary T. Hutchinson's paper on "Economic Capacity of a Combined Hydroelectric and Steam-Power Plant," read at the March meeting of the American Institute of Electrical Engineers.

Numerous devices are used to improve the operation of generating plants. Among those mentioned or described were head-water and tail-water level indicators, water-flow measuring devices, hydraulic and motor-operated valves, water-cooling systems, and overspeed safety devices. Standpipes or pressure-equalizing reservoirs are advisable when long penstocks delivering water at high speed are employed. Synchronous pressure regulators may be used when the cost of a standpipe is prohibitive. A plant should be situated with respect to the tailrace so that full advantage is taken of the draft therein. Switchboards should be compactly arranged so that the operator can perform all duties from one locality, thereby saving time during emergencies. Electrically operated headgates were advised.

#### HIGH LOAD-FACTOR AND NON-PEAK BUSINESS

Two classes of business were discussed in the report of the committee on high load-factor and non-peak business, of which George H. Jones is chairman. The first class relates to those applications which have already been highly developed, including such lines as electric-vehicle charging, ice manufacture, etc. The second class represents industries giving great promise for the future such as electric furnaces, electrochemical processes,

etc. Consumption data and actual load curves were presented for amusement parks, bakeries, breweries, brick plants, building construction, cotton mills, dairies, department stores, dredging, vehicle charging, electrochemical loads, flour mills, foundries, electric furnaces, hotels, ice plants, ice-cream manufacture, irrigation, mining, newspaper printing offices, packing houses, pumping plants, stone quarries, electric railways, etc. Descriptions were given of the plants for which data were presented, and the discussion pointed out the desirable load-factor conditions of certain of these applications. In the same connection the committee brought up the question of supplying the summer lighting demand of isolated plants which require steam-heating service in winter time.

## TRANSMISSION LINE PRACTICE

### OVERHEAD-LINE CONSTRUCTION

The committee on overhead-line construction, of which Thomas Sproule was chairman, presented as its report a revision of the first two sections of the 1911 report, covering primary and secondary line construction. The committee's report is printed in full in a "Handbook on Overhead-Line Construction" prepared by a sub-committee of the main committee.

The handbook contains in addition to the committee's report descriptions of the methods and materials employed in overhead-line construction; also the necessary formulas for the electrical and mechanical solution of the various transmission and distribution problems.

Contained in the handbook are an abridged electrical dictionary and several tables; data on wooden, reinforced-concrete and steel poles and towers; conductors and wire tables; general information on cross-arms, pins, line hardware, insulators, insulator manufacture, insulator characteristics, etc.; information regarding transformers, regulators and lightning in connection with electric circuits and protective apparatus; electrical calculations of alternating-current and direct-current systems; mechanical calculations for wire sag, strength of poles, etc.; general data on wood preservation; recommendations of the National Electric Light Association committee on wood preservation; American and German government data on the preservation of timber; primary and secondary line construction; effects of weather conditions on electrical equipment, and methods of resuscitation.

Attention was also called to a report on joint-pole usage prepared by joint committees of the American Electric Railway Association, the National Electric Light Association, the American Institute of Electrical Engineers, and the American Telephone & Telegraph Company, which will be presented at the fall convention of the first-named association.

### ELECTRICAL DISTURBANCES IN TRANSMISSION WORK

In a paper on the "Nature of Electrical Disturbances in Transmission Work," by D. B. Rushmore and E. A. Lof, the disturbances are divided into those caused by high currents and those caused by high voltages. The destructive effects of high currents may be reduced by increasing the reactance in the circuits by providing external reactors and so sectionalizing the system through selective switching devices that the disturbances will be confined to the smallest possible area. With reference to high-voltage disturbances, the authors point out that the regulation of modern transmission systems is generally improved by providing synchronous condensers with automatic voltage regulators. The

field is then adjusted so as to make the condenser take a lagging current at no load and a leading current at full load, the first to offset the effect of the line capacity and the second to offset the surplus lagging load current. The aluminum-cell lightning arrester protects against high-voltage disturbances occurring between the phase conductors or between the phase conductors and ground. Overhead ground wires are also very generally used to protect the line against atmospheric changes. Means for protecting against disturbances due to high frequency are being studied and investigated, and since these disturbances are liable to damage the interior of transformer windings, the authors say it is advisable to insulate heavily not only the end turns of the windings but the coil groups as well. Inductances and energy-absorbing devices may also be added for further protection.

#### INTERNATIONAL MEASUREMENTS AND VALUES

A brief outline of the events leading up to the adoption of an international standard of electrical conductivity for copper was given in the report of the committee on international measurements and values, of which Dr. A. E. Kennelly was chairman. A resistance of 1/58 ohm was adopted for standard annealed copper wire 1 m long and 1 sq. mm in cross-section at 20 deg. C. This value differs only very slightly from the value previously used in England, France, Germany and the United States. The international standard of resistance for standard annealed and commercial copper was appended to the report.

#### ACCOUNTING MATTERS

##### CLASSIFICATION OF CONSTRUCTION AND OPERATING ACCOUNTS

In a seventy-page report constituting a working handbook of expense classification the committee on classification of accounts, of which John L. Bailey is chairman, analyzed the principal items of outlay associated with the construction and operation of a modern electric-service system. Detailed lists were given of the items involved in organization, franchise-getting, physical-plant construction, liabilities, assets, income accounts, production, transmission, distribution, utilization, commercial, new business and general expenses and appropriations. Full explanations were given under each account heading as to its inclusiveness, and the subdivisions are carried to a degree of unusual completeness. A few commentary notes were included in the report. One of these emphasized the opposing practices of the New York and Wisconsin commissions with regard to allowing the capitalization of discount on bonds, the former prohibiting and the latter permitting it. The committee is of the opinion that where it is not permitted to capitalize the discount on bonds and the expense of their issue this cost should be charged to an account called "debt discount and expense." In this event it is proper to amortize the cost at a proportional rate based upon the life of the security to maturity. Under the heading "Maintenance of Underground Conduits," the committee held that this cost, including both patrolling and inspecting of underground conduits and subways which carry both transmission and distribution conductors, should be apportioned between this and the account provided for transmission underground-conduit repairs. In the scope of items included and the care with which their separation is affected the report is unusually clear and practicable as a working document.

##### DISBURSEMENT ACCOUNTS

In an extended paper by F. A. Birch describing the system used in accounting for purchases by the Phila-

delphia Electric Company, the advantages of the Holzerith method of tabulation were illustrated and a detailed account was given of the handling of each form designed for purchasing and the distribution of charges to the classification expense accounts. The company receives about 6000 purchase invoices each month, covering supplies bought for construction and operation. With the old-style voucher-register system monthly reports were not completed before the twentieth of the month following the expenditure, at the earliest, but with the use of tabulating machines a saving of from a week to ten days is attained. The forms used are comprehensive and clear-cut, and the author sets forth their interdepartmental routing with great precision. A special voucher case has been developed for use where a disbursement is not supported by a purchase invoice. No check book is required in using the voucher check. Verification of bill totals in the tabulating machine is a valuable feature, and instead of keeping details of operating expenses, construction charges and other accounts affected by accounts payable in the voucher register, this information is obtained from the tabulating cards.

The time required to run the accounts-payable cards through the tabulating machine for any month is less by several days than the time formerly needed to add the 140 columns on each of the twenty pages of the voucher register. It is now a matter of but a few moments to assemble and tabulate the vouchers and so obtain complete analysis of any account. The tabulating machines greatly expedite posting to general and auxiliary ledgers and the classification of data desired by public service commissions, boards of directors and executive officers. An example of the detail available from machine cards was given under the handling of customers' deposits. Cards may be sorted to show the amount of guarantee deposits in different sections of the city, the amounts of deposits received from various classes of business, the denominations of money in which they are received, number of deposits transferred, average length of time a deposit is held, amount of interest allowed on deposit, refunds and many other points. The slight disadvantage of the longer time required to analyze a single account with the tabulating machine as compared with the former method of entering each separate item, with an attached explanation in a book is offset by the great saving in time required to itemize all of the accounts in books, when particulars regarding only a few are needed and when very probably none will be asked for. It is contrary to the principles of scientific management to prepare a maximum amount of data for hundreds of items when details will be requested for only a very few, and the tabulating machine method is admirably flexible in this connection.

##### SUSPENSE ACCOUNTS

In a paper by Frederick Schmitt it was stated that suspense accounts are of two general classes—first, those rightly classified as suspense on account of having uncertain elements, and, second, those commonly representing costs of a definite character, which properly should be called clearance or apportionment accounts. The author described various components of each class, including under the suspense account general suspense and accounts receivable suspense, and under clearance accounts work in progress, storeroom expense, transportation expense, deferred and miscellaneous charges. Under general suspense it is customary in some companies to include cash advanced to employees for expenses to be accounted for later, also cash withheld from wages to satisfy judgments filed against employees.

The author also emphasized the value of a work-order system. He discussed storeroom expense at some length, favoring the clearing of such accounts on a constant or percentage basis added to each requisition for

material and criticising the elaboration required in such accounting by the Public Service Commission, First District, New York, in the case of companies using the clearing method. Experience shows that the cost of handling supplies bears a definite relation to their value, and that by an occasional adjustment, practice is more satisfactory than where a minute subdivision is attempted, involving such difficulties as the proportional cost of storage of each kind of supply carried, prorating shelving and counter space, building repairs, etc. The author did not look upon cash discounts recovered through prompt payment as a saving or revenue, but held that supplies should be charged with the full price, charging the discount when not taken to profit and loss. Apportionment of transportation costs should be on a rate per hour for the time of use of each vehicle, the actual sum paid being used for vehicles not owned by the company. Discount on bonds is not held to be a part of the cost of acquiring a property, being a virtual interest charge.

#### SORTING AND TABULATING MACHINES

In a paper by G. L. Knight and C. V. Woolsey was described the use of sorting and tabulating machines on the distribution system of the Edison Electric Illuminating Company of Brooklyn, N. Y., pointing out the adaptation of code numbers to the classification of material and equipment in transmission and distribution and giving in detail code data applicable to inventories. It was pointed out that the use of code numbers greatly simplifies the taking of an inventory, even in cases where a tabulating machine is not considered, saving time and reducing the chances of errors in making transfers.

The code is designed to indicate only such characteristics of the material as are required to estimate its unit value in reports of physical property. The code is greatly simplified by using a code number consistent with the material represented. Thus, the code number for a twelve-duct subway consisting of fiber conduit laid two ducts wide and six ducts high in the trench would be 1212. The first two figures (12) indicate the number of ducts in the trench, the third figure (1) represents the kind of conduit (fiber), and the last figure (2) shows the number of ducts width. Examples are given of the use of tabulating cards, summaries and other inventory data in a central-station office in which a complete statistical unit consists of two key punches, a gang punch, with quick-set device, sorter, tabulator and card files. The paper forms a working manual within its field and scope of the code submitted, and the clearness of the illustrations entitles it to be classed as a small handbook for the accounting force interested in the economical handling of both original and periodical transmission and distribution system inventories.

#### PUBLIC POLICY COMMITTEE REPORT

Looking back over the reports of previous years, the committee on public policy stated that it found no reason to retract or modify any of the recommendations of the past. Rather has time proved that they indicate a wise, constructive course which may well be followed to the benefit of the members individually and the industry collectively. The committee made note of an evident and spreading effort throughout the industry to maintain the highest attainable standards of service, to safeguard the health and lives of employees and to conduct affairs generally in a manner to commend the industry to the public at large. The report was signed by the following members of the committee: Nicholas F. Brady, Everett W. Burdett, Henry L. Doherty, Charles

L. Edgar, W. W. Freeman, George H. Harries, Samuel Insull, John W. Lieb, Joseph B. McCall, ex officio, Thomas E. Murray, Samuel Scovil, Charles A. Stone, Herbert A. Wagner, and Arthur Williams as chairman.

The committee found little conflict between its own views and those generally recorded by the various public service commissions. It has held consistently that the business of supplying electrical energy from large central stations is essentially a monopoly in the best meaning of the word. If a monopoly and privately owned and operated, but occupying public property to render a public service, it must be regulated by some public authority. Monopoly in public service can be justified only on the ground that some advantages accrue to the public. This position with the public cannot be maintained unless it can be shown that the greater part of the benefit resulting from such monopoly goes to the public and not to stockholders of the corporation. That stockholders are entitled to share in the results of an efficient, well-managed service no one can question. But this must be incidental to and not the principal consideration in the efforts to continue the industry in each given territory along regulated monopoly lines. The committee quoted from a recent decision of the Railroad Commission of California in the San José telephone case which says in part: "Life is entirely too short to be utilized in trying to make natural monopolies do what they say they can and ought to do without competition." The committee believes that the newer commissions are approaching their duties in a broad spirit of fairness and notes the reaffirmation of the newer as well as the older commissions of the general principle of non-competition in the field of regulated public utility enterprises.

In taking up "fair rates and good service" the committee says that usually, but not always, criticism begins with rates. All rate schedules should have the widest publicity. They should never be discriminatory in their nature, and they should be fairly representative of the cost of rendering the various classes of service to which they pertain. The committee stated that there are certain localities within which, while the rates have been reasonable, serious dissatisfaction has arisen because of the unsatisfactory nature of the service, or indifference or ignorance on the part of employees of the company. Reasonable, simple public rate schedules, an efficient, well-trained organization covering every feature of the activities of the company and a service of the highest standards are service features to which every community is justly entitled. If members fail in giving these, they fail in performing their just obligations to the public and to their own stockholders.

One of the purposes in maintaining a regulated monopoly in the electrical industry is to secure to the public and to the corporation the inherent advantages of generating and distributing electrical energy on a large scale to widely diverse classes and conditions of service. The larger the scale and the wider the diversity the greater the obtainable economies. Members are urged to endeavor to combine all of the electric service of the respective communities. The resultant benefits will be shared not only within the industry but with the public to the largest practicable extent.

In speaking of industrial education the committee says that throughout all of the undertakings of the membership special and general training from the elementary to the highest stages should be a continuing effort. The committee believes that, wherever practicable, the so-called continuation schools covering the various activities of the industry should be conducted by the members, that attendance should be within the employers' and not the employees' time, and that the courses should be broad and general as well as specific

and individual, so as to be most productive of the highest degree of human efficiency.

Regarding safety and sanitation the committee says that attention should be directed first to the elimination of all possible danger spots in the plants and distributing systems and second to the training of the employees and members to be constantly alert for danger to themselves and their fellow-workers. One of the member companies found that during the last seven years only 7.7 per cent of its accidents occurred as the result of negligence on its own part. The other 92.3 per cent occurred through carelessness and negligence on the part of the person injured or on the part of a fellow employee or an outside contractor. The average number of fatalities per 1000 employees among central stations of the Second District of the State of New York for the three years 1910 to 1912, inclusive, was 4.67, while for the central stations of the First District, which includes most of the larger central stations of the State, the corresponding figure for the years 1909 to 1911, inclusive, was 1.93. The largest central station in the latter group averaged less than one fatality per year per 1000 employees in the last seven years. This would tend to show that the accident-preventive measures which the largest companies have been particularly active in adopting have borne fruit. Several members have well-organized safety departments. One has recently adopted the rule that 10 per cent of its employees shall be appointed to membership upon safety committees for a period of six months. At the expiration of this period another 10 per cent is appointed to these committees and so on, until within a period of five years all of the employees will have served on the safety committees. This plan is commended to members.

Concerning public ownership and operation the report says that perhaps the most serious and unfair instance culminating during the year is that of the municipal electric-light plant in Cleveland. The committee claimed that the membership will recognize that if the price of 3 cents per kw-hr. prevails a very large percentage of the service will be supplied at a serious loss. In the judgment of the committee, with fair public regulation municipal ownership is bound to fail. Approximately 235 plants have been abandoned—in some instances only the plants, and in others both plants and distributing systems. The committee remarked that various municipalities in England are beginning to awaken to the serious burdens imposed by the ownership and operation of public utilities and that signs abound of a general reaction against this policy. Attention was called to the recent book by Yves Guyot on "Where and Why Public Ownership Has Failed," which was translated into English through the efforts of the committee. The committee has also encouraged the organization of the Bureau of Public Service Economics, New York. This bureau is prepared to make reports upon any government or municipal undertaking in this country or Europe on very short notice. The committee adds that it will be appreciated that there is no thought of concealment of the moral support behind the bureau. What little financial support it has needed has been available through its activities and the sale of various publications. The committee feels that with a straightforward statement of the purpose of the bureau this latter point is of incidental importance, as enlightened public opinion would hardly fail to support even material contributions to a purpose which simply sought to inform the public and place the industry before it in a proper light.

One phase of employee relationship highly commends itself to the members of the committee. This is the provision of convenient means to accumulate savings

whereby employees of the industry are aided in the purchase of their homes and of the securities of the companies by which they are employed. One of the members whose stock is not upon the market has assisted its employees in organizing a security-holding corporation, the shares of which are purchased upon the instalment plan. The securities behind the shares are the securities of the local electric light and gas companies. The committee commends to members any methods by which their employees are encouraged in the acquirement of either the homes in which they live or the established securities of the corporation by which they are employed.

There are three appendices to the report. A number of decisions were reviewed by Beardsley, Hemmens & Taylor, counsel of the New York Edison Company. In these attention was called to the recognition by commissions of the monopoly character of public service companies, the provision of supplementary service to block-lighting plants and the inclusion of business-building expenditures and going values in appraisals. Another well-established principle which has been reiterated by the courts during the last year, and which to a certain extent affects the large wholesale business of electric-supply companies, is that relating to the resale of merchandise. These decisions are of considerable importance to electric companies in cases where energy is sold in bulk to a customer who may dispose of it as he sees fit. Another appendix contains the unanimous recommendations of the committee on water-power of the Fifth National Conservation Congress. The last appendix contains an article on "Three-Cent Light In Cleveland," written by H. W. Wilson for the Bureau of Public Service Economics.

#### MUNICIPAL OWNERSHIP HEARING IN WASHINGTON

The hearings being held by the House committee on District affairs in regard to the Crosser bill, which provides for municipal ownership of the electric railways in the District of Columbia, were continued this last week. Previous hearings have been reported in earlier issues of this paper. The testimony presented during the past week was largely from those in favor of the bill. The witnesses included the commissioners of the District of Columbia.

##### TESTIMONY OF DISTRICT COMMISSIONERS

Oliver M. Newman, chairman of the commission, was the first to testify in support of the measure, and he was followed by Commissioner Frederick L. Siddons and the engineer commissioner, Lieut.-Col. Chester Harding, U. S. A. The first two were vigorous in their support of government ownership, but Colonel Harding was far less certain of its success. Under the terms of the bill the commissioners would operate the local railways under government ownership.

All the commissioners asked to be excused from discussing details of the management, service, and physical valuation of the local railways, because these features are pending in an inquiry before the District Public Utilities Commission. The witnesses were members of this commission.

Commissioner Newman told the committee that he felt that a public service ought to be rendered by the public and not by private corporations as private property. He declared that his experiences as a newspaperman, before President Wilson appointed him a commissioner, convinced him of the value of municipal ownership of public utilities.

Representative Samuel E. Winslow, of Massachusetts, who is leading the opposition to the Crosser bill in the committee, asked the witness if he was "prejudiced" in

favor of government ownership before he became a member of the committee.

"I would not call it prejudice," replied Mr. Newman. "I would call it a conviction."

In reply to a question as to the method by which the District commissioners should operate the suburban lines that are now a part of the present Washington systems, Mr. Newman declared that they could get authority from Congress to operate the outside lines, enter into a private contract with the roads now operating, or purchase the properties outright. Mr. Newman presented statistics in regard to municipally owned electric lighting plants from the Census reports. According to him, the municipal plants had increased in number more rapidly than the privately owned plants, and they were showing a good net profit.

Representative Winslow pressed Mr. Newman to tell what specific benefits would accrue to the people of the District of Columbia from the government ownership and operation of railways here. Mr. Newman, however, declined to go into specific details, declaring that because of the pending investigation of the Public Utilities Commission he would have to confine himself to general comment. Finally, however, he said: "In its attempt to regulate the Washington companies, the Public Utilities Commission has already met with so much obstruction and opposition to effective regulation that I seriously doubt that we can regulate them effectively, and for that reason, in addition to general reasons, I urge the passage of the Crosser bill."

Commissioner Siddons said he concurred entirely in the views of Commissioner Newman. He declared that the present regulation of street railways had come not because they conducted their affairs to give general and complete satisfaction but because they failed to do so. He also declined to make specific references to the local situation, but in general declared that private ownership of public utilities was responsible for poor service and equipment, lack of extension, "receiverships to squeeze out small stockholders," and demands for profit on capital not represented by cash invested. Mr. Siddons declared that he was not ready to admit the inability of the Public Utilities Commission to carry out the intent of Congress in the regulation of the local lines but said that he felt it wise to express his doubts whether the public regulation would accomplish the objects expected of it.

Colonel Harding, who is a member of the engineer corps of the army, told the committee that he had not made a study of municipal ownership except in connection with the present bill. He believed, however, he said, that his colleagues were right in their approval of the measure. He thought that, assuming equally efficient managements in private and public operation, a lower fare could be obtained under a publicly owned road. He admitted, however, that public bodies move slowly, when asked whether the municipality would respond more quickly to public demand for better service, extension and other improvements. As a result he confessed that his support of the measure was far less emphatic than that of his colleagues.

#### TESTIMONY OF CORPORATION COUNSEL

Corporation Counsel Conrad H. Syme also supported the views of the commissioners. He said that he believed in the general principle of public ownership of all utilities. He declared that these were necessary to the proper conduct of a city and should remain "functions of the government." He referred to the Public Utilities Commission as a step toward municipal ownership but expressed the belief that the commission finally would prove inadequate to regulate the operation of privately owned companies.

Several clashes marked Mr. Syme's testimony. First there was a conflict with C. P. King, president of the Washington Railway & Electric Company. Mr. Syme had declared that the entire value of this company would be found to be \$5,000,000 or \$6,000,000. Mr. King protested to the committee against accepting these figures and declared that when the properties were taken over the mortgages upon them totaled more than \$7,500,000.

As a result Mr. Syme made a second appearance before the committee and insisted that the "water" must be taken out of the capitalization when the government takes over the properties. Representative Winslow read to the witness a list of stockholders of this company in 1912 from which it appeared that Mr. Syme, as well as his wife and his father, each had owned ten shares of stock. Mr. Syme explained that he had sold his holdings when he was appointed because the law forbade such ownership. Mr. Syme grew indignant when Mr. Winslow pointed out that if his contentions were correct he had been the owner of the inflated stock against which he inveighed. Mr. Syme declared, however, that he felt that it was necessary that stockholders should suffer for the benefit of the people, if government ownership were made effective.

"When there are two evils," declared Mr. Syme, "it is better to choose that one which might have been guarded against. It is for the interest of the general public that these two corporations should be operated by the public. Then I think we should look out for the many—in other words, bring about the greatest good for the greatest number."

"Then the people who bought this stock have got to suffer when you take over the companies?" asked Representative Winslow.

"It would seem so," was the reply. "They must suffer or the people at large must suffer."

In reply to a question by Representative Caraway, Mr. Syme insisted that the enactment of the Crosser bill would not be an announcement by Congress that it favors the general idea of municipal ownership.

#### OTHER TESTIMONY

Another Washington official who appeared in favor of the measure was E. W. Oyster, an assistant tax assessor, who appeared also as a representative of the Petworth Citizens' Association. Representatives of various associations came because a plea had been made to the committee that none of these organizations was on record in favor of the government ownership. None of their representatives, however, presented resolutions of support. Mr. Oyster declared that his district wanted better car service. It had failed to secure this from the present companies and therefore wanted government ownership. Such ownership, he said, would mean better service, lower fares and better treatment of employees. He said he could give no data in support of his contention, but he felt that under government ownership citizens would feel a proprietary interest in the lines and that this would result in what was expected.

Thomas E. Will, a real estate operator and a member of the Northeast Citizens' Association, gave similar testimony. Mr. Will admitted that his experience in street railway operation was limited to "riding and paying," but he believed that 3-cent and even 2-cent fares would be profitable under public ownership.

Robert F. Bradbury, of Randle Heights Citizens' Association, also argued for government ownership on the plea that all sections of the city would then be treated alike. He complained that one electric railway company had spent \$700,000 in the business district of Washington and had neglected his own suburb. Mr. Bradbury acknowledged that he was interested in the Bradbury

Heights enterprise, which would benefit by the extension he asked, but he insisted that his desire for better service was not a selfish one. He said that he would recommend that the line be built even if it did not pay at once, arguing that eventually it would reach a paying basis.

Dr. Charles M. Emmons, president of the East Washington Citizens' Association, was the only one of these witnesses to object to the bill. He declared that his association objected to government ownership of street railways because the commissioners were not experienced railway men and because they should devote their energies to correcting the present abuses in the District, rather than to assume the additional burdens of running the street railway systems. He said that in his locality the citizens had been paying taxes for sixty years, but still had no sidewalks and no trees, and that many of their streets lacked improvements. He felt that these should be cared for first.

John B. Colpoys, representative of the Central Labor Union of the District, told the committee that organized labor favored government ownership of street railways. This, he declared, represented one-third of the families in the District. He contended that hours could be shortened and wages increased if the Washington street railways were operated by the District. But even if they were to be operated at a loss he declared that he favored their municipalization. He said that the present roads ought to be taken over by the government after a fair valuation of their physical properties. He did not think the city should have to pay for the franchises. However, if a jury decided that other items should enter into the cost than merely the value of the physical property, he would agree rather than see the roads remain in private hands.

#### PROGRESS OF THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION

Nine of the eleven principal buildings of the Panama-Pacific International Exposition are now completed, and the others will be finished within thirty days. The gates of the exposition will open on Feb. 20, 1915, and will close on Dec. 4, 1915. The department of machinery of the exposition has been actively engaged upon the allotment of space in the completed Palace of Machinery. As so many applicants asked for a large amount of space, the area of the building, 369,600 sq. ft., was far over-applied for and it became necessary to consider each application carefully so that all amounts of space might be appreciably reduced.

On April 1 preliminary work was started on the installation of the first exhibit, a 500-hp marine Diesel engine, by the Busch-Sulzer Brothers Diesel Engine Company. This installation will cost \$70,000. Several of the exhibitors have arranged, through the operation of pumps, etc., beautiful and artistic effects, such as waterfalls and illuminated fountains. The testing of high-potential insulators and transformers is provided

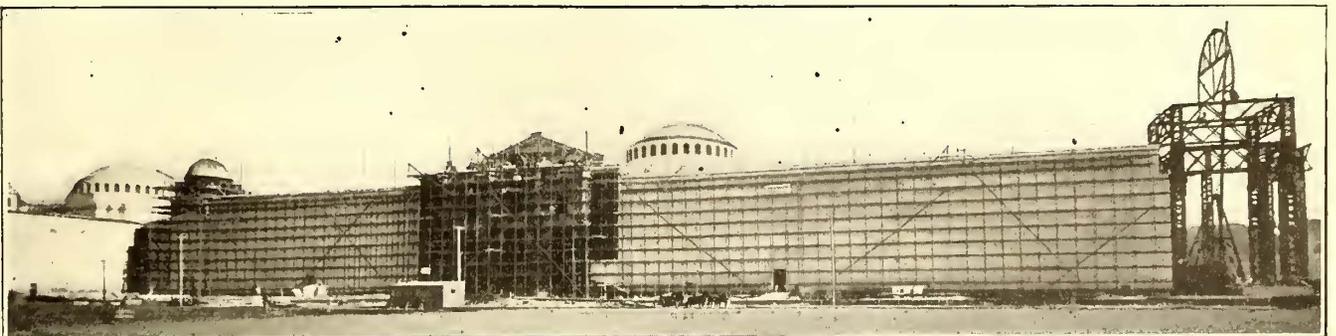
for by the arrangements which have been made with the largest manufacturers of high-voltage testing apparatus, and many spectacular effects have been prepared by the use of such instruments.

A feature of the Palace of Machinery will be the arrangements made for the convenience of the visitors. The reception spaces provided in connection with each exhibit will be equipped with suitable fixtures to enable technical visitors to prepare notes on the various features. All of the working exhibits will be equipped with the latest "safety first" devices, and these guards will form one of the most interesting exhibits to the engineer and manufacturer.

The exposition railroad already communicates with the United States transport docks adjoining the exposition grounds. There vessels of the deepest draught may be accommodated, and freight can be unloaded direct upon cars from the steamships, practically within the confines of the exposition. Many of the European countries will send vessels loaded with exhibits from European waters direct through the Panama Canal. As part of the exposition, terminal railway warehouses with a floor space of 50,000 sq. ft. have been provided adjacent to the ferry slip. The railroad yards to the rear of the Palace of Machinery can accommodate 200 cars. Two and one-half miles of the 12-mile system is within the confines of the respective buildings. In the Transportation Palace alone fifteen tracks, each 500 ft. in length, have been laid to carry the great array of locomotives and rolling stock equipment that will constitute the railroad portion of the transportation exhibit. This building is also equipped with transfer tables, 75 ft. in width and having a run of 3000 ft.

The Palace of Transportation is one of the nine great exhibit palaces that is completed and has been accepted. The picture herewith reproduced shows the north wall of the building undergoing the last applications of the imitation Travertine a few weeks before the contractors turned it over to the exposition's division of works. This wall, like the north wall of the other exhibit palaces, is a liberal treatment of the "Plateresque," which is the name for the Spanish architecture of the early Renaissance period and so called because of its likeness to the work of the silversmiths. The east and west walls are after the style of the Italian Renaissance and harmonize with the Palaces of Machinery and Fine Arts. All the ornament and enrichment on the north and south is chiefly concentrated around the doors, windows and entrances.

The structure rising at the right of the wall in the illustration is one of the decorative columns that will mark the entrance to the "Court of the Universe," which is the largest and most brilliant of the five exposition courts. The area is 900 ft. x 500 ft. The Palace of Transportation is 579 ft. x 614 ft.; its floor area is 314,000 sq. ft., and its volume 20,413,000 cu. ft. The average height is 65 ft. The outside height to the ridge is 96 ft., and the height to the dome is 110 ft.



View of the Transportation Palace at the Panama-Pacific International Exposition

## COMMUNICATION

### CENTER-ENTRANCE STEEL CARS FOR INTERURBAN SERVICE

KANSAS CITY, CLAY COUNTY & ST. JOSEPH RAILWAY COMPANY

KANSAS CITY, MO., June 1, 1914.

To the Editors:

I have read the article on the Michigan Railway car in the May 16 issue of the *ELECTRIC RAILWAY JOURNAL*, and have made some comparisons between its published dimensions and weights and those of our center-entrance, all-steel, interurban cars which were described in your issue of Jan. 18, 1913.

Our cars are 58 ft. long as against 67 ft. for the Michigan cars. They weigh 81,000 lb. as against 131,000 lb., the total weight of the Michigan cars, giving a difference of 50,000 lb. in weight and a difference in length of approximately 10 ft., although our cars have a 25 per cent greater seating capacity, namely, sixty-four passengers, as against fifty-two for the Michigan car. From these figures you will note that our cars have a weight of 1449 lb. per foot of car length, as against 1950 lb. per foot of car length for the Michigan car. Also, our cars have a weight of 1297 lb. per seated passenger, as against 2500 lb. per seated passenger, and they are nearly 50 per cent lighter weight on this basis.

We see no necessity for an increase in length, but we believe that our car could be increased approximately 10 ft. in length with the same weight ratio that we have at present. On the basis of adding 10 ft. extra length to our car at 1448 lb. per foot of car length, making our total length equal to that of the Michigan car, our car would have a total weight of 98,422 lb., as against the total weight of the Michigan car of 131,000 lb. Even allowing an increase of 10 per cent in the unit weight, due to the increased length required to make our car equal the length of the Michigan car, the total weight would be not more than 108,328 lb., and the saving in weight over the other type of car would still be 26,272 lb.

The seating capacity of the Michigan car is given at fifty-two, and I see no arrangement whereby people can be seated in the baggage compartment, although this may be done practically in the same manner as we do; but it occurs to me that the weight per seated passenger, which is given at 2500 lb., is excessive. I might add in this connection that the Cincinnati Car Company, the builder of our cars, has already advised us that it can build a car of the same capacity as our present cars, equally as strong, with approximately 8000 lb. less weight. If this can be done it is my opinion that it would be to our advantage.

On the whole I believe that the Michigan car is carrying an unnecessary weight of from 16,000 to 20,000 lb. Just how this can be obviated I am unable to say at this time, unless they were to follow the same type of car as used by our company, which is a low-step center-entrance design, and enables us to obtain an unusual amount of weight below the floor line, thus insuring a more perfectly balanced car with those easy riding qualities so much desired by the traveling public. It is my opinion that the designers of the Michigan car might have followed out this practice to advantage, reducing the weight of their superstructure very materially and with no sacrifice of strength or durability.

Of course you realize that conditions vary in different localities. For instance, if the Michigan company has a demand for a 66-ft. car only during the peak load and is compelled to carry this extra weight around the balance of the day, this would be objectionable. Even with our heavy traffic we find that after 7 p. m. our cars are far

from being loaded, and if we were compelled to carry such a heavy car during the eighteen hours per day which we operate, I feel that it would be a burden upon the operation. Fortunately, our cars are all wired for multiple-unit control, and it is possible in our case to couple on an additional car during the heavy trips and take it off when not needed.

Since we started the operation of this road we have heard some electric railway men say that the center entrance in our car takes up too much space. That is a mistaken idea. We have a car 58 ft. long that will seat sixty-four people. The rear-entrance cars used on the Ohio roads with which I have been connected were 62 ft. long and never seated over fifty-eight people, and, in consequence, I believe that the steel, center-entrance car is the most practical and most efficient design for interurban roads.

J. R. HARRIGAN, General Manager.

### WHAT CONSTITUTES A REASONABLE RATE OF RETURN?

MANCHESTER TRACTION, LIGHT & POWER COMPANY  
MANCHESTER, N. H., May 29, 1914.

To the Editors:

I have read with interest the discussion of reasonable return upon public utility investments appearing in the *ELECTRIC RAILWAY JOURNAL* of May 16, and desire to express my pleasure in the treatment of this topic as set forth by Mr. Hockenbeamer. There is no question that the cost of money to public utilities of many kinds is often greatly underestimated, and an article of this kind, emphasizing as it does many items of expense associated with the raising of capital which do not come within the vision of the layman, deserves wide reading, especially by regulating bodies and corporate officers directly concerned with the issue of securities and the closely associated question of a reasonable return upon the investment.

In answering a recent request for my own opinion, I have placed the minimum reasonable return upon total capitalization at 7 per cent, divided, let us say, at 5 per cent on the bonds and 8 per cent on the stock, with the addition of a sufficient amount to care for maintenance, depreciation and sinking funds, and assuming that the company holds an unlimited franchise. In cases where the franchise is limited I believe that a still further amount should be allowed for amortization of the property at the expiration of the franchise. The investor must be encouraged to place his money in such enterprises as well as elsewhere, and the establishment of attractive conditions is just as necessary in marketing the securities of an electric railway or a central station property as in other forms of business. Under modern conditions of regulation the so-called monopolistic advantages of public utilities are often greatly exaggerated, and Mr. Hockenbeamer is strictly within the truth in making the point that the management of such enterprises is constantly beset with hazards and difficulties arising from financial stringencies, from competition with other forms of energy, from actual and potential competition with other like utilities, with municipally owned utilities, from the diminution of earnings through improvements in energy-using devices on the premises of the consumer, from taxes, labor demands, regulation, etc.

The contention that securities should be marketed directly to the purchaser is a fallacy in the cases of all but very small enterprises, say below a minimum of \$100,000 capitalization. The specification of capital costs in Mr. Hockenbeamer's discussion is thoroughly illuminating, and there is still room for a more general appreciation of the legitimate and necessary outlays for

legal examinations, physical investigations by competent engineers, and for the whole range of expenses associated with the marketing of securities by bankers of established reputation and connections. It is unquestionably desirable that the small consumer, so-called, shall become financially interested in public utilities; but this can only be done by a policy which affords a liberal development along lines of safe financing and conservative management. The entrance of capital can be made more attractive without sacrificing any essential safety in many States. Thus, I believe that the limiting of bond issues to 75 per cent of the cost of improvements contemplated is needlessly severe in the case of a company which is well established, in good physical and financial condition, with a suitable sinking fund and favorable outlook in money matters. This whole subject of a reasonable return is one deserving of wide discussion. If various aspects of it can be frankly considered from time to time, in the press much good will be accomplished.

E. C. FOSTER.

HENRY L. DOHERTY & COMPANY

NEW YORK, May 28, 1914.

To the Editors:

The reasonable rate of return on capital in public utilities should be that rate which will most efficiently and permanently benefit the service.

In making this statement I pass by all arguments for the rights of capital under the Constitution of the United States to a fair return, as I would herein confine the discussion to some of the practical and economic elements which seem fundamental and of general applicability.

The paramount issue in a public service corporation is the permanent good of the service it delivers to the public—not whether the street-car fare this year is 4 or 5 cents, or the list price of current is 7 or 9 cents, or the interest rate on a certain bond issue is 5½ or 6 or 6½ per cent. Adequate and efficient service is vastly more important to the public than any single or many combined items contributory to the service. Quite properly, the public should desire and receive service at as low a price as is compatible with all-round efficiency. But the only public good resulting from minimum rates of return on capital invested is the immediate proportional reduction in the price charged for service. And yet the collateral results of minimum rates of return are heavy sales discounts on bonds and great difficulty in inducing additional capital into the business to meet the extensions of equipment and service demanded by the public.

In fact, one can sum up the entire question of capitalization and rates of return thereon by saying merely that both should be such as to get the capital required by the public service business on as efficient a permanent basis as possible. Private capital is free to invest where it will throughout the world. It cannot be commandeered into this or that business but will go wherever it expects to find the most attractive combination of security and profit.

One cannot consider the public utility business by itself. It has to get its capital from private investors throughout the world, in open competition with all other great businesses. Of necessity, methods of capitalization and rates of return thereon should therefore constantly be adjustable to world-wide financial conditions if truly efficient financing is to be accomplished.

Public demands for more and more service have forced the public service business to more than double its magnitude in the last decade. The present prospects are that during the next few years about \$1,200,000,000

per annum of new capital money must be put into the business in the United States—in other terms, \$4,000,000 of new money for each working day.

Failure to get most of this vast amount of new money would have collateral effects somewhat detrimental to present investments in the business. But should this new capital not come into the business, the service rendered the public would suffer to a vastly greater extent, as it would be impossible to meet the public requirements for additional service. What would be the public loss if during the next decade none of the new houses, hotels or theaters could be supplied with electric light or if no new railway tracks or cars could be put in operation in our cities and their up-building suburbs?

The paramount problem of the public utility business is not that the earnings of its present capital be made as light a burden as possible but that conditions be made such that adequate new capital will seek investment in the business.

It is as impossible to say what the rate of return on capital should be as to say what size of shoes men should wear; the average may be No. 9, but some can wear No. 5, whereas others require No. 12 shoes. Nevertheless, some general figures involving about \$30,000,000,000 of capital may be illuminating. The following table shows the average market prices, the net earnings and the relative receivership risks of the designated groups of securities over a considerable period:

	Market Price	Net Earnings Per cent	Risk of Receivership Per cent
Steam railroads.....	120	4.25	1.84
Industrials.....	94	7.79	2.07
Public utilities.....	90	8.45	0.37

If we standardize the railroads (as they are considered standard securities) at 100, then, proportionately, public utilities are selling at 75 (90:120), even though they are five times as safe (0.37:1.84), and have earned nearly twice as much (8.45:4.25).

We might apply all the theories of academic finance to these last statements without upsetting the hard fact that such to-day are the prices on which capital estimates the public utility business as compared with the railroad business in the United States. Such facts generally and specifically should be considered when the reasonable rate of return on capital in the public utility business is under discussion. In the light of such facts the reasonable rate should be set at that rate which will get \$100 into the business when it is needed, in view of the attractions of other standard businesses, for the \$100 sought.

Apart from all other considerations, the rate, or rates, which will do this—which will efficiently attract the \$4,000,000 a day of new capital needed—is the reasonable rate of return on the capital. From such a rate, or rates, the greatest permanent good of the public service will result.

W. H. GARDINER.

PUBLICITY FOR ELECTRIC RAILWAYS

DETROIT UNITED RAILWAY

DETROIT, MICH., June 1, 1914.

To the Editors:

One sometimes must go from home to hear the news which accounts for my being startled in reading over the May 30 issue of ELECTRIC RAILWAY JOURNAL.

In a mighty interesting paper on "Publicity for Electric Railways" by W. T. Buchanan, publicity manager of the Portland Railway, Light & Power Company, Portland, Ore., the author is of the belief that the Detroit United Railway carried on a campaign in the newspapers, with circulars and before clubs, against the

agreement of Aug. 7 whereby "7-fer" tickets are now sold in Detroit. Mr. Buchanan is very much in error and is evidently confused with a previous street railway campaign.

The Detroit United Railway was a party to all the negotiations leading up to this agreement now in effect and as the very name implies *agreed* to it. There was no campaign carried on against the measure.

It is true that for a year previous to this agreement we used some advertising space in the papers but only to discuss general street railway problems. Rates of fare were never mentioned in that educational campaign, which was simply a prelude to our present system of publicity consisting of a weekly publication called "Electric Railway Service," distributed in boxes in the cars, the issue now being 125,000 copies weekly as against 50,000 for the first number. This newspaper is now our sole means of publicity, and the results have been, indeed, gratifying.

I do not at this time desire to enlarge upon the work being done in publicity by this company as the ELECTRIC RAILWAY JOURNAL in its report of the last convention at Atlantic City very kindly reproduced a paper read by me at that meeting. (See issue of Oct. 16, page 806.)

Personally I am not inclined to favor any nation-wide campaign of generalities. Like Mr. Buchanan I am inclined to the belief that local peculiarities need local treatment. The public *can* be reached by honest railways giving the facts, but years of misunderstanding cannot be wiped out in a few months.

A. D. B. VAN ZANDT, Publicity Agent.

### SOLID AND INSERT MANGANESE STEEL SPECIAL TRACK WORK EXPERIENCE

UNITED RAILWAYS COMPANY OF ST. LOUIS  
ST. LOUIS, Mo., May 23, 1914.

To the Editors:

I have read with a great deal of interest the article on "Chicago's Experience with Solid and Insert Manganese Special Track Work," and in response to your request I will endeavor to describe the results of tests with similar special work in St. Louis.

The rail sections used in a large part of the special work of both solid manganese and insert types are Lorain sections 228 and 333, and with those rail sections the solid manganese has proved much superior to the insert type. The insert type has not been satisfactory on account of the loosening of the rails in the castings supporting the insert, the breaking of the castings and the cupping of the rails on the run-off side of the insert, which cupping is almost always followed by breaking of the rail head.

While the manganese insert frogs, switches and mates were in most cases of the renewable type, it was seldom possible to wear out more than one insert on account of the failure of other parts of that particular piece of special work. The solid manganese pieces have as a rule outlasted the manganese insert pieces used in the same parts of the same special work layouts, and as the price in St. Louis is practically the same for both types of special work, the solid manganese type has been generally used on the heavier layouts during the last three years.

In the solid manganese special work used, the right-angle frogs and crossings chip and acute-angle frogs and crossings cup in a manner similar to that described in your paper, but there has been very little cupping at internal joints in special-work layouts. The small amount of cupping at internal joints is probably due to the fact that a better joint plate fit is ob-

tained in St. Louis than in many other cities. While it is sometimes necessary to renew frogs or crossings on account of the chipping or cupping referred to, the life of manganese insert special work has generally been exceeded before such renewal was necessary.

The Lorain rail section No. 440 is now being used for solid manganese special work, and it is thought that better results will be obtained with this section, but our past experience with the manganese insert special work does not lead us to believe that a change in rail section would have prevented a very large part of the failures found with that type of special work.

C. L. HAWKINS, Chief Engineer.

THE TOLEDO & WESTERN RAILROAD COMPANY  
SYLVANIA, OHIO, May 21, 1914.

To the Editors:

Answering your recent letter, as I have already stated, our experience with solid manganese work in Toledo has virtually been "nil." However, I made an especially careful examination of various layouts in Chicago a couple of months ago, and it was my feeling that solid manganese work was not justified except in a few cases. The traffic conditions in Chicago, of course, are very different from those in Toledo, yet we have places in Toledo where the number of wheels and tons over a given point compares very closely with locations in Chicago. It must also be remembered that we run a great many interurban cars into Toledo, and they naturally are much harder on special work than the ordinary city cars, for they will weigh 60 to 100 per cent more than city cars.

On our special work to-day we use a deep flangeway which accommodates the interurban cars. One thing has been brought very forcibly to my mind by the photograph shown as Fig. 2 in your article, which is exactly the same situation that we have here. Such a situation only develops because of weak joint connections. I have found that our joint plates are not considered of as much importance as they should be. It is my opinion that a much stronger joint is necessary. This, of course, would result in more cupping, as we all know that the receiving end of a rail will naturally cup. However, I do not know that the cupping is as bad as the condition shown in this photograph, where the drop is about  $\frac{1}{2}$  in. A great deal of our special work trouble is caused by this one particular matter. On T-rail sections, where there is quite a difference in the height of rail at special work, we have required that the compromise joint shall be reinforced at the point where the two rail sections meet, thus giving greater stability to the joint.

I am not satisfied that a welded joint or a riveted joint at the end of special work would be the thing, but I do believe that a higher tensile strength in the joint material is what will solve this problem. We find very few instances where the rail arms at the end of the hard centers in frogs cup or show anything other than the ordinary amount of running wear. We have had a number of instances, however, where an iron-bound mate or tongue would break off directly at the joint between the hard center work and the running rail of the special piece. In my opinion this was due in a good many cases to the excessive heat required to weld the iron-bound material around the steel rail, which made the steel rail a great deal softer than conditions required. In other cases it was due to improper support under the special piece.

The question of foundations and the best method of keeping the water away from the special work piece is one that should receive special consideration when special layouts are being installed. We do not believe

in concrete directly under the ties and around them but in a cushion of about 3 in. of stone, placed underneath the tie and on top of the concrete foundation. Thoroughly tamped and rammed between ties this will form a very good surface on which to place the top layer of concrete, on which may be placed the paving materials. The paving should be well grouted, especially where it joins with the special work material, as this will tend to keep the water away from the substructure of the track, thus permitting the least possible amount of pumping.

No special records have been kept as to the life of manganese work as compared with built-up work in Toledo, that is to say, the records have not been kept long enough to determine very much. General conditions, however, lead us to believe that manganese insert work is less expensive and less troublesome in the long run than solid manganese layouts.

We have found that our insert work is more apt to chip, split and granulate than to flow. We find, as stated in your article, that on our 90-deg. crossings chipping or granulating shows up more than in the acute angles, although it seems, after a certain amount of cupping has taken place on our sharp angle frogs, that the metal then begins to chip and crumble away.

Chicago seems to be quite fortunate in as much as in that city there are not many loose inserts in frogs under 90 deg. With us the loose inserts seem to occur about as often in one place as in another.

We have the same results with branch-offs and switch ends as Chicago, namely, where traffic is heavy through the branch-off, the tongues and mates indicate exceptional wearing qualities. We have many places where the traffic is heavy on the straight track and cold rolling has appeared to such an extent as at times not to permit the switch point to fit back into place, thus requiring the rolled material to be cut away.

It is my opinion that the manganese manufacturers are going after this matter quite carefully, as indicated by the report recently put out by them relative to standardizing methods and shop practices. I believe that they are as much interested in the matter as street railway engineers and that they will do a great deal towards bettering conditions.

A. SWARTZ, Vice-President.

OMAHA & COUNCIL BLUFFS STREET RAILWAY COMPANY  
OMAHA, NEB., May 19, 1914.

To the Editors:

I have read your article on Chicago's experience with solid manganese special work, with much interest. Solid manganese steel special work has not been used on our system to any great extent. We have within the last two years adopted the use of the solid manganese switch for the reason that we had much trouble with the manganese bedplates of our switch pieces coming loose and found it very impracticable to tighten them ourselves.

It appears to me that the solid type of switch piece is a more sensible construction and at only a small increase in cost, and we expect better results from this type. With the exception of some switches and a few railroad crossings under heavy railroad traffic on which we find it profitable to use solid manganese construction, our track construction is entirely of the manganese hard center type. We also have a few rolled manganese railroad crossings giving good service. We have some loose center troubles and also chipping of centers, which is very common. We find that special work installed on a solid concrete foundation is too rigid and causes excessive chipping. As our subgrade is of hard yellow clay we use crushed rock ballast from 6 in. to 8 in. under the ties. Wherever the subgrade is

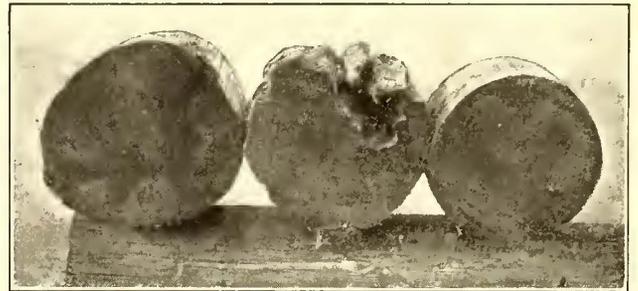
soil with low bearing power we use a combination construction of 6 in. concrete and 2 in. crushed rock between concrete and tie. We also use 6 in. x 8 in. white oak switch ties of different lengths on all special-work installations.

Manganese steel has a very low elastic limit, and cold rolling results, which stretches fibers beyond their elastic limit. This low elastic limit is responsible in a great measure for the chipping. If this limit could be raised and still maintain the degree of toughness of the present manganese steel a great improvement would be made. It is a problem for a steel chemist to produce a tough alloy steel with a higher elastic limit, and perhaps some of our troubles would be solved in both hard center construction and solid alloy steel construction.

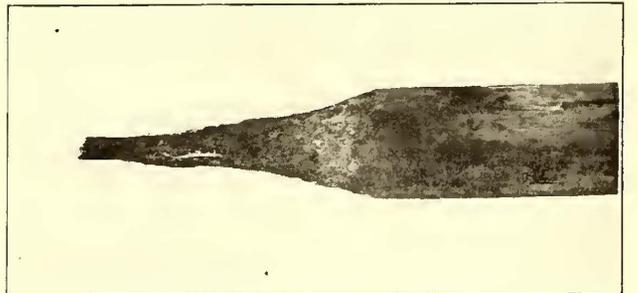
R. H. FINDLEY,  
Superintendent Track and Roadway.

### EFFECT OF BORERS ON TREATED AND UNTREATED PILES

The accompanying illustrations are taken from a report on the Galveston Bay bridge prepared by F. B. Ridgeway and referred to briefly in last week's issue of the *ELECTRIC RAILWAY JOURNAL*.



Air, Water and Mud Sections Creosoted Pile—Treated in 1895



Untreated Yellow Pine Pile—Completely Eaten in Two by Toredos and Limnoria

The first figure shows the work of the toredo and limnoria on a pile well creosoted and driven in 1895. This was removed about a year ago. The other illustration shows a part of an untreated pile driven in 1909 and completely eaten through. These cases can be considered typical and speak for themselves.

In a recent issue of *Electrical Engineering* appeared a description of an automatic ticket-issuing machine which has been installed at the Victoria Station, London, England, by the Metropolitan District Railway Company. The machine is set in action by depressing levers, will print any of five different kinds of tickets, and can deal with ten kinds if required. The power is obtained through a chain drive from a 6-hp d.c. series-wound 200-volt motor, which is fed from the d.c. mains, which have a voltage of about 550, through resistances.

# Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates)

## USE OF INSPECTION TEST SET TO LOCATE INCIPIENT DEFECTS

BY E. D. RANSOM, B.E.

Although the inspection of car equipment on a time or mileage basis is acknowledged to be the most efficient and economical practice, there is still room for improvement in this method of maintenance in the nature of locating what might be called near-defects, namely, incipient defects which have not yet matured into troublemakers. In the following article the results obtained in locating such defects by means of inspection test sets and the method of testing will be described. A list of the more common defects will also be given.

A test set was installed at each of the two general repair shops of a large electric railway for use on all cars going through these shops on periodical schedules, such as painting and varnishing. To report the result of each test a standard form was made out in triplicate, one copy going respectively to the equipment office, one to the shop maintaining the car, and one to the shop where the test was made.

For the benefit of those not familiar with this instrument, it might be well to say here that the principle used is that of the Wheatstone bridge, namely, the balancing of a known resistance against the car circuit to be measured. As applied in this case, two dials of variable resistance and an ammeter are inclosed in a portable case which is placed on the car platform. Current is obtained by a pole from the trolley wire through two circuits of five lamps in parallel. The lead connections are made by means of a plug which is inserted in one of five receptacles, according to the test made and the capacity of the circuit measured. There are different values, such as full dial of resistance, equivalent to 1.5 ohms, 15 ohms, 150 ohms, and a connection for insulation resistance where any leakage is accurately shown. The test set is placed on the car platform, the trolley connection is made to the wire, the ground plate inserted under the brakeshoe and then the following tests are made:

1. The resistance of car wiring from trolley wheel to ground on each step of each controller, and from each pole of two-pole cars. This test locates crossed leads, loose connections, poor wiper tension and improperly made up or defective resistance. The following shows standard limits as used for car with K controller, two 55-hp motors and two frames of grid resistance, similar limits being used for each type of equipment.

Controller Point	Resistance in Ohms	Controller Point	Resistance in Ohms
1	5.20 to 5.75	6	2.65 to 3.10
2	3.20 to 3.75	7	1.40 to 1.80
3	2.00 to 2.40	8	0.80 to 1.10
4	1.30 to 1.70	9	0.25 to 0.75
5	0.80 to 1.20		

Equipments which give readings within these limits are assumed in good condition, and any above or below are investigated to find the trouble.

2. Resistance of each motor armature and fields locating short or open circuits, poor brush tension, broken

brushes and loose leads. Standards for each type of motor were determined, the following being an example of one type: Motor, 55 hp; ohms resistance of armature, 2.50 to 3.25; and ohms resistance of fields, 2.30 to 3.50.

3. Resistance of compressor motor armatures and fields, including governor contact, locating similar troubles, as described in the second test.

4. Resistance of heater circuits locating grounded, crossed and open-circuited heaters, and wrong type and defective coils.

5. Insulation resistance of all wiring, including lightning arresters, lights, etc. This test locates partial

ELECTRICAL INSPECTION REPORT															
SHOP												May 22, 1914			
CAR NO	CONTROLLER		MOTORS		RESISTANCE		HEATERS		COMPRESSOR		INSULATION RESISTANCE				
4388	K		55 LF		3 Frames Grid		6 Two coils								
POINT	1ST TEST		FINAL TEST		MOTORS				COMPRESSOR		HEATERS				
	No 1 Cont	No 2 Cont	No 1 Cont	No 2 Cont	NO 1	NO 2	NO 3	NO 4	1ST TEST	FINAL TEST	1ST TEST	FINAL TEST			
FORW	8.25	8.35	5.51	5.52	ARM	.290	.216	.220					EQUIPMENT	NO 1	OK
REV	8.30	8.30	5.45	5.48	FIELD	.180	.190						CONTROLLER	OK	
2	5.20	5.30	3.38	3.37	IN FIELD								MOTORS NO 1	OK	
3	4.30	4.20	2.06	2.10	TOTAL	.468	.395	.400					NO 2	OK	2
4	3.50	3.26	1.35	1.38									NO 3		
5	1.20	1.10	.81	.84									NO 4		
6	5.65	5.35	2.77	2.70									HEATERS	OK	
7	3.60	3.50	1.44	1.36	COMPRESSOR								LIGHT ARREST	OK	
8	1.30	1.20	.80	.75	ARM										
9	1.00	1.10	.27	.22	FIELD										
10					TOTAL										

REMARKS:  
 \*In TEST shows equipment as found, FINAL TEST shows correct values after repairs were made.  
 \*High readings on controller, due to trolley pole not making proper contact in stand.  
 High reading No. 1 armature, due to strands broken in brush lead.  
 Note 1 - Resistance frames show leakage of .125 mghms. at insulators.  
 Note 2 - No. 2 motor armature shows leakage of .225 mghms. due to carbonized brush holder block.

*John Smith, Inspector*

Typical Report of Test Made to Catch Incipient Defects

grounds, carbonization, defective insulation and all causes of current leakage, which would eventually break down. Out of a large number of cars tested, 50 per cent were found to have one or more incipient defects, that would not be located by regular inspection methods. In general the defects found were of such a nature that they were not causing actual trouble, but eventually they would have broken down or become serious enough to cause more or less expensive damage to equipment or serious delay to service. The following is a list of the principal defects found: Resistance grids short-circuited; resistance grids loose in frames; wrong grids in frames; resistance leads loose in terminals; commutator short-circuited; commutator open-circuited; commutator carbonized; brush broken; brush holder carbonized; brush tension weak; loose connection in motor lead connectors; poor tension in controller wipers; broken strands in cables; poor contact of trolley pole in stand; poor contact between base and stand; trolley stand shunts not making contact; fields short-circuited;

fields grounded; heaters open, crossed and short-circuited; wrong coil in heater; leaking insulators.

From the foregoing defects, as listed, it can be readily seen that defects such as wrong coil in heater or wrong grids in resistance frames, which are due to oversights and carelessness, would very likely be overlooked by a visual inspection. In like manner, carbonized brush-holders and commutators, which would not show defective to ordinary inspection methods, would sooner or later result in grounded armatures. Loose connections in motor leads and broken strands in cables were often found in places where they would most probably be overlooked, with consequent fires, because of burning open-circuited. As leakage due to defective insulators, and in fact all sources of leakage, is located before an actual ground occurs, much damage is avoided.

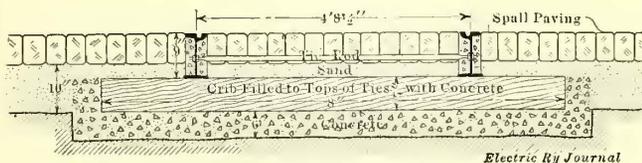
A careful study of the defects presented will plainly show the saving of time, labor and material, to say nothing of serious delays to service, that are saved by testing for incipient defects. Aside from these merits, the test gives an accurate check of the thoroughness of or weak points in methods of inspection at the shop which maintains the car. The standard resistance values for each type of equipment and apparatus have also been found of great worth, as the deterioration from the original rating can be closely followed and compared with the length of time in service. A typical test report is reproduced on the preceding page.

LIFE OF CONCRETE TRACK AT RICHMOND, VA.

BY A. LANGSTAFF JOHNSTON, JR., M. E.

The value of concrete in street railway track construction is well illustrated by the reconstruction of the Broad Street section of the Virginia Railway & Power Company, Richmond, Va. The Broad Street line was originally the property of the Richmond Traction Company and was built under the engineering supervision of A. Langstaff Johnston in 1896. The track was constructed as shown in the attached illustration. Untreated sawed oak ties, 7 in. square and 8 ft. long, were laid in a crib of concrete 6 in. deep and coming flush with the top of the ties. The web of the rail was also incased in concrete.

When this construction was recommended by the



Cross-Section of Concrete Track Construction Taken Up After Service of Eighteen Years Because of Wornout Rails

engineer, it was opposed as unnecessarily expensive. In practice, however, the many advantages asserted for it by Mr. Johnston have been realized, namely, long life, minimum maintenance of track and cars, no loose rail bonds and no bad effect on the alignment of the track after heavy spring thaws. The track is now being rebuilt after very heavy service for eighteen years. The cross-ties, though not treated, are still in a very good state of preservation. Repairs are being made on account of the wornout rails.

It is interesting to note that the first 90-lb., 60-ft. girder rails manufactured were first used in Richmond by Mr. Johnston, who also built, in Richmond in 1888, the first commercial electric street railway operated in the country.

CAR CIRCUIT BREAKERS

BY R. H. PARSONS

A most important although often neglected part of the electrical equipment of a car is the circuit breaker. If the breaker is kept in good condition it will protect the motors and car wiring from all overloads by opening the circuit when the controller is fed too fast or from an overload following a breakdown of the insulation. Very little neglect makes the breaker useless.

The principal cause of the failure of a circuit breaker to blow is sluggish action due to the entrance of dust into the movable parts. The consequence is that the tripping levers are prevented from operating. Often

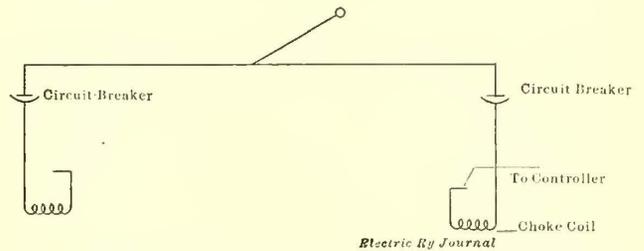


Fig. 1—Wiring When But One Breaker Is Used at a Time

the tripping arrangement will release the main contacts, but the dirt will prevent these from parting sufficiently to break the circuit, causing them to hold a heavy arc and to set fire to whatever may be around it. At first thought the answer to this is very simple, namely, clean the apparatus thoroughly on regular inspection. However, on some lines running through dusty territory, a few days suffice for the breaker to gather enough dust to change the blowing point, if not to prevent its blowing entirely.

Many cars are wired with the trolley and circuit breaker connected as shown in Fig. 1. The main trolley is connected between the two circuit breakers at opposite ends of the car, and only one breaker is used at a time according to the direction of running. If the cars are wired in this manner, the circuit breaker at the rear should always be thrown off by the motor-man when he stops operating from that end of the car.

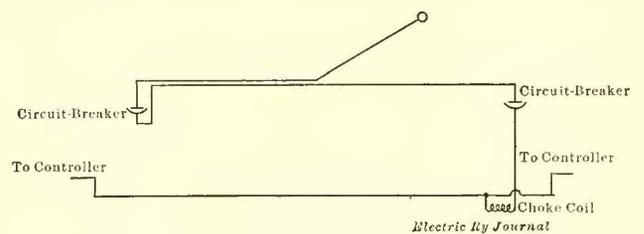


Fig. 2—When Both Breakers Are in Series

This action leaves open the circuit to the rear of the car and also helps to keep all the parts of the breakers in good working order.

Other cars are wired with the two breakers in series, then to a common trolley for both controllers, as shown in Fig. 2. The advantage of the second scheme is that it gives the protection of two circuit breakers; its disadvantage is that line voltage is on the rear controller when it is not necessary, subjecting that controller to the dangers of lightning and also making a double path for lightning to the motor circuit. When cars are wired in this way the circuit breakers should be tripped when the car is stored at the end of the run. This frequent tripping and resetting of the breakers will keep them in better condition to blow when they should.

Methods of calibration are all alike in principle although carried out differently. The apparatus consists of an ammeter and a water or grid rheostat controlled to cut resistance in or out for the current at which the breaker should blow. It is important, however, that the breakers should be tested and calibrated at frequent intervals, at least every two or three weeks and even oftener if possible. It is desirable to run the car near a stationary test equipment, but if this is not convenient a portable outfit should be used. The latter may comprise an ammeter, rheostat and an air compressor, rigged up either on a hand truck or an old car. In any event, the testing set should be in constant use to blow out the circuit breakers with air and to keep them calibrated. In many cases the circuit breakers are periodically removed from the cars, repaired at the bench and then tested at a board before replacing them on the car. When this is done they should be tested in the position that they would have on the car, because a variation in position may make a difference of from 20 to 60 or even 70 amp in the blowing point.

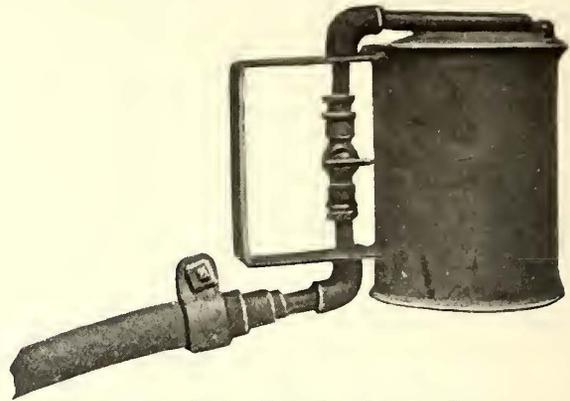
Another reason for circuit-breaker failure is mechanical damage to the parts, as when the motorman uses a switch bar instead of his hand for tripping. If the bar does not break the handle, it jars the springs and catches so badly that they are bent and their calibration is destroyed. Severe discipline should be dealt out to motormen who trip the breaker in this manner. Repeated blowing causes holes to be burned into, and sometimes through, the fiber arc chutes at the sides of the contact tips. In some cases it is necessary to change the side plates, but several electric companies have placed on the market a cement with which the holes may be filled after they have been cleaned. When this cement hardens the plate actually becomes a better arc resistor than it was originally. Other troubles naturally arise from worn and broken parts, but modern improved breakers seldom have more troubles than those outlined. Nevertheless, a road with up-to-date equipment does not feel that enough protection is obtained by the use of circuit breakers alone. A fuse, therefore, is installed in the trolley circuit, rated to blow at a current a little greater than that which will trip the circuit breaker.

#### AIR BRUSH FOR PAINTING MOTOR CASES

At the main shops of the Illinois Traction System in Decatur, where all of the interurban equipment for the 450 miles of line in central Illinois is repaired, a simple little air brush is used for applying varnish to the inside of motor cases. A picture of the brush is shown. It is connected with the shop air supply system by a hose. The spraying part, or atomizer, is so arranged that there is no pressure on the can which holds the varnish. When using this brush the interior of a GE-222 motor case with coils in place can be thoroughly covered with black air-drying varnish in five minutes.

Probably the greatest advantage of the air-brush method of covering the interior of motor cases is the assurance of obtaining thorough results. With the hand method of painting, even though the motor cases may have been cleaned with the utmost care, nevertheless considerable carbon dust and copper dust will remain lodged in the corners. If varnish is applied by hand this dust, which is a good conductor, gets mixed into the varnish and it is very difficult to coat the motor casing in such a way that the varnish will have any great value as an insulating medium. There are bound to be places where the carbon and copper will stick through the varnish. The air brush sprays the varnish finely but with considerable force, and thus the copper and carbon dust are packed against the steel and thor-

oughly covered. Also with this brush it is easy to reach behind the commutating poles and the field coils, and thus the whole interior right up to the coils will get a thorough coating. With hand work this prac-



Air Brush for Painting Motor Cases

tice would be found difficult. The cost of this brush is insignificant compared with the saving in time and the improvement in the work.

#### MOTOR-DRIVEN PIPE-THREADER ON COLUMN

In the Youville shops of the Montreal Tramways advantage is taken of a building column for the mounting of a motor-driven pipe threading machine, as shown in the accompanying half-tone. The machine is located about 5 ft. above the floor on a wooden platform, at-



Compact Motor Drive, Montreal Shops

tached to the column by steel angles, the motor, an old compressor outfit, being similarly situated but about 8 ft. high. The wiring is by conduit carried up to the motor from a small starting switch mounted between the flanges of the column, and the arrangement is unusually compact and convenient for a belted drive.

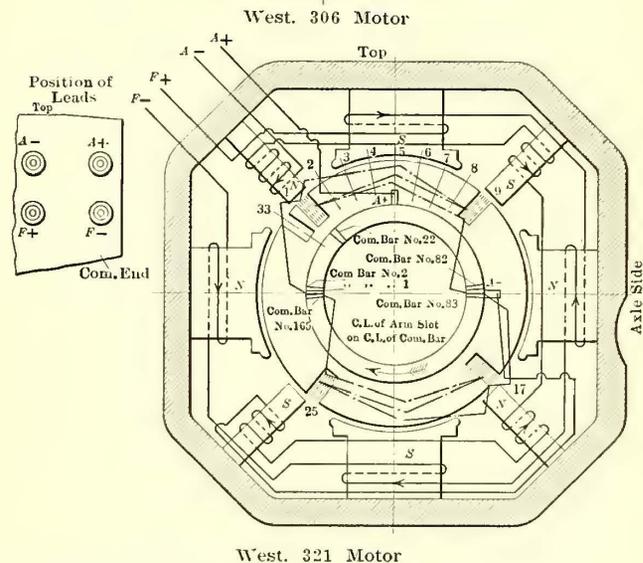
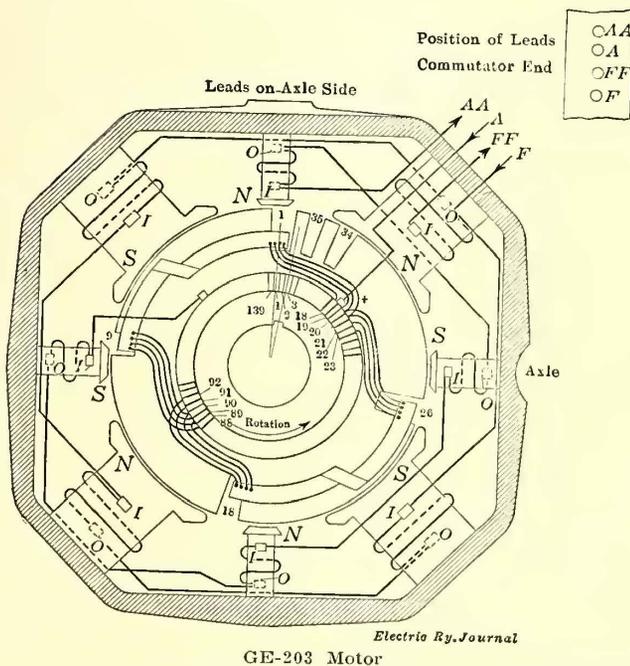
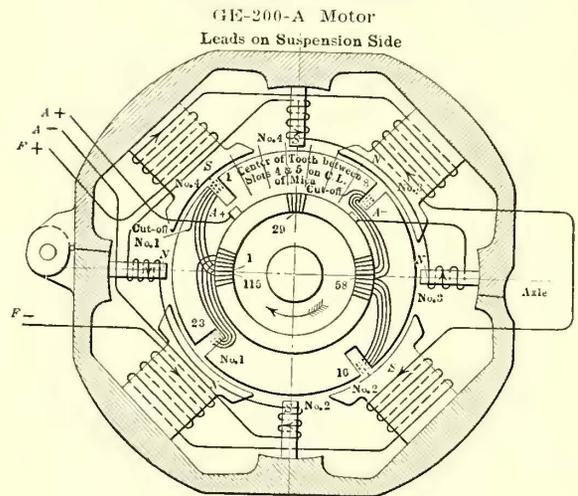
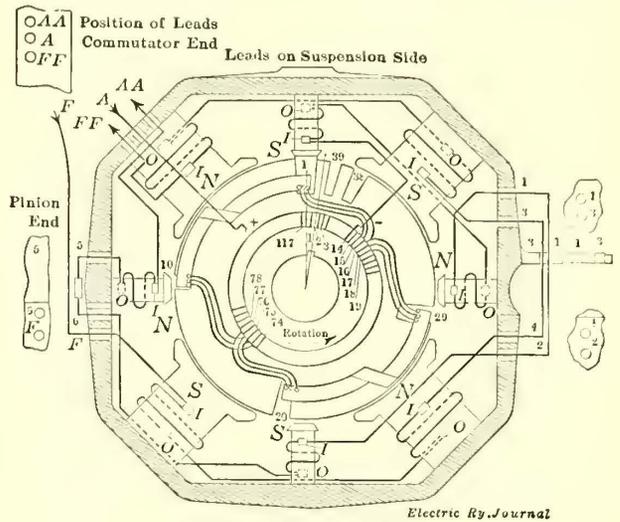
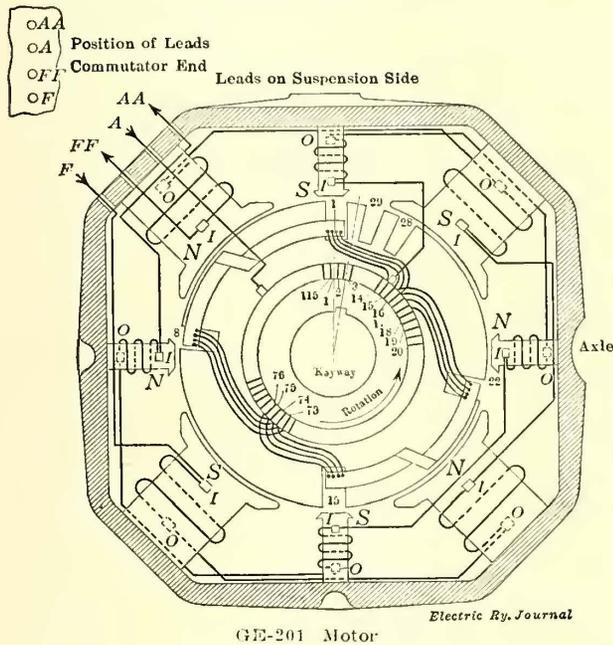
WIRING DIAGRAMS OF COMMUTATING POLE MOTORS

Both the Westinghouse and General Electric companies have prepared simplified diagrams which show the direction of rotation, the throw of the leads and the method of bringing out the leads on different commutating-pole motors. The accompanying cuts are reproductions of these diagrams made to handy notebook size for the convenience of the car maintenance man. The following is a summary of the salient features of the motors shown in the diagrams:

Westinghouse No. 306—Rated 50 hp at 500 volts and 60 hp at 600 volts. The approximate weights are as follows: Motor complete without gear and gear case, 2645 lb.; armature with fifteen-tooth pinion, 595 lb.; gear with sixty-nine teeth, 250 lb., and gear case, 135 lb. Westinghouse No. 321—Rated 110 hp at 750 volts. The approximate weights are as follows: Motor complete without gear and gear case, 3680 lb.; armature with sixteen-tooth pinion, 1050 lb.; gear with sixty-one teeth, 295 lb., and gear case, 175 lb.

The data on three prominent General Electric motors follow :

	GE-200	GE-201	GE-203
Rated	33 hp 500 volt 40 hp 600 volt	55 hp 500 volt 65 hp 600 volt	40 hp 500 volt 50 hp 600 volt
Weight motor alone—pounds.....	1670	2385	2170
Weight motor complete with gear, gear case, pinion, axle lining and axle collar—pounds....	2080	2885	2640
Weight armature and pinion—pounds...	464—14 teeth	635—15 teeth	566—15 teeth
Weight, in pounds, of gear.....	198—67 teeth	220—71 teeth	200—69 teeth
Gear case—pounds...	170	178	180



Diagrams of Direction of Motor Rotation, Throw of Leads and Method of Bringing Out Leads

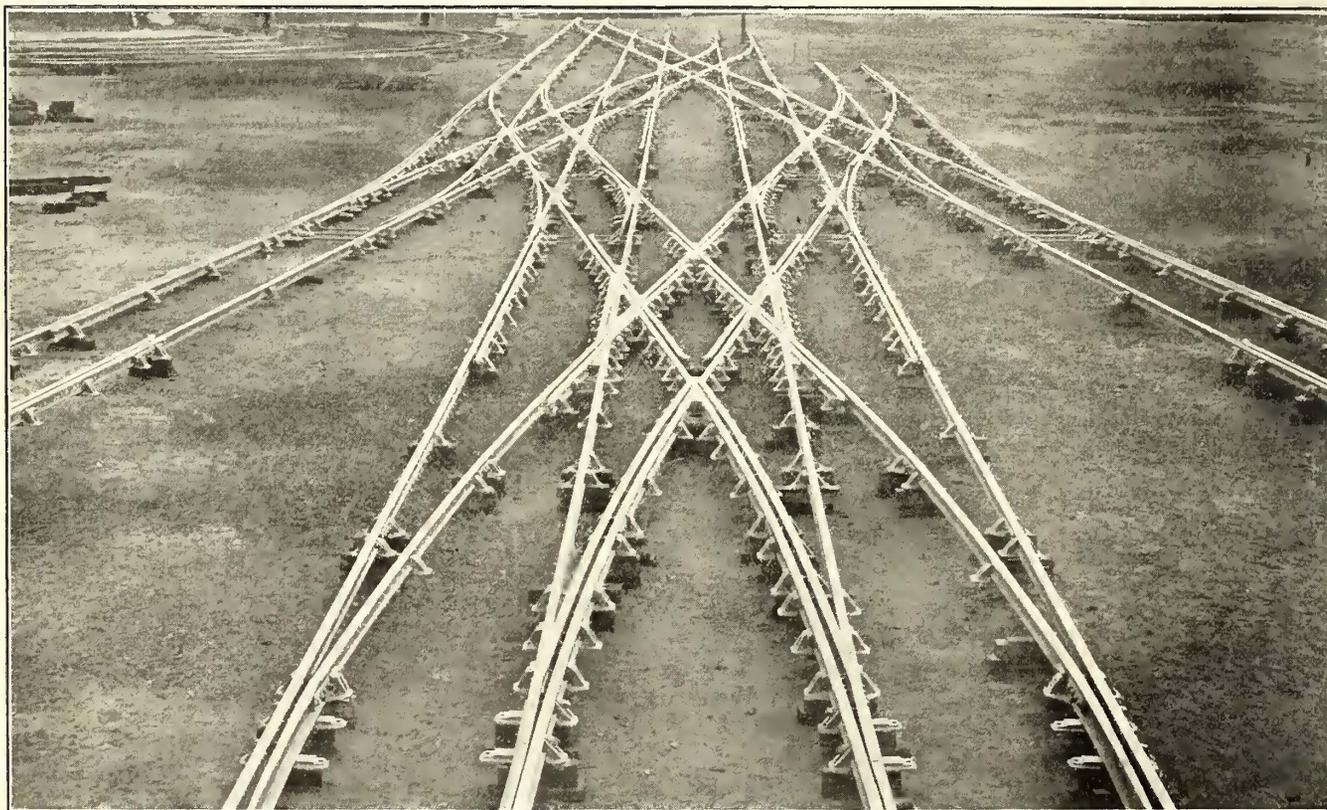
### PURE INGOT IRON FOR THIRD-RAILS

The conductivity of third-rails, especially where there are no feeders, is an important consideration that is dependent largely upon the composition of the metal, it being not unusual to roll third-rails of special steel in order to attain a low specific resistance. In general it has been found that high contents of carbon and manganese produce high resistance, and along this line it has been suggested that third-rail composition should be limited to 0.82 per cent of carbon and 0.40 per cent of manganese, giving a conductivity of 12 per cent of that of commercial copper. This conductivity has been exceeded in the case of the Manhattan Elevated Railway in New York, where the contents are respectively 0.73 and 0.34, giving a rail conductance equal to 13 per cent that of copper. These figures are given on a volumetric basis.

Recently, however, the American Rolling Mill Company has had tested for conductivity a sample of its

### A PREMIER PIECE OF MANGANESE SPECIAL WORK FOR BUENOS AYRES SUBWAY

What is stated to be the largest piece of manganese steel permanent way in the world was recently completed for the new Buenos Ayres Electrical Subway by Hadfield's Steel Foundry Company, Ltd., Sheffield, England. This great assembly of "Era" manganese steel special work is 520 ft. long and weighs 160 long tons. It will be installed at the Primera Junta station, where two island platforms will be provided to handle a four-track service. The layout is described by its makers as following the standard adopted for heavy British railway service, namely, the rails are of the British standard bullhead section weighing 90 lb. per yard and are to be secured in cast-iron chairs with oak keys. Both the rails and the crossings are of manganese steel. This extensive and complicated layout has sixteen standard single crossings, four special single and eight special compound crossings. The cross-



A Remarkable Piece of Manganese Special Work Assembled at the Maker's Yards Before Shipment for Use in Buenos Ayres Subway System

American "Ingot" iron, a metal of a high degree of purity, with the idea that the absence of foreign material should produce a high conductivity. That this is actually the case is shown by the fact that the conductivity was found to be 16.78 per cent on Mathiessen's standard where the soft-drawn copper is assumed to have a resistance of 0.141729 international ohm per metergram at 0 deg. Cent., a resistance temperature coefficient of 0.0042 per deg. Cent. from and at 0 deg. Cent. and a specific gravity of 8.89 at 0 deg. Cent.

The conductivity was 16.76 per cent based on the international standard for annealed copper having a resistance of 0.15328 international ohm per metergram at 20 deg. Cent., a resistance temperature coefficient at constant mass of 0.00393 per deg. Cent. from and at 20 deg. Cent. and a density of 889 grams per cubic centimeter at 20 deg. Cent. The conductivities on a weight basis were respectively 18.98 and 18.96 per cent.

ings are made throughout of manganese steel but are reinforced with a cast center, bound and securely held in position by rolled rails. The center pieces are castings made from specially prepared patterns and carefully finished to templets. There are no bolts or rivets through the nose piece to work loose and require constant attention.

William B. McKinley, president of the Illinois Traction System, Champaign, Ill., has presented a portrait of his father, the late Rev. George McKinley, to the George McKinley Memorial Presbyterian Church in Champaign. About two years ago Mr. McKinley built this edifice at a cost of about \$35,000, in memory of his father, who was a pioneer Presbyterian minister in Illinois. After building the church William B. McKinley gave a \$6,000 pipe organ of the latest design, and has now placed his father's portrait in the church.

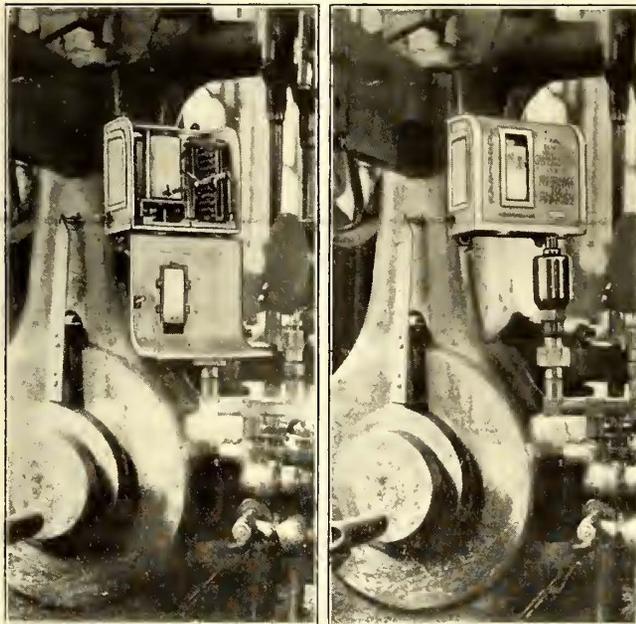
GRAPHIC WHEEL PRESS RECORDS AT BOSTON

In common with many other railroad systems, the Boston Elevated Railway maintains careful records of car-wheel service, and at both the Sullivan Square and Albany Street shops automatically drawn diagrams of wheel-press operation are a regular feature of the work of rolling stock maintenance. The heavier service is performed at Sullivan Square, where the major part of the shopwork for the rapid transit lines is done. The equipment includes a 300-ton Putnam hydraulic wheel press fitted with a hydraulagraph, sample records of the latter being reproduced here-with in connection with the pressing on of a motor truck wheel and a trailer truck wheel used in elevated car service. The hydraulagraph, which was built by the American Steam Gage & Valve Manufacturing Company, Boston, Mass., consists of a cylindrical recording drum and pen, the former being actuated by the movement of the wheel ram in the press and the latter by the liquid pressure in the cylinder of the press. The pen is normally held at zero on the chart carried by the drum by a powerful spring, its travel being controlled by the pressure of the liquid in a system of piping connected with the ram chamber.

Lard oil is used instead of water in the press on account of the valve wear experienced with the latter fluid, and the pressure gage and hydraulagraph connections are taken off a common tee with a central

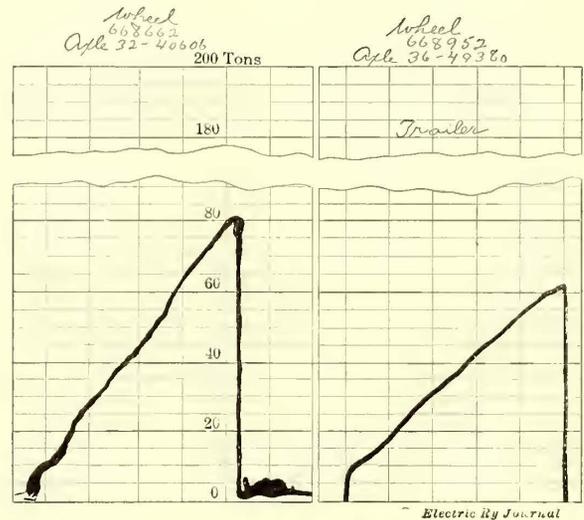
tion of which is a 2-in. x 5-in. glass window, with a small slot at the top through which the operator can write in pencil the number and make of each wheel as it is pressed upon the axle. The records are carried on a roll 100 ft. long, the capacity of the roll being 400 records, or 200 pairs of wheels. A padlock on the cover keeps the records intact until removed by the foreman of the department or his authorized assistant.

The movement of the drum is accomplished by a cord passing out of the case and around a 1-in. pulley, the cord terminating in a hook at the top of a piece of strap iron 16 in. long, 1¼ in. wide and ⅛ in. thick, which is attached to the ram. A movement of the



Hydraulagraph Cover Down and Closed, Sullivan Square Shops, Boston Electric Railway

pipe leading to the pressure chamber. The tee was made by the company out of a 1½-in. square steel forging 9 in. long, with a ⅜-in. hole bored in the center for oil or water transmission. The connections leading from the tee to the indicating gage and to the hydraulagraph are bored to an inside diameter of ¼ in. to give a free flow of liquid, one terminating in the gage pipe and the other in a cylinder 3½ in. in diameter, which contains the plunger of the hydraulagraph spring and pen system. In general design, therefore, the apparatus is not unlike the steam engine indicator. The recording mechanism is mounted in a cast-iron case 10½ in. long, 9½ in. high and 5½ in. deep, attached to the frame of the wheel press, and provided with a hinged front in the central por-



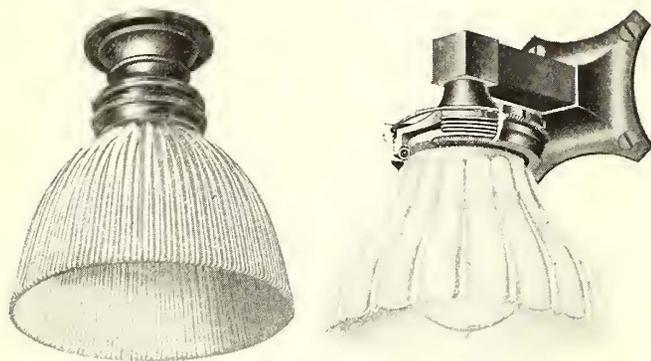
Typical Hydraulagraph Records

latter is thus directly transferred to the drum, and the record is calibrated with vertical lines indicating a horizontal movement of 1 in. between graduations. The ordinates of the records show the total pressure on the ram to a scale graduated in 5-ton steps. Wheels on the rapid transit lines are of steel, with an axle fit 6 in. long, the diameter of the axle being 5⅜ in. with wheels used on steel cars and 5 in. with wheels on wooden cars. Motor truck wheels on the rapid transit lines are 34 in. in diameter and trailer truck wheels 31 in. A difference of 0.017 in. is the company's practice, between the axle and wheel fit diameters. The maximum pressures used in the wheel press are about 85 tons on motor truck wheels and 50 tons on trailer truck wheels. The press is gear driven by a 7½-hp, 550-volt Crocker-Wheeler d.c. motor mounted on the frame.

Records are pasted on the backs of the wheel cards used to hold mileage, wear and other data, and when the wheel is scrapped these records are sent to the office of the general foreman of the Sullivan Square shops, for mileage study and tabulation. At the surface car shops on Albany Street the wheel presses are equipped with hydraulagraphs. The maximum pressures applied to cast-iron wheels is from 30 to 40 tons, and that for steel wheels from 40 to 60 tons. The hydraulagraph records are useful in showing the exact conditions of pressure obtaining at the application of every wheel used by the company, incidentally checking the workmen. Furthermore, they indicate unfavorable conditions, such as shoulders, in the wheel fit, and thus forestall loose wheels. In the latter respect, the records are valuable evidence of the thoroughness of the company's shopwork in case of court proceedings.

## CAR LIGHTING FIXTURES FOR SERIES TUNGSTEN LAMPS

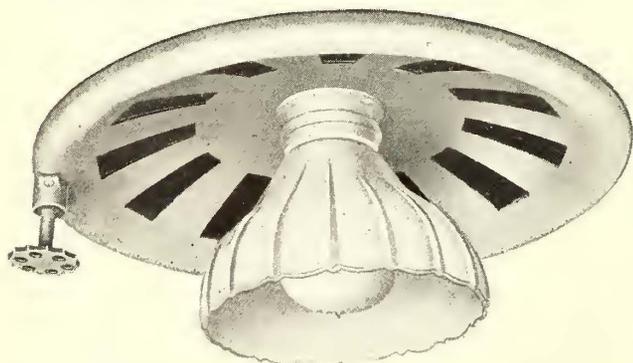
The rapid progress of scientific car lighting as stimulated by the tungsten lamp is illustrated by some recent car-lighting fixtures of the Dayton Manufacturing Company, Dayton, Ohio. For example, the reflecting shades shown are designed to provide 75 per cent greater effective illumination at a current consumption of 65 per cent below that required by carbon lamps. One of the three accompanying cuts shows a one-light pendant in which the base of the socket used is flush with the base of the fixture, and for which no cutting



One-Light Pendant and Circular Spring Shade Holder

of the ceiling is required. A second fixture shown is a combination one-light pendant and ventilator register which has been developed for steel arch-roof cars. It is heavily enameled in white and is curved to fit the arch of the ceiling.

Glassware on car-lighting fixtures must be so well secured that it will not rattle or work loose, while still giving due opportunity for expansion from heat. If screws gripping the neck of the globe at three or four points are used, the tightening of the screws to prevent rattling prevents the glass from expanding evenly with the heat and consequently it is liable to crack. To overcome this trouble the "Flex" holder has been devised. In this holder, the shade, or globe, is held in a flexible manner by a coiled-wire spring which clamps the glass firmly with the same pressure at every point. Thus, the glass may expand and contract again



Combination One-Light Pendant and Ventilator Register

and again without relaxing the grip of the holder. Furthermore, glassware may be removed almost instantly for cleaning by turning a knurled sleeve ring two or three revolutions, and it may be replaced just as quickly. The adjusting sleeve also carries a wire locking ring (shown continuous in the illustration) at its upper edge, which may be removed if it is desired to dismantle the fixtures for refinishing.

## TRIAL SERVICE OF THE PIEPER GAS-ELECTRIC CAR AT PARIS

In 1911 the Compagnie Internationale d'Electricité of Liège, Belgium, furnished to the Compagnie des Chemins de fer de la Grande Banlieue of Paris several gas-electric motor cars fitted with the system of Henri Pieper. The first element is a four-cylinder 90-hp gas engine, the power of which is transmitted to the truck axles by means of worms and gears. The second element is a machine which operates either as a generator or motor, according to conditions. The third element is a sixty-cell storage battery.

The principle of the Pieper system is to use the battery for the storage of energy when the full capacity of the gas engine is not required for traction and then to have the battery give up this stored energy to aid the gas engine when the traction requirements are high. In the first instance the electrical machine serves as a generator driven by the gas engine to charge the battery. In the second instance, it serves as a motor driven by the battery to assist the gas engine. The use of a heavy flywheel on the generator aids the return of electrical energy to the cells when the car is descending grades. This method of regeneration also permits automatic braking as soon as the spark is cut off, the gas engine itself acting as a flywheel whose motion is contrary to that of the car. The gas engine is reversible. The mixtures of gasoline and air which are supplied to the engine are varied merely by the movement of the controller handle. The circulating cooling water passes through tubes which in



Gasoline Car with Electric Auxiliary

their travel are carried over the roof of the car. Each car has a gasoline tank of 567-gal. capacity which is enough for a trip of at least 62 miles. A meter in the compartment of the motorman shows the electrical condition of the battery.

The cars as constructed by the Société Anonyme Energie de Marcinelle, Belgium, have the following dimensions: Length over all, 48 ft. 6 in.; distance between axles of trucks, 26 ft. 3 in.; truck wheelbase, 5 ft. 8 in.; weight of car empty, 23 metric tons; weight of car loaded, 26 metric tons.

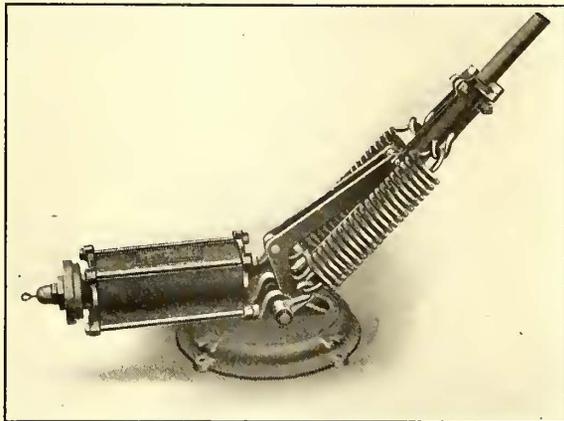
The car has one first-class compartment and one second-class compartment with a total of thirty-three transverse reversible seats, but the total capacity is fixed at fifty passengers. The gas engine is in the baggage compartment. A vestibuled platform with double step is provided at each end.

On trial these cars have made 10.5 m.p.h. to 15.5 m.p.h., according to the load, between Poissy and St. Germain-en-Laye, a distance of 3.4 miles and including a grade of 5 per cent for 1640 ft. On level track a speed of 31 m.p.h. an hour has been obtained. The gasoline per ton mile amounts to 25.6 to 41.6 grams, and the cost of maintenance quoted by the manufacturer is 1.9 cents per train mile.

**AIR TROLLEY BASE WITH RETRIEVING FEATURE**

The current-collecting merits of the trolley wheel and the non-jumping qualities of the pantograph for high-speed interurban work have been most ingeniously combined in a new type of air-retrieving trolley base which has been developed and put on the market by the Wasson Engineering & Supply Company, Milwaukee, Wis. This novel base is already in service on a number of high-speed and city lines.

The cardinal principle of this device is the combination of an air-operated retrieving cylinder, "4," and auxiliary springs to maintain uniform tension when the pole is in normal position on the wire. It is hardly necessary to point out the value of uniform tension for securing maximum wear from wheel and wire. Furthermore, the application of the power to the pole at



**Air-Operated Trolley Base with Retrieving Feature**

a point 26 in. from the fulcrum gives quick, active and resilient tension. The major part of this base is made of cast iron, but those parts which are subjected to the greatest strains are made of annealed carbon steel. Brass, bronze and leather also enter into its construction.

The air cylinder is cast on the revolving part of the base and is fitted with a cup-shaped piston, "9," which is connected to the pole support castings by a bell crank. Forming a part of the opposite end of the cylinder is the valve "13" which controls the air. This is operated automatically when the trolley wheel escapes the wire, or it may be operated by hand to place the trolley pole under the control of the motorman, who can retrieve it at will. Air used in the retrieving mechanism is obtained from the main air-brake reservoir. A single line of pipe connecting this reservoir to the trolley base is all that is necessary, and this may be run either inside or outside of the car. Air is never required ex-

cept when the trolley wheel leaves the wire, and even then only a few cubic inches are needed.

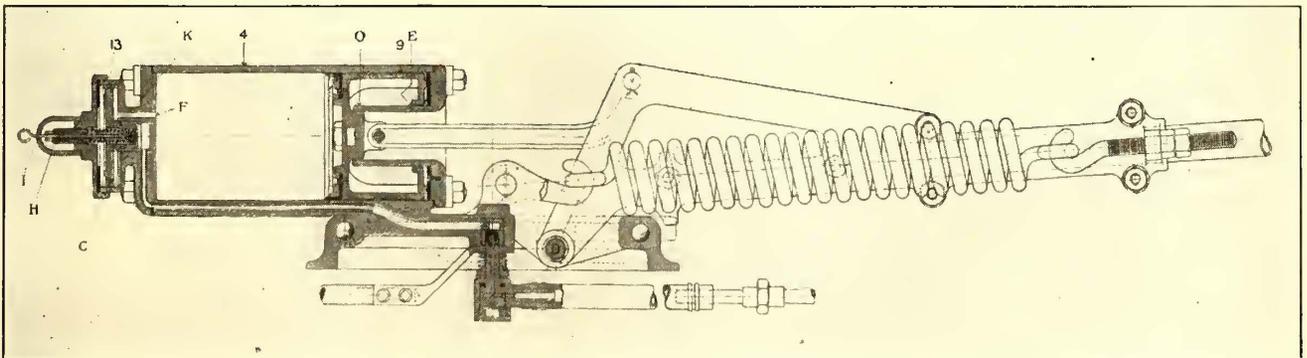
To prevent the piston from working against a vacuum or back pressure as the pole moves up and down to meet the varying heights of wires, thus interfering with the pole tension, "breathing" arrangements or small by-passes *E, F, C, H, I* are placed in each end of the cylinder. When the trolley wheel leaves the wire the pole flies upward. This creates compression in the cylinder which becomes effective over the entire area of the valve. This pressure unseats the valve at *K* and admits reservoir pressure into the cylinder behind the piston. As the air pressure is greater than the lifting power the piston is forced to the further end of the cylinder. Since the piston is connected to the pole, it necessarily pulls the pole down and holds it there firmly until the air is released. The retrieved position of the pole is the same as if it were under the hook.

This combination of valves operates so quickly that as the pole is recovered and thrown back away from the wire, considerable momentum is created which, if not absorbed, might damage the pole and car roof. To prevent this, the piston telescopes a concentric cylinder *O* thereby inclosing a pocket of air which absorbs the shock and cushions the pole to the retrieving point.

The base provides a uniform tension and is designed to meet the requirements of either city or interurban service. It can be used on any car carrying not less than 50 lb. nor more than 110 lb. of air pressure in the main reservoir. The base complete weighs 150 lb. and is 8¾ in. over all in height. Those parts subject to corrosion are either made of brass or lined with it. The pole fulcrum *D*, which is the principal wearing point, is provided with a renewable bushing which takes up all the wear. This base is reversible and has a large ball-bearing base plate which is so arranged that the parts subject to the greatest wear can be shifted from time to time so as to increase the life of the bearing. Still another feature is that the current is conducted through the center of the base instead of the bearing to avoid the pitting of the bearing and the blistering of the balls.

**ELECTRICALLY WELDED RAILS ON "THE KEY ROUTE"**

A decision to weld the rail joints on the San Francisco-Oakland Terminal Railways by the electrical process was made when A. W. McLimot became general manager of that company, and the work has now been completed. A record was made, it is thought, in assembling equipment on the job from an Eastern point. The welding outfit worked on the tracks of the Grand Rapids (Mich.) Railroad on April 22, and was then shipped to Oakland, Cal., on three gondolas in time to be at work again on May 6, thus losing less than two weeks between jobs 2500 miles apart. The process used is that of the Lorain Steel Company.



**Cross-Section of Air-Operated Trolley Base with Retrieving Feature**

## ELECTRIC RAILWAY LEGAL DECISIONS

## CHARTERS, ORDINANCES, FRANCHISES

## New York.—Taxation—Assessment—Item Wrongly Included—Viaduct.

A traction company seeking a reduction of an assessment of a special franchise tax may not complain of an item erroneously included in the assessment where it concedes that the entire assessment, omitting the improper item, ought to be larger than it is.

A viaduct constructed in a town by a traction company pursuant to a contract with the town stipulating that the cost to the town should not exceed \$35,000, while the relator should expend at least \$95,000 and should maintain and repair the viaduct and approaches during the term of the franchise, and declaring that the structure should be a public highway, is properly treated as tangible property in assessing the company's special franchises. (People ex rel. Buffalo & L. E. Traction Co. v. State Board of Tax Com'rs., 103 N. E. Rep., 778.)

## New York.—Taxation—Assessment—Paving.

The pavement which a street railroad corporation constructs and maintains between and near its tracks, as required by the railroad law (Consol. Laws 1910, Chap. 49), Sec. 178, cannot be treated as tangible property in assessing its special franchise defined by tax law (Consol. Laws 1909, Chap. 60), Sec. 2, Subd. 3, to include the value of the tangible property situated in, on, under or above any street in connection with the special franchise, since the cost of the pavement is imposed as an exercise of the taxing power, but the cost of paving may be considered in arriving at the value of the intangible privilege of the corporation in occupying streets. (People ex rel. Buffalo & L. E. Traction Co. v. State Board of Tax Com'rs., 103 N. E. Rep., 776.)

## New York.—Sufficient Sign—Denial of Transfer.

The placing of the sign "Astor Place" on a street car, without adding the word "only," was not a sufficient notice to passengers that it went only to Astor Place and not to the end of the line to relieve the company of its liability for a penalty for failure to give a passenger a transfer to a through car. (Goodman v. New York Rys. Co., 142 N. Y. Supp., 520.)

## New York.—Construction—Consent of Abutting Owners.

Under Constitution, Art. 3, Sec. 18, providing that no law shall authorize the construction or operation of a street railroad except upon the consent of the owners of one-half of the abutting property and of the local authorities having control of the street or highway upon which it is proposed to construct the railroad and that, if the consent of the property owners cannot be obtained, permission may be granted by the Appellate Division of the Supreme Court upon the report of commissioners to determine the necessity of the line, and under the railroad law (Consol. Laws 1910, Chap. 49), Sec. 171, requiring the consent of the owners of one-half of the abutting property, a street railroad whose proposed route extends over numerous streets may be constructed along the streets upon which the property owners have consented, even though the property owners on all of the streets have not given their consent, the provision for application to the Supreme Court being to provide for the contingency of the non-consent of the property owners of part of the proposed line. (Manhattan Bridge Three-Cent Line v. Brooklyn Heights R. Co. et al., 144 N. Y. Supp., 524.)

## New York.—Taxation—Mode of Assessment—Franchise Tax—Net Earnings Rule.

In assessing a special franchise for taxation under the net earnings rule, the following rulings were made: The question of what is a fair and reasonable return on the capital invested in tangible property is one of fact. The legal rate of interest may properly be adopted as a fair return on the capital invested in tangible property, in the absence of any evidence satisfactorily showing that this would not be a reasonable return thereon. Where the court allowed 6 per cent as a fair return on the tangible property it should have capitalized the balance of the net income on the basis of 7 per cent to determine the intangible element of the special franchise. The value of the tangible property upon which a return is to be allowed is its present or

depreciated value and not the cost of reproducing it new. Development expenses consisting of expenses for legal advice, technical advice, consents of public service commissions, or other public bodies, completing the organization, preliminary surveys, property owners' consents, interest, and taxes during the construction, promoter's profits, and the financial man's charges or broker's commissions for raising the necessary capital or underwriting the securities, are not to be added to the value of the tangible property in determining the amount upon which a return is to be allowed, since the taxes and interest are presumptively given proper consideration in determining the value of the tangible property, and the other expenses do not add to the value of such property, but, if anything is obtained therefor, are represented by the intangible element of the special franchise. In determining the probable life of each item or unit of tangible property suffering depreciation and allowing a deduction for replacements thereof, obsolescence should receive consideration. (People ex rel. Third Avenue R. Co. v. State Board of Tax Com'rs et al. (City of New York, Intervener). People ex rel. Wallace et al. v. Same. People ex rel. Kingsbridge Ry. Co. v. Same, 142 N. Y. Supp., 986, 988, 989, 991.)

## New Jersey.—Transportation of Municipal Officers—Reasonableness of Regulations.

The right of municipal officers to free transportation on the lines of street railways in municipalities in this State is limited to uniformed public officers or to police officers acting as detectives whose duties are required to be performed without uniform while engaged in the performance of their public duties.

A regulation by the railway company that all police officers whose duties are required to be performed without uniform should, as a means of identification, produce a book or tickets freely issued by the company to all persons of this description, in order to entitle them to free transportation, is not unreasonable. Otherwise the company could not determine whether the person claiming it was entitled to free transportation. (Public Service Ry. Co. v. Board of Public Utilities Com'rs et al., 88 Atlantic Rep., 818.)

## Pennsylvania.—Franchise on Bridge—Rent.

Where a city purchased the entire stock of a bridge company and opened the bridge free to public use, it could not exact rental from a street railway company which was operating under a franchise permitting it to use the streets of the city, including the bridge, in the absence of any provision in the franchise authorizing it to collect such rental.

In the exercise of its police power, a city may regulate the use of a franchise by a street railway company by exacting a license fee sufficient to indemnify the city against additional cost of maintaining a bridge over which the railway tracks are laid. (Point Bridge Co. v. Pittsburgh Rys. Co., 87 Atlantic Rep., 614. Similar case, Monongahela Bridge Co. v. Pittsburgh Rys. Co., 87 Atlantic Rep., 619.)

## LIABILITY FOR NEGLIGENCE

## Alabama.—Actions for Assault.

In a passenger's action against a street car company for an assault by its conductor, it was proper to charge that the burden of proving its plea of justification was on the company. (Birmingham Ry., Light & Power Co. v. Coleman, 61 Southern Rep., 890.)

## Arkansas.—Right-of-Way at City Crossing.

A street car has the right-of-way at a city street crossing, and in a personal injury action by one run down by a car, the giving of a charge that a pedestrian lawfully upon a crossing has equal rights with a street car, both having the same right to use the street to the exclusion of the other, is prejudicial error, for a traveler is required to use ordinary care in crossing the street even at a crossing. (Little Rock Ry. & Electric Co. v. Sledge, 158 S. W. Rep., 1096.)

## Massachusetts.—Wheel Guards or Running Board of Open Cars.

While a street railway is bound to exercise a high degree of care in the selection of its passenger cars, it is not required to provide, regardless of expense, every new equipment that can be devised to prevent accidents or to discard

those it has always found adequate because they may be a source of possible danger to a passenger using them for purposes for which they were not intended, and hence a common carrier was not guilty of negligence in using open cars which had wheelguards upon the running board, it not appearing that it was customary or feasible to dispense with such wheelguards, and it being shown that they had been in common use for a number of years without accidents. (*Adduci v. Boston Elevated Ry. Co.*, 102 N. E. Rep., 316.)

**Massachusetts.—Master and Servant—Injury to Lineman.**

An expert lineman directed by his foreman to take down a wire stretched across a street between two poles mounted a ladder adjusted and fastened on one of the poles by a fellow servant, and the ladder fell by the springing of the pole following the severance of the wire. The ladder and ropes furnished by the employer were proper appliances and in good condition. The failure of the fellow employee to do his part of the work properly was due chiefly to the lineman's failure to signal him. The lineman knew that the danger coming from the slipping of the ladder from the jar and jerk of the pole was something to be guarded against. Held, that the foreman, who was a statutory superintendent, was not guilty of negligence for failing to warn the lineman as to such dangers. (*Kelly v. Boston Elevated Ry.*, 101 N. E. Rep., 999.)

**Massachusetts.—Company Liable for Damages Due to Improper Treatment by Physician.**

Where a person injured by defendant's negligence used due care in applying for treatment to a reputable physician, defendant was liable for the injuries resulting, though they were aggravated by an accidental and improper, but honest, treatment on the part of the physician. (*Gray v. Boston Elevated Ry. Co.*, 102 N. E. Rep., 72.)

**Michigan.—Contributory Negligence When Driving on Track Question for Jury.**

It cannot be said, as a matter of law, that a driver upon the highway who turns out to avoid an obstruction in his way and in so doing drives onto the track, when he sees an approaching car 595 ft. away, is guilty of contributory negligence, but his contributory negligence is for the jury. (*Seebach v. Michigan United Rys. Co.*, 142 N. W. Rep., 1086.)

**Michigan.—"Look and Listen" Rule.**

A traveler in an automobile, before crossing the tracks of a street railroad company, where the view is unobstructed, must look and listen before proceeding into danger, and if necessary should stop. (*Colborne v. Detroit United Ry.*, 143 N. W. Rep., 32.)

**Missouri.—Duty to Look and Listen at City Street Crossing Private Right-of-Way.**

Where an electric company operated a line on a private right-of-way crossing a city street on a curve and at a point where the view of the track was obstructed by a building until a person operating an automobile was very close to the tracks, the tracks themselves were a signal of danger and imposed on the traveler the duty to look and listen before attempting to cross. (*Chappell v. United Rys. Co. of St. Louis*, 156 S. W. Rep., 820.)

**Missouri.—Motorman Looking Back in Car.**

Where a street car motorman just before his car struck a pedestrian was looking backward into the car, the jury was justified in finding that his negligence was the proximate cause of the injury, notwithstanding the pedestrian's contributory negligence in standing on the track while another car passed. (*Eskridge v. Metropolitan St. Ry. Co.*, 157 S. W. Rep., 106.)

**Missouri.—Negligence May Be Imputed to Infant.**

A child of tender years may comprehend certain dangers so as to be guilty of negligence as a matter of law, and will be held negligent if he does so or if the danger is obvious to one of his age. (*Battles et al. v. United Rys. Co. of St. Louis*, 161 S. W. Rep., 614.)

**New Jersey.—Passenger Standing on Platform.**

A passenger who voluntarily stands upon the rear platform of a car in rapid motion when a seat inside is available assumes the risk of so doing, and if he is injured he is guilty of negligence which will prevent recovery. (*Hodler v. Public Service Ry. Co.*, 88 Atlantic Rep., 1072.)

**New Jersey.—Injury at Crossing.**

A pedestrian upon a crosswalk has a right to assume that the motorman of any street car which may be approaching will expect pedestrians to be crossing, will have the car under proper control accordingly, and will respect his right to cross provided he is under a reasonable belief that he can safely do so if both he and the motorman exercise reasonable care. (*Devine v. Public Service Ry. Co.*, 88 Atlantic Rep., 1080.)

**New York.—Riding on Platform of Elevated Train.**

It was not negligence for a passenger on an elevated railroad train to ride on the platform where the car was crowded and no warning was given or objection made by the guard. (*Starkman v. Interborough Rapid Transit Co.*, 144 N. Y. Sup., 780.)

**New York.—Passengers Must Indicate They Wish to Stop.**

Where a passenger on a street car had requested the conductor to stop at the next corner the conductor is not bound to foresee that the passenger who stood on the step of the car would attempt to leave it while it was in motion, having the right to assume that the passenger was merely holding himself ready to alight when the stop was made. (*Miller v. Brooklyn Heights R. Co.*, 144 N. Y. Supp., 208.)

**Pennsylvania.—Injury to Passenger from Tripping Over Conductor's Foot.**

A street car company is not liable for injuries to a passenger from a fall due to tripping over the foot of the conductor while she is going to the platform to alight, where the conductor is guilty of no negligence and his foot merely comes in contact with hers when he turns in the performance of his duties. (*Markle et ux. v. Pittsburgh Rys. Co.*, 86 Atlantic Rep., 204.)

**Pennsylvania.—Collision with Bicycle.**

Where a person injured from the collision of his bicycle with the side of a street car was riding slowly just before the accident and in no apparent danger until he suddenly guided his bicycle into the rear step of the car, and the proximate cause of the accident was his careless operation of the bicycle, the street railroad company was not liable, though the motorman was negligent in failing to stop on the proper side of the last crossing passed before the accident. (*Black et al. v. Philadelphia Rapid Transit Co.*, 86 Atlantic Rep., 1066.)

**South Carolina.—Ejection by Fellow Passenger—Duties of Conductor.**

Where in a passenger's action for injuries caused by being ejected from an electric car by a fellow passenger the undisputed evidence was that the conductor saw plaintiff thrown off, if he did not assist in doing it, and saw him thereafter following the car for some distance and did not attempt to stop to let him on again, the court did not err in refusing to modify plaintiff's request of instruction that a common carrier may be held for damages unless it exercises the highest degree of care to protect its passengers from the violence of other passengers by adding thereto that the rule stated applies only when the carrier knows of the danger, or of facts from which the danger may be reasonably anticipated. (*Dennis v. Columbia Electric St. Ry., L. & P. Co.*, 76 S. E. Rep., 711.)

**South Carolina.—Punitive Damages Allowed for Injury Caused by Fast Running by Schoolhouse.**

Where a car crew ran at a high rate of speed past a crossing before which they were required to stop and which was used by school children, being at the intersection of three streets, punitive damages are properly allowed in an action by a child injured. (*Dodd v. Spartanburg Ry., Gas & Electric Co.*, 78 S. E. Rep., 526.)

**Tennessee.—Injuries to Fireman Riding as a Free Passenger.**

Where defendant street railway company carried members of the city fire department free without a pass as a matter of courtesy, and plaintiff, a fireman, was injured by the carrier's negligence while riding on a car, he was a passenger, and entitled to recover. Payment of fare is not necessarily essential to the establishment of the relation of carrier and passenger, provided the person carried is accepted for transportation like a paying passenger. (*Memphis St. Ry. Co. v. Caviness*, 157 S. W. Rep., 64.)

## LONDON LETTER

*(From Our Regular Correspondent)*

The returns of traffic on the London County Council Tramways for the financial year to April 1, 1914, show a slight improvement. The receipts amounted to £2,208,664, an increase of more than £20,000 over the receipts of the previous year, notwithstanding the fact that the Easter traffic was not included in last year's returns. The Board of Trade has authorized the London County Council to run additional trail cars on its tram system. Two hundred cars have been fitted with couplers and 150 cars have been ordered to be used as trailers. The London County Council has arranged with M. Mariage, directeur-général of the Compagnie Générale des Omnibus de Paris, to report on the subject of consolidating and linking all the Council's tram lines. M. Mariage was appointed because he was responsible for both tramway and omnibus services in Paris and had to deal with the problem of "dead-ends." This matter of "dead-ends" is one of the most serious difficulties which the London County Council has to overcome in connection with its tramway system.

The London press has been interested recently in the exhibition of the "flying" train, the invention of M. Emile Bachelet. The laboratory in which the model is situated has been filled from morning until night with visitors. The British Admiralty and the War Office have sent special commissioners and experts to inspect the invention. The new system is described as "a railway that runs on a road-bed of invisible impulses." M. Bachelet's laboratory is at Saffron Hill. All the praise has come from the daily papers. The engineering press has ridiculed the device.

Further progress in the use of escalators has been made by the opening to the public of the new escalators at the Oxford Circus Station of the Bakerloo Railway, and the closing-down of the lifts which have been in use since the tube was opened. Though a number of escalators are now in use in London in connection with the tubes and underground railways, this is the first time that the escalator has actually displaced the now old-fashioned lift. The new escalators are claimed to be the largest in the world, and together have a capacity of 27,000 people an hour. One of the escalators, like that at Paddington Station, has been made reversible, so that at busy hours both escalators may be worked the same way.

The first section of the electrification scheme of the London & Northwestern Railway has been opened, namely, that between Earl's Court Station and Willesden. This section will eventually be an important link between the inner and the outer electric systems of London, providing, as it will, direct electric communication between Charing Cross, Victoria, Earl's Court and the new electric line to Watford, and also a useful link between North London (through Willesden), and Putney and the southwestern suburbs.

The Corporation of Manchester has a bill before a House of Lords committee by which it is seeking permission to erect a new generating station and other works at Davyhulme near Trafford Park. The Manchester Corporation has three stations at present, with a total capacity of about 70,000 kw. The recent rate of development, however, has been about 4000 kw per year, so that in another two years there will be no surplus capacity. The Corporation has decided to erect a new generating station which will eventually have a capacity of 120,000 kw. The new station will be close to the Manchester Ship Canal and the Bridgewater Canal, so that it will be possible to get coal by cheap transit.

The House of Lords committee, however, has refused to allow the clauses in the bill in which the Manchester Corporation desires to include in its area of electric supply the township of Davyhulme and a portion of Stretford, and also power to purchase the already existing Trafford Power Company.

The Bristol Corporation has the option on May 1, 1915, of purchasing the tramway system now operated by a company, of which Sir George White is the chairman. The City Council, therefore, has been advised to procure the necessary Parliamentary powers, and the Bristol Corporation (tramways) bill has accordingly been presented. A select committee of the House of Lords has now passed the

bill, so that the Bristol Corporation can purchase the tramways in about a year if it so desires. The option that expires in May, 1915, affects the tramways within the city boundary only, but the bill gives the Corporation further powers to enter into and carry into effect agreements to purchase or lease by the Corporation of the lines outside the present municipal limits, and now also operated by the company. The company regards the bill as premature, and contends that there is no strong view among the ratepayers in favor of the Corporation operating the tramways, and that the bill is not in the public interest.

The Birmingham tramways committee has reported adversely on the proposal for the establishment of an all-night tramway service. It took a census on seven selected routes of the number of passengers walking or driving toward or from the city, and came to the conclusion that the number of nocturnal passengers to be catered to by an all-night service would not justify the city in subjecting residents upon the routes to the annoyance of night cars.

A select committee of the House of Commons has sanctioned the use of trail cars by the London United Tramways, which operates a large system of tramways in the western suburbs of London. The opposition contended that the cars unduly obstruct traffic. It was strongly argued, however, that the trail cars tended to reduce overcrowding and were important revenue earners, and it was stated that in many large cities of Europe the trail car was common and that no bad results had accrued from its use.

The Stirling Town Council, which has declined the offer of Balfour, Beatty & Company to purchase its electric undertaking and run electric cars in place of the present horse-drawn service, is inquiring into the question of constructing, by arrangement with the County Council, the Bridge of Allan Town Council and the Stirling & Bridge of Allan Tramways, a system of electric tramways between Bridge of Allan and Bannockburn.

The success of the system of railless trolley cars established some time ago at Dundee is being keenly discussed. The roadways over which the cars have run have been badly cut up, and a portion of the route is to be paved with concrete bottoming at a cost of \$6,000, half of which is to be charged against the tramways department. The cost of dealing with the whole of the route would be £14,000, and the question debated is whether, in the light of this expenditure, the system can be regarded as successful.

A select committee of the House of Lords has rendered another verdict adverse to the bill which the Glasgow Corporation is promoting. The committee decided that the section of the bill proposing the construction of a tramway along University Avenue should not proceed. Several professors were called to show that the scientific instruments of the University and the research work would be interfered with.

Schildon, the center of the North-Eastern Railway's huge sidings, is to be more extensively centralized for the distribution of coal and coke from South Durham, and just outside the network of rails a system of electrification for 20 miles is to be introduced whereby all mineral trains working to Middlesbrough will be propelled by electricity. The overhead system is being installed, but underneath three low-lying bridges the current will be diverted to a third-rail. Electric locomotives are being constructed at Darlington capable of drawing 100 coke or coal wagons, each containing 20 tons of minerals.

A scheme for the electrification of the entire suburban system of the Midland Railway, including the line to Southend, is believed to underlie the bill now before a House of Lords committee. This bill confers power to build a double line of railway between Stepney, on the system of the London & Blackwall Railway, which is controlled by the Great Eastern Company and operates between Fenchurch Street Station and the upper docks, and Bromley-by-Bow, on the Midland Railway, and to widen and equip the Tilbury & Southend line between Barking and Upminster. It is understood that the Midland Railway is considering the electrification of the line between St. Pancras and Barking, which runs through South Tottenham, Walthamstow and Leyton, and connects with the Tilbury & Southend line at Barking. The company proposes to continue the electric line thence to Leigh, Westcliff, Southend, Shoeburyness and Thorpe Bay.

A. C. S.

# News of Electric Railways

## Report of Toledo Franchise Committee Adopted

The Council committee of the whole of Toledo, Ohio, rejected the franchise proposed by Henry L. Doherty, representing the Toledo Railways & Light Company, on the evening of May 28 and adopted the report of the special franchise committee filed on May 25. From all appearances the vote was strictly along administration lines. On both questions it stood eleven to six.

The communication of H. Whitford Jones, acting as trustee for unknown parties, offering to submit a bid for a franchise to operate a street railway system in the city on the basis of a straight 3-cent fare, with universal transfers and control of operation in the hands of the city, has been received. Mr. Jones assures the committee that he will give a bond of \$50,000 to guarantee compliance with the terms of the proposal as made by him.

There is considerable speculation as to the identity of the men represented by Mr. Jones. Aside from A. K. Detwiler, no others have been named. Harry D. Vansickle, advertising man, and S. B. Chambers, former sheriff of Lucas County, have been in conference with Mr. Jones frequently since he has been in Toledo. Mr. Jones in an interview on May 29 said that his principals are prepared to carry through any plan they may undertake and that at the proper time the details will be made public.

The Council will meet on June 8 to consider the action of the committee of the whole in rejecting the proposal of the Toledo Railways & Light Company and the recommendation of the special committee to award a franchise only on the basis of 3-cent fare for a period of twenty-five years. The further plan of advertising for bids will also be considered.

City Solicitor Thurstin is responsible for the statement that if the Toledo Railways & Light Company desires to bid for a franchise, its proposition will have to be made under the same terms and requirements exacted from others. His suggestion is that the city provide for a new grant and that no renewal or extension be considered.

Henry L. Doherty sent a communication to Mayor Keller on June 1, in which he expressed the determination of the company to collect the full fare from all passengers on and after June 3. Advertisements were inserted in the daily papers explaining the steps taken. Mr. Doherty requested Mayor Keller to protect the company from damage from those who might refuse to pay their fares.

After receiving the communication Mayor Keller said that the Schreiber 3-cent ordinance would be enforced, even if the police department was compelled to swear in 500 extra men to man every car and protect those who proffered the low fare.

Mr. Doherty said that the officers of the company believed that the 3-cent ordinance was invalid. This assumption was based upon the opinion of Judge Killitts of the Federal Court. He said that the company has been losing \$1,000 a day since March 27 when it began carrying free those who refused to pay the old rate of fare.

City Solicitor Thurstin intimated that a suit might be brought in common pleas court to force the company to accept the ordinance. On the other hand, the company now has a suit pending in the Federal District Court asking for the appointment of a receiver.

Mr. Doherty's letter to Mayor Keller was written partly with a view to securing an expression of the city's policy and partly as a notice as to what the company intended to do. It was as follows:

"We can only interpret the action of the committee meeting of Thursday evening as a move to cause a needless delay in the settlement of the street railway problem. We have heretofore endeavored to have the city officials take some action on the decision handed down by Judge Killitts, but without success. Except that our communications have been read and referred to some committee, they have been otherwise totally ignored. This company has gone to the extreme in its endeavor to meet a trying situation that has been forced upon us, and which cannot be justified from any

standpoint. We have patiently accepted everything up to the present. We have been subjected to heavy losses of revenue. Our men have had to put up with the insults of the small but quarrelsome element of the community. The patrons of our cars have been, in many instances, subjected to unnecessary inconveniences. We have been subjected to unwarranted delays in our negotiations.

"We are forced to conclude in spite of protests to the contrary, that if the Council and city officials are acting intelligently they are endeavoring by means of delay to bankrupt our company, or force it to take some drastic action. If this is the real attitude of the city officials, the exercise of further patience on our part will be of no value to anybody. We have been constantly in receipt of numerous protests from all classes of good citizens against the policy of permitting free riding. In view of these protests and the actions of the city officials, we wish you to have notice that we will issue instructions to our conductors to permit no free riding after June 2.

"As the owner of important property interests in Toledo we are anxious to enforce our just rights with as little disorder as possible, and are therefore fixing the date when we will commence to enforce the collection of our fares at a time which will permit plans to be made to avoid anything in the nature of disorder which will reflect upon the good name of Toledo. If the city officials are anxious to prevent the possibility of disorder, we will hold ourselves in readiness to co-operate with them in every way. This letter is not filed for the purpose of making a record, but with the hope of securing a prompt answer. Please advise us what assistance or opposition will be furnished by the city authorities so that we can govern ourselves accordingly."

On June 2 the business men of the city took a hand in the matter. Realizing that the determination of the company to collect fares from all passengers and that the belligerent attitude of the administration toward the company would result in riots and possible bloodshed, forty prominent business men of the city called upon Mayor Keller and advised that he request Mr. Doherty to rescind his order to conductors to collect the fares. They also urged the Mayor to take the lead in matters hereafter and open negotiations in earnest and at once for a settlement of the questions at issue with the company.

Mr. Doherty yielded to the wishes of these men, and agreed to recall his order and allow matters to continue as in the past until another attempt has been made to reach a settlement. Mayor Keller stated, however, in an interview that the city's attitude will remain unchanged. It was due to this stand of the business men that Mr. Doherty was willing to rescind his order until further steps toward a settlement can be taken.

Mayor Keller insists that the Schreiber 3-cent ordinance is valid and that the city's attitude was based upon this. On the other hand, Mr. Doherty asserts that Judge Killitts' opinion is to the contrary and that, under the circumstances, the city has no authority to name a fare which shall be accepted by the company.

Before Mr. Doherty agreed to suspend his order he insisted that negotiations be opened on a new basis. The Mayor assured him that the desired steps toward a settlement would be taken at once. Only the old rates of fare will be accepted during this truce.

The Citizens' Franchise Association, with 150 members, has been organized with permanent quarters in the Second National Bank Building. Frank Mulholland, a well-known attorney, is in charge of the active work of organization. At a meeting on June 2, each member pledged himself to secure five new members and each has written to the Mayor, the City Council as a body and to the Councilman from his own ward, demanding earnest work toward a settlement. The Cleveland sliding scale plan has been discussed.

Henry L. Doherty said:

"I feel that our position has been greatly strengthened within the last few days and I am pleased at the business men deciding to take a hand in the settlement of the rate question. Our company has no new proposition to make, but we are willing to consider any suggestion that may be made

by the Citizens' Franchise Association, the Council or any individual."

The Non-Partisan League has been formed to offset the influence of the Municipal Ownership League.

A meeting of the franchise committee of the Council was scheduled for the evening of June 4. It was thought possible that at the meeting Mr. Jones might give some further information as to the bid he expects to make.

A committee of twenty-five from the Citizens' Franchise Association will attend all committee and council meetings, Mayor Keller asserts that no statement as to the position of the city is necessary at this time. The collection of fares from all will be held in abeyance until the administration signifies its attitude toward an early settlement. A number of manufacturing and business concerns have notified employees to apply at the office for tickets if they do not wish to pay the fare themselves.

**Conditions of New Philadelphia Agreement**

The statement issued by A. Merritt Taylor, head of the department of city transit of Philadelphia, in regard to the agreement between the city and the Philadelphia Rapid Transit Company for the construction of a new high-speed rapid transit system in the city, referred to briefly in this paper last week, is as follows:

"A complete program has been outlined at the conferences, which I have held with the management of the Philadelphia Rapid Transit Company, and it is herewith submitted for consideration.

"This program provides for the construction, equipment and operation of

"1. The Frankford elevated line from a point of connection with the present Market Street subway-elevated at Front and Arch Streets to Frankford.

"2. The Darby elevated line from a point of connection with the Market Street elevated line at Thirtieth and Market Streets to Darby.

"3. The recommended Broad Street subway, with such branches as may be determined on, and the delivery loop.

"4. The Camden tube from a point of connection with the present Market Street subway at or near Front and Market Streets to the Pennsylvania Terminal in Camden.

"The program further provides for the operation of the existing and new transit facilities of the city as a unit, in such manner as will best serve the public, including the elimination of all exchange tickets; and, further, for the issuing of free transfers wherever surface lines intersect high-speed lines (city's and company's Camden tube excepted) at station points, and at all points of intersection between high-speed lines (Camden tube excepted). The intent being to make all high-speed lines (city's and company's) available as a link in a complete journey in a forward direction between any two points within the city for one 5-cent fare.

"Many vital provisions, which are commented on elsewhere, will be found in the program, which provides as follows:

COMPANY'S PROPOSED INVESTMENT	
	Estimated cost
Frankford and Darby elevated (equipment).....	\$1,603,000
Broad Street subway (equipment).....	7,393,000
Total .....	\$11,996,000

(The tube under the Delaware River to Camden to be built by interests holding that franchise. This line to be leased to the Philadelphia Rapid Transit Company and operated as an extension to the Market Street elevated service, but with an additional fare of 3 cents. The franchise to be granted by the city enabling the construction of the tube to be for fifty years, and ownership of the tube, subject to bonds issued for the cost thereof, to be vested in the Philadelphia Rapid Transit Company.)

CITY'S PROPOSED INVESTMENT	
	Estimated cost
Frankford elevated (structure).....	\$6,510,000
Darby elevated (structure).....	4,390,000
Broad Street subway—delivery loop and extensions (structures) .....	34,682,000
Total .....	\$45,582,000

Note.—Frankford-Darby line to be operated via Market

Street subway between Front and Arch Streets and Thirtieth and Market Streets, pending the time when the city constructs the Chestnut Street subway or other city-built connections or delivery facilities for these two lines.

"Company to agree to provide all necessary equipment for and to operate the above mentioned city-built lines, or any of them, if and when built, and at the option of the city, any or all city-built lines built during the term of this contract, on the following basis:

"From net earnings, deduct items 1, 2 and 3, as follows:

"1. (a) Interest on company's investment at 6 per cent, cumulative. (b) In addition to the 6 per cent return on the company's investment for such equipment, beginning ten years from the date of this contract, the city shall allow, and the company shall pay, to a depository to be designated by the city, for its account, 1 per cent per annum upon the cost of such equipment, for the purpose of amortizing the cost of such equipment during the term of this contract.

"The said depository may invest such amortization fund, as far as practicable, in the bonds which the company has issued to pay for such cost of equipment, at a price not to exceed 110 per cent of their face value, with accrued interest, and the interest on such bonds bought with this sinking fund is to accrue for the benefit of and to be paid to the sinking fund for the purchase of additional bonds.

"The said payment of 1 per cent per annum for such sinking fund on the equipment purchased during each year of this contract shall cease upon completion of said amortization.

"Upon the expiration of the contract period of fifty years, the company shall surrender the then existing equipment of the city-built lines to the city on being paid the cost thereof. Accruals in the aforesaid sinking fund may be used by the city for the purpose of making such payments. When the equipment is so surrendered by the company to the city all reserve, depreciation and amortization funds which may have been established and accumulated in connection with the maintenance and operation of the city-built lines shall be paid to the city.

(2) Preferential payments. The base figure which shall be used in ascertaining the amount of the preferential payments as hereinafter specified shall be that amount which represents 110 per cent of the average annual net income (other than that derived from exchange tickets) of the company from its present system with surface extensions for the two fiscal years prior to the operation of the first city-owned high-speed line, unless during the first of the two fiscal years aforesaid there be some unforeseen, unusual and abnormal occurrence which causes an abnormal decrease in the net income of the company, then the base figure may be taken at 115 per cent of such average annual net income for the preceding and succeeding fiscal year, or if there should be such an occurrence during the last of the two first mentioned fiscal years which causes an abnormal decrease in the net income then the base figure may be taken at 120 per cent of such average annual net income for the two preceding fiscal years.

"If other city-owned high-speed line or lines be placed in operation thereafter while the company is entitled to the preferential payment calculated as prescribed herein, then the base figure of annual net income of the present system with surface extensions prior to the beginning of operation of such subsequent city-owned line or lines should be calculated as prescribed for the first city-owned line, but there shall be added the net income specified diverted from the present system with surface extension by the operation of the said first operated city-owned line or lines.

"If other city-owned lines be placed in operation after a preferential payment ceases to be necessary, then the base figure of annual net income of the present system with surface extensions prior to beginning of operation of such subsequent city-owned lines shall be calculated as prescribed for the first city-owned line.

"If the net income of the then existing system of the Philadelphia Rapid Transit Company (except Camden tube) in any year after the opening of a municipally owned line falls below the base figure the preferential payment shall be the amount required to make up the difference between the net income for such year and the base figure; provided, however, the amount of any such preferential payment shall be limited to and shall never exceed such decrease in the

net income of the then existing system of the company (except Camden tube) which results solely from the diversion of such normal net income as may have been gained prior to the opening of municipally owned line or lines.

"In determining the amount of any preferential payment it will be presumed that any decrease in the company's net income below the base figure is due to such diversion of traffic, except to such extent as it may be shown to be due to other causes.

"After the preferential for any year has been so determined it will be reduced by these credits, namely: (a) The net income resulting from the operation of the Camden tube. (b) The difference between the rate paid and 6 per cent on operator's equipment investment. (c) Payment made for the use of the Market Street line between Thirtieth and Front and Arch Streets.

"3. Interest and sinking fund on city's investment, cumulative.

"4. Divide balance of surplus earnings of all city-built lines between the city and company in proportion to their relative investment therein. Market Street subway investment excluded.

"5. Free transfers to be given wherever surface lines intersect high-speed lines (city's and company's) at station points, enabling a passenger to transfer in a forward direction (except to and from the Camden tube), but the aforesaid free transfers shall not be made in the business district until Jan. 1, 1920.

"Free transfers to be given all passengers transferring in a forward direction between all company-owned and municipally owned rapid transit lines at points of intersection where stations exist (except to and from the Camden tube).

"The intent being to make all high-speed lines (city's and company's) available as a link in a complete journey in a forward direction between any two points within the city for 5 cents, but not to compel the company to give a transfer upon a transfer on its own surface system without a high-speed line intervening.

"In all cases where the fare collected covers a ride upon any line or lines of the company and upon any line or lines of the city, the fare collected shall be equally divided between the company-owned and the municipally owned lines—that is to say, 2½ cents to the company-owned lines and 2½ cents to the municipally owned lines.

"Should the result of the aforesaid division of fares appear to be inequitable and unjust to either party, such party may require the question to be submitted to a board of arbitration for determination, one member of which board shall be appointed by the city, one by the company and the third by the Public Service Commission. The findings of the board of arbitration to be subject to final review only by the Public Service Commission of Pennsylvania.

"Such regulations to be established and enforced as may be found necessary to prevent the misuse of transfers.

"6. When the city builds the Chestnut Street subway or other delivery facilities or connections to the Frankford and Darby elevated lines, company to equip and operate the same on the above basis. City to have the right to require company to equip and operate on the above basis additional rapid transit lines or extensions which the city may from time to time build. City to have the right to require the company to extend its surface system from time to time after the Public Service Commission, upon hearing, determines that such extensions are likely to be reasonably remunerative, either separately or in conjunction with the system, to the Philadelphia Rapid Transit Company, provided not more than approximately 4 miles of single track be requested by the city for the years ending June, 1916, and June, 1917.

"The 1907 contracts to be extended seven years. In future division of earnings provided under contracts, city to receive during last seven years of extended contract and thereafter (if property is not purchased at expiration of extended term) all surplus earnings over 6 per cent on par value of Philadelphia Rapid Transit stock.

"Note.—Company to be permitted to capitalize its interest accruals to end of first year of operation. Such accruals as are capitalized shall not be taken out of earnings and shall be considered a proportionate part of the cost.

"During the operation of the Frankford-Darby line through the Market Street subway there shall be charged against the earnings derived from such line under Item I such portion of the fixed charges accruing against that portion of the structure which is used by the Frankford-Darby line as shall bear the same proportion to the whole fixed charge on that portion as the proportion of car miles operated by the Frankford-Darby trains through that portion of the subway bears to the car mileage of all trains operated through that portion of the subway. The fixed charge against the operation of that portion of the subway which is used for surface cars not to be included in the above calculation. The term fixed charge in this paragraph means 6 per cent on cost.

"If the city elects to build the Frankford line first, the operation and fixed charges against the Frankford line shall be calculated on the costs westwardly on Market Street to Thirteenth Street only, subject to the above-mentioned credit. Such Frankford and Darby trains as may be routed through to Sixty-ninth Street or Camden shall only be charged with one-half of the expense and fixed charges which would be due company for the operation of through trains in the section between Front and Arch Streets and Thirtieth and Market Streets.

"The Philadelphia Rapid Transit Company will rely upon the Union Traction Company to aid in securing only such funds as will be required for the normal extension of the existing system, the requirements for which will be greatly lessened by the establishment of the new high-speed lines.

"Wages paid on and charged against the operation of all new high-speed lines shall be reasonably compensatory for services rendered, but shall not exceed the same rate per hour paid for similar services on company's high-speed lines at that time.

"Union Traction and Market Street Elevated Passenger Railway to become parties to and be bound by the terms of the agreement with the city.

"All dividends accrued on Philadelphia Rapid Transit Company stock up to Dec. 31, 1914, to be waived and canceled.

"The Department of City Transit to have free access at all times to the books, accounts and records of the company and the right to audit the same.

"Company to eliminate all exchange tickets, excepting those in the delivery district, which is defined as bounded by Arch and Walnut Streets and the Delaware and Schuylkill Rivers, both of the aforesaid streets inclusive, on Jan. 1, 1916, and the remainder of the exchange tickets on Jan. 1, 1920, when it is hoped that the delivery loop will be in full operation, thus furnishing such added carrying capacity as will avoid any undue congestion in the delivery district.

"On and after Jan. 1, 1916, one free transfer will be allowed in a forward direction to each passenger using surface lines exclusively at any point where surface lines intersect outside of the delivery district as above defined. On and after Jan. 1, 1920, one free transfer will be allowed in a forward direction to each passenger using surface lines exclusively at any point in Philadelphia where such lines intersect. In consideration of which the city will surrender to company accrual in sinking fund, and permit the company to postpone future payments to the sinking fund for ten years from July 1, 1914.

"The amount so surrendered and postponed to be made up by such larger annual payments by the company after the aforesaid ten years as will be required to produce the same amount in sinking fund at the expiration of the 1907 contract extended for seven years as would, with interest included, have been produced by the original sinking fund payments at the end of the fifty-year term. Further, the city will relieve the company of the payment of approximately \$116,000 a year, tax on dividends, for a period of six years, beginning Jan. 1, 1915.

"The company to have forthwith authority to make such changes in its routes and lines as will enable it to take advantage of the economies which can be gained from the substitution of free transfers for exchange tickets.

"In case of any trouble arising under the agreement, the question shall be arbitrated by one representative each of city, company and Public Service Commission, whose findings shall be subject to review and final decision by the Public Service Commission."

### River Tube Contracts Awarded

During the week ended May 30 the Public Service Commission for the First District of New York awarded rapid transit contracts aggregating more than \$14,200,000. The largest single contract let for such work since the \$35,000,000 contract awarded to John B. McDonald for the construction of the present subway operated by the Interborough Rapid Transit Company was among the number. This was the contract for the construction of the two tunnels under the East River from downtown Manhattan to Brooklyn to Booth & Flinn, Ltd., and the O'Rourke Engineering Construction Company, on their joint bid of \$12,444,725. One of the tunnels will run from Whitehall Street, Manhattan, to Montague Street, Brooklyn, and will be operated by the New York Municipal Railway Corporation; the other will run from Old Slip, Manhattan, to Clark Street, Brooklyn, and will be operated by the Interborough Rapid Transit Company. Of the total bid, which was the lowest submitted, \$5,974,809.50 is for the New York Municipal tunnel and \$6,469,916.25 for the Interborough tunnel. The contract requires the completion of the work within three and a half years from the delivery of the contract, and provides a penalty of \$1,000 a day for each day beyond that limit. The contractors must give a bond of \$500,000 for each tunnel. The other contract awarded during the week was that for the construction of Section No. 2 of Route No. 20, the Canal Street crosstown subway in Manhattan. This went to the Underpinning & Foundation Company, the lowest bidder, for \$1,822,994. This subway will be operated by the New York Municipal Railway Corporation. It will connect the Fourth Avenue subway in Brooklyn by the tracks coming over the Manhattan Bridge with the new subway in Broadway, Manhattan.

The Public Service Commission for the First District has adopted an alternative route, to be known as the Spruce Street Route, which may take the place of a portion of the Park Place, William and Clark Street route in Manhattan. The route will run north of instead of under the United States post-office property. The route, as it formerly stood, left the Seventh Avenue subway at West Broadway and ran east through Park Place, under the New York Municipal subway in Broadway and thence under the northern end of the post-office property to Beekman Street, through Beekman to William Street, and down William Street to Old Slip and the proposed tunnel under the East River. At the time the old route was laid out Congress, at the request of the commission, passed a special act permitting the construction of a subway underneath the post-office property. Last winter the commission forwarded to the treasury department a form of deed for the proposed easement. Since that time the commission has been negotiating with that department for the necessary easement, but so far without success.

### Mayor of Pittsburgh on Transit Problems

Mayor Joseph G. Armstrong of Pittsburgh, Pa., issued a statement to the Council on May 26, in which he said:

"While many experts have been employed and very serious thought has been given to the street railway subject by previous administrations in an endeavor to solve this problem, it does not appear that much has been accomplished to date. Therefore, I am prepared at this time, with the law department, to take up this most serious matter with the railway companies. Your honorable body having passed a resolution on April 21, requesting the law department to take such action as it deemed necessary pertaining to the establishment of a transfer system, better transportation facilities, etc., indicates to me that you, too, are very much interested in trying to bring about improved conditions of the railway service. I at this time invite any suggestions and your most earnest co-operation, either by body or committee."

In reference to the proposed rerouting of South Side cars, a letter from J. D. Callery, president of the Pittsburgh Railways, was read before a sub-committee of the public service and surveys committee in which he stated briefly his objections to the proposed ordinances, saying that they specify the exact routing of the cars all the way into the

city and the frequency of the service not only over the three or four switches that would have to be built, but all the way to the city, and impose expenses upon the company for any repairs to the streets in which the tracks had to be altered, by a charge for the actual work, plus 15 per cent for supervision and 25 per cent additional. Incidentally Mr. Callery stated that the curves would cost the company about \$8,000 each and would not save the company a cent.

### President Hutchins Replies to Detroit Commission

Upon the receipt of a letter from J. C. Hutchins, president of the Detroit (Mich.) United Railway, in which he did not designate the selling price of the properties of the company within the city of Detroit, but indicated the desire to continue negotiations with the city, the Detroit Municipal Street Railway Commission passed resolutions to the effect that engineers and accounting experts be employed as soon as possible to appraise the property of the company in Detroit. The commission had previously written to the company asking for the designation of a sale price by June 1, but Mr. Hutchins, in his letter, pointed out that the company had expected an appraisal along technical and scientific lines and he considered it inadvisable to name any fixed price without following this method.

According to information given to the newspapers, the commission will not abandon its plan to construct a subway system. The acquisition of the surface lines, it is reported, will be placed first in importance. Separate staffs of subway engineers and street railway experts will be engaged to work simultaneously on the plan for a complete surface and subway system.

The public utilities committee of the Common Council has voted to recommend to the Council the adoption of the subway suggestion of the commission and it is considered probable that the Council will agree with the recommendation.

The letter of Mr. Hutchins to the commission is substantially as follows:

"At the first meeting in August of the street railway commission, following the low fare agreement of Aug. 7, 1913, under which we are now operating, it was agreed that the company would as soon as possible supply the commission with inventories and our engineers' estimates of reproduction values of its properties in Detroit. Their inventories, showing a reproduction value of \$31,028,982, were filed with the commission on Dec. 15, 1913. The inventories, as was stated, did not for obvious reasons include materials and supplies on hand, with a value approximating \$1,000,000, nor did they include work under way, such as a new section of the Highland Park shops, the construction of a new 10,000-hp generating unit in the Detroit power house, the Michigan Central depot extension, and cars under construction; nor did they include franchise values, which were stated by Professor Adams in 1909 to be worth \$4,500,000. Since the filing of these inventories the company has continued its developments, and has expended some hundreds of thousands of dollars. It is now progressing with the Junction Avenue extension, and with other works, to cost many hundreds of thousands more.

"We had supposed the engineers for the city would proceed to check these inventories and investments, applying proper standards of depreciation, to determine the value at some given date of the company's properties. We have been advised that the commission, without resorting to the delays of such technical and scientific methods, would like us to name a price at which the company would sell its properties in Detroit. While anxious to meet the wishes of the commission in every way possible, we greatly fear that any figure we might find it possible to name would at once be criticised as being excessive, to the embarrassment both of ourselves and the commission.

"Some sixteen years ago Governor Pingree believed the railway properties in Detroit, as they then existed, were worth \$17,500,000, and was willing to pay that amount for them. These properties are in their physical aspects tremendously more valuable now than then, as the result of continuous vast additions. In December, 1900, the Detroit United Railway paid its capital stock to the amount of \$12,500,000, subject to \$11,000,000 of bonds then outstand-

ing, as the purchase price of all of the railways then existing in Detroit and its immediate vicinity. Aside from the value of the property this stock covered at that time, there has been invested in the company's properties in undistributed earnings by the stockholders since this stock was issued to insure its value, an amount of money approximating its full face of \$12,500,000. Had the custom been pursued which is followed by both public and private companies, this stock would have been inflated to cover these expenditures. As a matter of fact, no additional stock has been issued, the stockholders have received in dividends upon their holdings a lower average than they could have got from the savings bank.

"Subsequent to the issuance of this stock, that is, in 1901, the company by the payment of some cash and the assumption of bonds amounting to \$4,880,000, acquired the lines outside now known as the Pontiac, Orchard Lake, Flint and Wyandotte divisions. On Jan. 1, 1902, the company executed a mortgage of its properties inside and outside the city, under which bonds to the amount of \$25,000,000 were issuable—\$15,880,000 so authorized being held by the trustee to pay and retire at maturity the \$15,880,000 of underlying bonds above mentioned, that is to say, \$11,000,000 in the city and \$4,880,000 outside.

"Since then \$7,000,000 of these underlying bonds in the city have fallen due and have been refunded, a like amount of the \$25,000,000 being issued in their stead. The remainder of this issue of \$25,000,000 to wit: \$9,120,000, under the terms of the mortgage, were available at the rate of 75 cents in bonds for \$1 expended for betterments and improvements, excepting as to \$3,000,000 which were set aside under the mortgage and used to pay for developments previously made. Under the terms of the mortgage the bonds were all issued prior to 1910. Since then the company has issued and sold \$2,000,000 of its two-year notes partly to pay for additional betterments and improvements in Detroit. The company's properties in Detroit are therefore worth upon an investment basis this \$20,000,000 of bonds plus at least \$12,500,000 of its capital stock, and plus \$2,000,000 in notes; and on an investment basis are additionally worth the amounts otherwise expended by the stockholders in excess of its capital stock, as indicated above.

"I am sure this recital will assist your commission to an understanding of the equities of our situation. Mark you, we say these properties are of such value upon an investment basis. But perchance it may be said these values have been dropping out at the bottom in depreciation and obsolescence faster than the new capital has been poured in. This is the rub! None of the income of the company has been applied to the payment of excessive dividends, nor has any of it been otherwise diverted or misused. Therefore these investments stand intact or else the company has been operating at too low a rate of fare.

"I have no doubt that the creation of a property in Detroit such as the company possesses would cost as much or more than the aggregate of all expenditures to which reference is made. Just what amount these properties would be shown to be worth by the application of existing standards of depreciation and obsolescence, I am unable to say in advance of an analysis by expert engineers representing both ourselves and the city. This could not possibly be determined by our engineers within the time you have mentioned, and, of course, their conclusions should be checked by engineers and experts representing the city, unless indeed you believe as I do, that our property ought to be worth as much as we have invested in it.

"We are willing to sell to the city all of our property in Detroit for just what it is worth now after eliminating everything that comes under the head of obsolescence, wear and tear, and depreciation. We do not wish to discontinue negotiations for the sale of these properties to the city. On the contrary, we will be very glad to negotiate with your commission, as you may point the way, for their sale and early delivery, and we would do so in full faith that the city will deal fairly and honestly with those whose money is invested as shown."

The commission has since resolved immediately to devise plans to accomplish the end suggested by Mr. Hutchins by employing such engineers and accounting experts to appraise the property in Detroit in the shortest time possible.

#### Kansas City Franchise Committee Completes Its Work

The joint committee handling the franchise negotiations of the Metropolitan Street Railway, Kansas City, Mo., concluded its labors on May 30, and decided to submit the ordinance to a vote of the people on July 7. The conferees met on June 1 and signed the grant, which will go to the Council on June 8. In the meantime copies will be distributed to the voters. As the grant now reads, the location of the proposed interurban terminal is left to the board of control. The City Council must approve the choice. The representatives of the interurban railways asked that the selection of the site be left to them. This request was denied. The fare question was settled during the week ending May 30. Adults will pay 5 cents. Children under eight years of age, when accompanied by a person paying fare, will be carried free. Children between the ages of eight and twelve will be carried for half fare. Children under eight will ride free even if accompanied by another child between eight and twelve, both riding on the single half fare. Tickets will be used on the half-fare payment, each being worth 2½ cents. It was announced that the half fare for children clause meant an annual decrease in revenue to the company of about \$50,000. A clause was adopted limiting the board of control in making contracts with electric light companies to five years.

The final sessions of the joint committee were devoted principally to arranging for car service to the new Union depot, and to the dispute between the Metropolitan Street Railway and the Terminal Railway. Under a clause adopted, the Metropolitan Street Railway will build tracks over viaducts in dispute and deed them to the city forever. The company will then keep the tracks in repair. The routing to the new depot will be determined by the board of control. The Terminal Railway has agreed to allow the Metropolitan Street Railway to build tracks across the plaza and to use them for a period of ten years free of charge. The city will remunerate the company for building the viaduct tracks. Several extensions were provided for in additional clauses to the franchise, and the capitalization was raised \$250,000 for extensions, making the total capitalization as now allowed \$30,250,000. The extensions to be built under the franchise were noted in the *ELECTRIC RAILWAY JOURNAL* of May 30, 1914, page 1224.

#### Dividends on Public Utilities

In its issue of May 30 the *United States Investor* says that since the year 1914 opened public utilities have kept up their good record of dividend payments. In the five months that have elapsed thirteen well-known public utility properties have increased their dividends, in each case 1 per cent being added, and eight companies have paid an initial dividend either on their common or preferred stock. One company, United Light & Railway, paid an extra dividend of 1 per cent on its common stock, while another, the Federal Utilities Company, on Feb. 28, 1914, paid the dividend of 1½ per cent which was passed on Nov. 30, 1913, as well as the dividend which was due on that date. The Municipal Service Company and the Bangor Railway & Electric Company, which have been paying dividends on their preferred stock since their organization, both declared initial common stock dividends, the former paying dividend of 1 per cent and the latter one-half of 1 per cent. The American Public Utilities Company increased the annual rate of dividends on its common from 2 per cent to 3 per cent and, as stated, the United Light & Railway Company declared an extra 1 per cent on its common stock. The Central States Electric Corporation, operating in Cleveland, Ohio, declared an initial dividend of 1 per cent and the Manufacturers Light & Heat Company, serving the Pittsburgh district, raised its dividend rate from 7 to 8 per cent. The Cities Service Company increased the dividend rate on its common from 5 to 6 per cent, while the Southern California Edison Company, located in California, increased its dividend from 5 to 6 per cent. The El Paso Electric Company and the Galveston-Houston Electric Company increased the dividend rate on their common stocks, the former from 8 to 9 per cent and the latter from 6 to 7 per cent. The Pennsylvania Water &

Power Company paid an initial dividend of 1 per cent, and the Brooklyn Borough Gas Company an initial semi-annual dividend of 3 per cent. According to the financial statements of these different companies these dividends have been warranted and there is nothing to indicate that they have been paid with the main object in view to aid and facilitate any new financing.

**Kansas City Company Accepts Valuation.**—The Metropolitan Street Railway, Kansas City, Mo., is willing to accept the valuation of \$8,227,551 fixed by the Missouri State Board of Equalization. This is the amount assessed in 1913. Judge John H. Lucas appeared before the board on May 29 and stated the company was satisfied with the valuation.

**Purchase of Toronto Suburban Line.**—Corporation Counsel Geary, of Toronto, Ont., stated on May 28 that the city had not yet paid over to the Toronto & York Radial Railway the \$890,000 voted by the people for the purchase of the portion of the Mimico line between Sunnyside and the Humber because the description of the property had not yet been completed. The company is to restore the carhouse which was damaged by fire before the railway is taken over by the city.

**London & Port Stanley Railway Electrification.**—Royal assent having been granted at Ottawa to the London & Port Stanley Railway bill, whereby the city of London, Ont., is authorized to expend \$700,000 in electrifying its steam road to Port Stanley, Adam Beck, of the Hydro-Electric Commission and chairman of the commission in charge of the electrification plan for the railway, announces rehabilitation work will begin almost immediately, and it is expected that the electrified line will be in operation early next year.

**Attitude Toward Sale of United Railroads to City.**—Jesse W. Lilienthal, president of the United Railroads of San Francisco, has issued the following statement in regard to settling the present controversy over financial matters mentioned elsewhere in this issue: "If the Mayor and supervisors of San Francisco make an equitable offer for purchase they will find me, as president of the company, in a mood to entertain. Tedious condemnation proceedings to gain control of the lines would not be necessary." Mayor Rolph has stated that he is willing to appoint a committee to confer with Mr. Lilienthal regarding the latter's offer.

**Order Requiring Lifting Jacks in Pennsylvania.**—An order issued by the Public Service Commission of Pennsylvania on May 23 requires that half the street cars in operation by companies in Pennsylvania must be equipped with lifting jacks by Dec. 1, 1914, and that all must be so equipped by June 1, 1915. Hearings on the subject were held recently. A bill requiring all electric railway cars to be equipped with jacks was passed by both houses in the last Legislature, but Governor Tener vetoed the measure, saying the Public Service Commission had power to prescribe such regulations without special warrant at law.

**Injunction in Ohio Fare Case.**—Judge Sater has issued a temporary injunction to prevent the city of Cincinnati from putting in force its ordinance providing for a 5-cent fare on the Millcreek Valley line of the Ohio Traction Company between Cincinnati and the villages of Carthage and Hartwell. The court said that the representations and conditions are such as to make it advisable that the status quo should be preserved until the case can be heard upon its merits. As to jurisdiction, the court holds that it has acquired jurisdiction of both the parties and the subject matter. Attorneys for the city contend that the Federal Court was without jurisdiction in the matter.

**Commission Appointment Protested.**—Joseph Johnson, formerly fire commissioner of New York, has been appointed chief of the transportation bureau of the Public Service Commission of the First District of New York at a salary of \$7,500. The commission was divided three to two over the appointment, Messrs. Maltbie and Eustis protesting the nomination. Mr. Maltbie pointed out that the position had always been held by expert engineers and that in his opinion the place called for the exercise of special knowledge. Mr. Johnson was manager of the campaign conducted by Chairman McCall of the commission last fall for election as Mayor of New York City on the Democratic ticket.

**Parr Shoals Development Completed.**—The Parr Shoals Power Company's new 30,000 hp hydroelectric development near Columbia, S. C., recently completed by the J. G. White Engineering Corporation, New York, was officially opened on Decoration day. The Parr Shoals Power Company is a subsidiary of the Columbia Railway, Gas & Electric Company, Columbia, S. C., and the new plant supplements the steam and hydroelectric stations of the parent company, which are rated at 14,500 hp. The new station comprises a concrete dam 2200 ft. long across the Broad River about 30 miles above Columbia. The present installation comprises five generating units, operating at 35 ft. head, which will generate 18,000 hp. Current at 60,000 volts will be transmitted to Columbia over a double circuit, steel tower transmission line.

**Mr. Mellen Prescribes for Railroad Ills.**—Charles S. Mellen, former president of the New York, New Haven & Hartford Railroad, in a page interview in the Sunday *American* says that as a cure for railroad ills stockholders should cast their own votes or not vote at all. Voting by proxy should cease. He would oblige the railroads to market their own securities. Meetings of the directors ought to be as open as the deliberations of a board of aldermen or a town meeting. Railroad officials should be compelled to advertise for bids for all purchases. Railroad accounting should be uniform, so that everyone could see at a glance how the property was being managed. Minority stockholders should have the right of dissent from decision of directors, with the privilege of court appeal. According to Mr. Mellen, "public ownership is inevitable and is coming fast."

**Decision in Duluth Franchise Case.**—The District Court of St. Louis County, Minn., has handed down a decision upholding the franchises of the Duluth Street Railway, a subsidiary of the Duluth-Superior Traction Company, which had been attacked by the city on the ground that the original terms of the franchise granted in 1881 had not been complied with by the laying of 1 mile of track within one year after the passage of franchise by the legislature. The court held that the company is operating under a valid and subsisting legislative franchise granted Nov. 17, 1881; that the city had admitted its validity by assessing taxes against it since 1882, and that in court action in 1912 the validity of this franchise was admitted. The court also held that the company, relying on the validity of the franchise, had issued and sold securities which now amount to several millions of dollars and are widely scattered and held by many individuals who purchased them on assurances as to the validity of the franchise.

**Transportation and City Planning.**—The effect of transportation on city planning was discussed on the morning of May 27 at the City Planning Conference in Toronto. Among the speakers were John A. McCollum, assistant engineer, Bureau of Franchises, Board of Estimate and Apportionment, New York; George McAneny, president of the Board of Aldermen, New York; J. V. Davies, consulting engineer, Brooklyn Rapid Transit Company, and Edward M. Bassett, formerly a member of the Public Service Commission for the First District of New York. Mr. McCollum's subject was "The Motor-Bus." He said that the great field of this vehicle was as a supplement to the street railway. Unnecessary duplication of the street railway and bus facilities would be inane and unprofitable. Each mode of transportation had its own sphere. Mr. McAneny said that street railway officers had too often been permitted to be the city planners. He outlined the new rapid transit agreement in New York. He also referred to the plan to regulate the height of buildings in New York. Mr. Davies shared with Mr. McCollum the opinion that the motor-bus was really an adjunct to the street railway. He compared the relative costs of construction of electric railways in county districts, city overhead electric railways, underground conduit railways, elevated railways, open cut railroads, subways in city streets, and tunnels under rivers. Mr. Bassett said that by all means the single downtown central terminal for rapid transit lines should be avoided. Preparations should be made early in the history of the city for dealing with the rapid transit problem. High-speed rapid transit lines became imperative when population in a city reached 1,000,000.

# Financial and Corporate

## ANNUAL REPORTS

### Pittsburgh Railways

#### Stock and Money Markets

June 3, 1914.

In the trading on the New York Stock Exchange to-day the tendency was toward recovery and the average of closing quotations showed a good net gain. The volume of dealings was still well above the recent low point. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2½ per cent; four months, 3 per cent; six months, 3 @ 3¼ per cent.

In the Philadelphia market to-day sales of Rapid Transit were recorded at 15¾. Union Traction declined to 44¾.

In Chicago the only railway issues dealt in to-day were Chicago Railway 2's and Kansas City Railway & Light preferred. Twenty-five shares of the latter were sold at 39. The bond transactions to-day were with one exception all in the railway issues and totaled \$59,000, par value.

In the Boston market to-day trading was more active and stronger. Interest centered in the New Haven hearing at Washington.

In the Baltimore market the trading in stocks to-day totaled 717 shares. The bond market was unusually active.

Quotations of traction and manufacturing securities as compared with last week follows:

	May 26	June 3
American Brake Shoe & Foundry (com.)	87	87½
American Brake Shoe & Foundry (pref.)	135	136
American Cities Company (com.)	*29	*29
American Cities Company (pref.)	65	65¼
American Light & Traction Company (com.)	337	337
American Light & Traction Company (pref.)	107½	108
American Railways Company	37	37
Aurora, Elgin & Chicago Railroad (com.)	32½	32½
Aurora, Elgin & Chicago Railroad (pref.)	77	77
Boston Elevated Railway	82	81½
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	a55	a65
Boston & Worcester Electric Companies (com.)	*6¾	*6¾
Boston & Worcester Electric Companies (pref.)	36	36
Brooklyn Rapid Transit Company	93	92¾
Capital Traction Company, Washington	100	100¾
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	20
Chicago Elevated Railways (pref.)	65	62
Chicago Railways, ptcp, ct. 1	95	95
Chicago Railways, ptcp, ct. 2	34¾	34½
Chicago Railways, ptcp, ct. 3	5	5
Chicago Railways, ptcp, ct. 4	2	2
Cincinnati Street Railway	102	102¾
Cleveland Railway	104¼	104¾
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	53	53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*63	*63
Detroit United Railway	a80	a80
General Electric Company	149	147½
Georgia Railway & Electric Company (com.)	120	120
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)	14¾	14¾
Interborough-Metropolitan Company (pref.)	62	62
International Traction Company (com.)	*40	*40
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	18	*18
Kansas City Railway & Light Company (pref.)	37	*37
Lake Shore Electric Railway (com.)	*6	*6
Lake Shore Electric Railway (1st pref.)	*92	*92
Lake Shore Electric Railway (2d pref.)	22	*22
Manhattan Railway	130½	131
Massachusetts Electric Companies (com.)	10	12
Massachusetts Electric Companies (pref.)	60	60¾
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	25½	*25½
North American Company	76½	76
Northern Ohio Traction & Light Co. (com.)	a70	70
Northern Ohio Traction & Light Co. (pref.)	a101	101
Philadelphia Company, Pittsburgh (com.)	39¾	39
Philadelphia Company, Pittsburgh (pref.)	38½	38½
Philadelphia Rapid Transit Company	17	15¾
Portland Railway, Light & Power Company	50	*50
Public Service Corporation	112	112
Third Avenue Railway, New York	42½	41
Toledo Traction, Light & Power Co. (com.)	a20	a20
Toledo Traction, Light & Power Co. (pref.)	a70	a70
Twin City Rapid Transit Co., Minn. (com.)	106	105
Union Traction Company of Indiana (com.)	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	*14	*14
United Rys. & Electric Company (Baltimore)	28½	28
United Rys. Inv. Company (com.)	15½	14
United Rys. Inv. Company (pref.)	42	38
Virginia Railway & Power Company (com.)	49	49
Virginia Railway & Power Company (pref.)	98	99
Washington Ry. & Electric Company (com.)	87½	87¾
Washington Ry. & Electric Company (pref.)	83½	83½
West End Street Railway, Boston (com.)	66½	66
West End Street Railway, Boston (pref.)	88	85
Westinghouse Elec. & Mfg. Company	77¾	76¼
Westinghouse Elec. & Mfg. Co. (1st pref.)	123	124

\* Last sale. a Asked.

The thirtieth annual report of the Philadelphia Company, Pittsburgh, Pa., for the year ended March 31, 1914, contains the following statement of income, profit and loss of the Pittsburgh (Pa.) Railways for the year ended the same date:

Gross earnings from street railway operations	\$11,782,860
Operating expenses:	
Maintenance of way and structures	\$1,112,627
Maintenance of equipment	794,791
Traffic	24,573
Transportation	4,580,810
General and miscellaneous	1,383,066
Total operating expenses	\$7,895,867
Taxes	437,801
Total operating expenses and taxes	\$8,333,668
Net earnings from street railway operations	\$3,449,192
Auxiliary operations:	
Gross earnings	\$133,888
Operating expenses and taxes	98,404
Net earnings	\$35,484
Total net earnings	\$3,484,676
Other income:	
Rental from investment buildings and real estate	\$10,634
Interest and discount	150,569
Miscellaneous income	80
Total other income	\$161,283
Total income	\$3,645,959
Deductions from income:	
Rent of leased properties	\$2,838,531
Interest on equipment trust bonds	22,016
Interest on current liabilities	104,648
Total deductions from income	\$2,965,195
Net income before deducting fixed charges	\$680,764
Fixed charges—interest on funded debt	341,490
Net income after deducting fixed charges	\$339,274
Interest on income debentures	239,274
Balance to profit and loss	\$100,000

The report states that while the gross receipts of the company increased during the fiscal year, the operating expenses increased in greater ratio because of many exactions and settlements (such as bridge tolls, paving and street cleaning) with the city of Pittsburgh and various boroughs through which the railway operates, as well as because of an increase in the cost of labor and materials. There was expended during the year \$1,114,267 for improvements, betterments and extensions, and in addition large sums were expended for maintenance of roadway, tracks, bridges and overhead construction.

During the year 1910 the general manager designed a light-weight double-truck steel car with low wheels, having a side entrance and a low floor, to be used as a trailer. Fifty of these cars were purchased and placed in service during 1911. They operated so satisfactorily as trail cars that the company endeavored to purchase motors, but were unable to do so until the general manager designed a motor for this truck. During the year 1913 fifty trail cars and fifty of these low-floor motor cars were ordered and are now being placed in service, and a further order was placed for 100 more cars of the same type to be delivered not later than Nov. 1, 1914. Five double-deck cars, each having a seating capacity of 110 people, were also purchased.

The report states that some double tracking was done on the interurban roads. There has been a large increase in population along these routes which promises a future increase in revenue. During the year a contract was made with the Duquesne Light Company for supplying all the electric current to be used by the electric railways. Terminal facilities are being supplied to three interurban roads—namely, the Pittsburgh & Butler Street Railway, the Pittsburgh, Harmony, Butler & New Castle Railway and the Allegheny Valley Traction Company. During the year the municipal improvement known as the "hump cut" was completed and was instrumental in increasing the receipts.

The income, profit and loss statement of the Beaver Valley Traction Company, New Brighton, Pa., which is

controlled by the Philadelphia Company, is as follows for the year ended March 31, 1914:

Gross earnings from street railway operations.....	\$334,670
Operating expenses:	
Maintenance of way and structures.....	\$29,229
Maintenance of equipment.....	39,358
Traffic .....	352
Transportation .....	113,057
General and miscellaneous.....	31,379
Total operating expenses.....	\$213,375
Taxes .....	9,327
Total operating expenses and taxes.....	\$222,702
Net earnings from street railway operations.....	\$111,968
Auxiliary operations:	
Gross earnings .....	\$7,905
Operating expenses and taxes.....	10,734
Net earnings—deficit .....	\$2,829
Total net earnings.....	\$109,139
Other income:	
Rental of real estate and buildings.....	\$462
Interest and discount.....	145
Total other income.....	\$608
Total income .....	\$109,747
Deductions from income:	
Rent of leased properties.....	\$6,291
Interest and discount.....	11,613
Total deductions from income.....	\$17,904
Net income before deducting fixed charges.....	\$91,843
Fixed charges—interest on funded debt.....	76,250
Net income for the year.....	\$15,593

#### United Railways Investment Company

According to the twelfth annual report of the United Railways Investment Company, San Francisco, Cal., the statement of income, profit and loss for the year ended Dec. 31, 1913, is as follows:

Income:	
Dividends on stocks owned.....	\$1,998,849
Interest on bonds owned.....	45,400
Interest on bonds in sinking fund.....	19,393
Interest on notes and accounts receivable.....	68,097
Interest on bank balances.....	2,485
Total .....	\$2,134,224
Expenses and other charges:	
Expenses:	
Salaries .....	\$42,745
Corporation taxes .....	5,570
Tax on bonds held in Pennsylvania .....	2,024
Transfer agents', registrars' and trustees' fees.....	2,825
Fees of trust companies for paying coupons, etc.....	1,018
Directors' fees and expenses.....	1,243
Stationery, printing and postage.....	766
Traveling .....	2,072
General .....	5,464
Total expenses .....	\$63,727
Other charges:	
Interest on collateral trust sinking fund 5 per cent gold bonds .....	\$907,500
Interest on 6 per cent convertible gold bonds of 1910 .....	66,200
Interest on 6 per cent notes of 1908.....	98,999
Interest on dividend certificates.....	80,256
Interest on loans, notes and accounts payable.....	11,203
Total other charges.....	\$1,164,158
Total .....	\$1,227,885
Net income .....	\$906,339
Profit and loss surplus at beginning of year.....	4,256,542
Profit and loss credit—discount on bonds purchased for sinking fund.....	59,647
Profit and loss surplus, Dec. 31, 1913.....	\$5,222,528

The distribution of net income as shown by the above statement was as follows: Sinking fund for purchase of collateral trust sinking fund 5 per cent gold bonds, \$207,023; payment of 6 per cent serial notes of 1908, \$400,000; payment of Sierra & San Francisco Power Company second mortgage bonds, series A, \$100,000; acquisition of other securities, including bonds received as interest on Sierra & San Francisco Power Company second mortgage bonds, \$153,305, and reduction in net liabilities and accrued amounts, \$46,010.

The report states that the Sierra & San Francisco Power Company has suffered from a shortage of water for its hydroelectric plant, thus forcing it to fall back upon its steam-generating plants at resulting increased cost. The

demand upon the power company by the United Railroads of San Francisco increased 5.56 per cent, and outside of the railroad's contract the gross earnings of the company from the general public increased 39.31 per cent. During the year the power company began the construction at Lower Strawberry, Cal., of an additional dam and reservoir which will store about 762,300,000 cu. ft. of water. By the payment in 1913 of \$400,000 of the 6 per cent serial notes of 1908 and the further payment on Feb. 15, 1914, of an additional \$200,000 of these notes, the amount outstanding has been reduced to \$1,300,000. The final payment of \$100,000 of Sierra & San Francisco Power Company second mortgage bonds, series A, has been made in accordance with the agreement of July 29, 1910. The amount of the 6 per cent convertible bonds of 1910 outstanding was reduced during the year from \$1,229,000 to \$852,000, which amount has since been further reduced to \$810,000.

The statement of income, profit and loss of the United Railroads of San Francisco for the year ended Dec. 31, 1913, follows:

Gross earnings:	
Passenger .....	\$8,496,854
Advertising .....	56,000
Total .....	\$8,552,854
Operating expenses and taxes:	
Maintenance of way and structures.....	\$604,454
Maintenance of equipment.....	472,912
Transportation expenses .....	2,946,667
General expenses .....	644,663
Total operating expenses.....	\$4,668,696
Taxes .....	495,000
Total operating expenses and taxes.....	\$5,163,696
Net earnings .....	\$3,389,158
Other income:	
Sinking fund earnings.....	\$89,375
Interest .....	70,440
Rentals .....	7,306
Miscellaneous .....	3,489
Total .....	\$170,610
Gross income .....	\$3,559,768
Current income charges:	
Interest on 5 per cent promissory gold notes.....	\$50,000
Interest on income notes.....	66,200
Interest on equipment notes.....	16,375
Interest on trustee's certificates.....	8,564
Interest on bills payable.....	155,335
Rentals and leases.....	76,800
Total .....	\$373,274
Net income before bond interest charges.....	\$3,186,494
Bond interest:	
United Railroad's bonds.....	\$964,193
Underlying bonds .....	699,050
Total .....	\$1,663,243
Net income for the year.....	\$1,523,251

From the net income as shown above, appropriations were made as follows: Depreciation reserve, \$257,581; bonds and sinking fund reserve, \$474,432, and dividends on first preferred stock, \$350,000. The increase in gross earnings was not up to normal during the year owing largely to the general business depreciation on the Pacific Coast. The gross earnings for 1913 increased \$80,179 over 1912, but there was a decrease of \$203,938 in net income, \$318,648 in total income and \$427,400 in surplus after the payment of interest charges. There was a balance for the year after all charges, including dividends on first preferred stock, of \$441,237, as compared with a balance of \$617,949 in 1912, or a decrease of \$176,712. The decrease in net income was accounted for in the increase in the wage scale and also in an increase in taxes of \$79,000. The ratio of operating expenses and taxes to gross income was 60.38 per cent in 1913 as compared to 57.59 per cent in 1912.

#### Certificate Issue of United Railroads—Investment in Irrigation Project

The Railroad Commission of California recently authorized the United Railroads of San Francisco to enter into a car-equipment trust agreement by which it will obtain sixty-five new cars for service in San Francisco. The cars will cost the company \$378,000. The company will pay \$78,000 in cash, and equipment trust certificates with interest at 5½

per cent will be issued for the remaining \$300,000. The certificates have been purchased by E. H. Rollins & Sons, Boston.

In the course of its decision authorizing this issue the commission says that the United Railroads would have had funds on hand available for the purchase of the cars if its surplus earnings had been properly conserved. In this connection it states it is informed that Patrick Calhoun, while president of the United Railroads of San Francisco, subscribed for 49,991 shares of common stock of the Solano Irrigated Farms Company, and that the balance sheets of the railway show that \$1,096,115.70 was applied from its funds to the Solano project. It then seems, the report adds, that upon the taking of office by Mr. Lilienthal, the present president of the railway, Mr. Calhoun was required to give a one-day promissory note for this amount in favor of the railway, the security being the stock of the Solano project, which note Mr. Lilienthal has since carried on the company's books at the value of \$1. In answer to the above charge of the commission Mr. Calhoun issued the following statement from Cleveland: "Everything I did was done with the authority of the board of directors and the stockholders. I invested about \$1,096,000 of the company's funds in stock of the Solano Company. I thought it was a sound investment. When criticism was made by some of my associates I assumed the obligation myself and gave the company the stock in the Solano enterprise, which they still have as security for their money."

In connection with the commission's decision Mr. Lilienthal said:

"I regret that the Railroad Commission has deemed it its duty to give publicity to the Solano transaction, because it seriously interferes with my sincere purpose to improve the relations between the company and the public and to build up the credit of the company so that it may adequately perform its duty to the public. I need not add that I am a thorough believer in the Railroad Commission and in the intelligence and integrity of its members and therefore regret my inability to agree as to the wisdom of the course adopted by them in this matter."

On May 29 the commission decided to investigate the entire financial condition of the United Railroads of San Francisco, and a hearing was set for July 17. At that time the directors of the United Railroads will be asked to restore to the funds of the company the amount in question, or present a satisfactory plan for the restoration of that sum. Mr. Lilienthal states that he welcomes the investigation and will heartily co-operate with the commission in throwing as much light as possible on the company's financial affairs.

**Alton, Jacksonville & Peoria Railway, Alton, Ill.**—The Alton, Jacksonville & Peoria Railway, which has been in the hands of Receiver Edward L. Butler, Chicago, for two years, has been sold under foreclosure for \$500,000 to J. C. Van Riper, St. Louis, president of the Title Guaranty Trust Company. Only two bids were received. The first was for \$250,000 made by Israel Shrimsky, Chicago. The second and successful bid was made by W. T. Nardin, who said he represented Mr. Van Riper, acting for the bondholders. It is understood that the road which has been sold will eventually be included among the properties of E. W. Clark & Company, Philadelphia, Pa., who control the electric railways in East St. Louis and vicinity.

**Big Four Electric Railway, Tulare, Cal.**—The Railroad Commission of California has rendered a decision in which it grants authority to the Big Four Electric Railway to issue 392,058 shares of its capital stock at the par value of \$1 a share. The sale of this stock is restricted so that no commissions are allowed until \$100,000 in cash is realized and deposited to the credit of the company, and thereafter no commissions in excess of 20 per cent shall be allowed stock salesmen. The commission also instructs the board of directors of the company to recover or reimburse the treasury in the sum of \$1,798 owed to the company.

**Boston (Mass.) Elevated Railway.**—The Public Service Commission of Massachusetts has authorized the Boston Elevated Railway to issue \$1,000,000 of 5 per cent thirty-year coupon or registered bonds, having determined that the amount is needed to supply working capital.

**Chicago & Milwaukee Electric Railroad, Highwood, Ill.**—Judges Baker, Seaman and Mack, sitting in the United States Circuit Court of Appeals, have affirmed the decree of United States Judge Geiger, entered at Milwaukee on March 24, 1914, for the sale of the Chicago & Milwaukee Electric Railroad. Fayette S. Munro, receiver of the Republic Construction Company, appointed by Judge Landis of the Federal Court on March 9, 1908, has been discharged on the filing of his report under order of March 6, 1912, for turning over \$30,000 and all assets to W. O. Johnson, receiver of Chicago & Milwaukee Electric Railroad, in compliance of a motion of the latter company for an accounting.

**Clear Lake Railroad, Lakeport, Cal.**—The Railroad Commission of California has authorized the Clear Lake Railroad to issue 750 shares of its common capital stock at a par value of \$100 a share and \$500,000 in first mortgage 6 per cent bonds. The funds are to be applied to the construction of the new railroad between Hopland and Lakeport, which will be approximately 23½ miles long. Of the stock authorized, \$50,000 is to be sold at par and \$25,000 is to be exchanged for certain lake-front property at Clear Lake of the Yolo Water & Power Company.

**Columbus Railway, Power & Light Company, Columbus, Ohio.**—The Columbus Railway, Power & Light Company has called a special meeting of the stockholders for June 29 at Columbus, Ohio, to authorize an issue of \$3,145,000 of 4 per cent prior preference stock. New stock is to be issued to take up and retire in whole or in part, with the consent of the bondholders, the \$3,145,000 of outstanding first consolidated mortgage forty-year 4 per cent bonds of the Columbus Railway due on Oct. 1, 1939. Approval also will be asked of an issue of \$450,000 series "A" 6 per cent preferred stock to take up and retire \$450,000 of 6 per cent first mortgage bonds of the Columbus Electric Company. The stockholders will be asked to approve an increase in the capital stock of the Columbus Railway, Light & Power Company from \$11,550,000 to \$15,145,000, including the above issue of prior preference 4 per cent stock and 6 per cent series "A" preferred stock. Stockholders also will be asked to approve an issue of first and refunding sinking fund 5 per cent bonds of an authorized amount not to exceed \$25,000,000.

**Detroit & Port Huron Shore Line Railway, Detroit, Mich.**—Eversz & Company, Chicago, and the First & Old Detroit National Bank, Detroit, are offering at 92½ and interest, to net 5½ per cent, \$908,000 of first mortgage 5 per cent gold bonds of the Detroit & Port Huron Shore Line Railway of 1900, due on Jan. 1, 1950, without option of prior payment. The bankers say that \$305,000 of these bonds have been purchased from the treasury of the Detroit United Railway and the balance, namely \$603,000, refund divisional bonds maturing on or before May 1, 1916. This closes the mortgage of \$2,500,000 and will make the bonds a first lien on 113.69 miles of electric railway from Detroit via Mt. Clemens to Port Huron at less than \$22,000 per mile. The entire capital stock of the company was acquired by the Detroit United Railway at a cost of \$1,436,728, and during the past six years \$650,482 has been spent on the property, not including important improvements charged to maintenance, which last year amounted to about 30 per cent of the gross earnings.

**Georgia Railway & Power Company, Atlanta, Ga.**—The Railroad Commission of Georgia has issued an order granting the application of the Georgia Railway & Power Company for authority to execute a new mortgage to secure the \$30,000,000 of bonds authorized by the commission in 1912, and allowing the petition of the company for authority to increase the first instalment of the bonds to be issued from \$12,400,000 to \$12,917,000. The remainder of the \$30,000,000 issue is to be held by the trustee uncertified and undelivered pending future approval by the commission. The Fidelity Trust Company, as trustee, is ordered to certify and deliver to the Georgia Railway & Power Company bonds for the following purposes: \$365,000 to reimburse the treasury of the company for expenditures made in the acquisition and construction of the Stone Mountain Railway; \$8,865,000 to cancel a \$10,000,000 bond issue of the Georgia Power Company secured by mortgage to the Central Trust Company, New York; \$1,135,000 to cancel a bond issue of the Blue Ridge Electric Company of \$1,370,000

secured by mortgage to the Knickerbocker Trust Company, New York; \$1,367,000 to cancel a bond issue of the Atlanta Water & Electric Company, secured by mortgage to the Knickerbocker Trust Company; \$550,000 to cancel a bond issue of the Savannah River Power Company, secured by mortgage to the Knickerbocker Trust Company; \$650,000 to reimburse the company's treasury for expenditures for construction of power plants and substations and the purchase of equipment between Jan. 4, 1912, and April 1, 1914. Drexel & Company, Philadelphia, Pa., announce that the syndicate formed by them to underwrite \$6,860,000 of first and refunding mortgage 5 per cent forty-year sinking fund gold bonds of the Georgia Railway & Power Company due on April 1, 1954, has been closed, all the bonds having been sold.

**Glendale & Eagle Rock Railway, Glendale, Cal.**—The Railroad Commission of California has approved the trust deed by which the Glendale & Eagle Rock Railway secured the payment of 6 per cent first mortgage bonds in the sum of \$50,000.

**Idaho Railway, Light & Power Company, Boise, Idaho.**—O. G. F. Markhus, receiver of the Idaho Railway Light & Power Company, has filed at Boise, for the inspection of all creditors and others interested, his report approving and allowing certain claims as expenses of operation and supply accounts incurred in the operation of the company within six months prior to the appointment of the receiver and disallowing other claims so presented. All creditors are notified to file any objection that they may have with the court on or before June 13 next, as a hearing thereon is to be had on June 15.

**International Railway, Buffalo, N. Y.**—The Public Service Commission of the Second District of New York has authorized the International Railway to issue \$387,000 of capital stock to be sold at not less than par, the proceeds to be used to reimburse the treasury of the company for expenditures from income from July 31, 1912, to May 1, 1914.

**Maryland Electric Railways, Baltimore, Md.**—The Maryland Electric Railways has applied to the Maryland Public Service Commission for permission to sell 489 bonds secured by a mortgage deed of trust to the Mercantile Trust & Deposit Company, Baltimore, Md., dated Sept. 15, 1906. It is stated that \$443,597 of the proceeds will be used for the purchase of new cars; \$4,914 for car heaters and \$20,490 for a rotary converter.

**New York (N. Y.) Railways.**—Upon an opinion rendered by Commissioner Milo R. Maltbie, the Public Service Commission for the First District has ordered the New York Railways to restore to its reserve for injury and damage claims the sum of \$33,984. In its last report for 1913 the company showed the transfer of this amount from the reserve account to the surplus account, covering a prior period. The commission decided that while the company could fix the amount of such reserve, it had no right to transfer any amount back to surplus until all claims for the period had been liquidated.

**San Francisco-Oakland Terminal Railways, Oakland, Cal.**—Application has been made by the San Francisco-Oakland Terminal Railways to the Railroad Commission of California for permission to issue \$10,000,000 of 5 per cent general and refunding mortgage bonds recently authorized by the stockholders. The applicant, it is stated, has procured underwriting contracts for the sale of \$5,125,000 and upwards of its bonds by responsible banking institutions at 80 per cent of their par value. Authorization is sought for the sale of an additional \$2,500,000 of the bonds at not less than 80 per cent, and the remaining \$2,500,000 at not less than 85 per cent of the par value. Of a floating indebtedness of \$4,600,000 in excess of the bonded indebtedness, sums aggregating \$3,600,000 are covered by securities with an estimated value of \$9,000,000. This includes \$5,000,000 of the first-mortgage bonds of the Oakland Terminal Company and all its capital stock, pledged for the repayment of a loan of \$1,100,000 due to the Anglo-California Trust Company as trustee. In addition to paying off the floating indebtedness it is proposed to make improvements and betterments at a total cost of \$2,400,000. The company has also asked the Railroad Commission for permission to change its name to the California Railways Company. The present

name, San Francisco-Oakland Terminal Railways, is considered too cumbersome.

**Twenty-third Street Railway, New York, N. Y.**—The Public Service Commission for the First District has granted the application of the Twenty-third Street Railway for the execution of a mortgage for \$1,500,000 and the issuance of fifty-year 5 per cent bonds in the same amount under such mortgage. The proceeds of the bonds are to be used to liquidate notes made to the Mercantile Trust Company as trustee in 1907.

**Waycross Street & Suburban Railway, Waycross, Ga.**—H. H. Burnet, auditor of the Waycross Street & Suburban Railway, has been appointed receiver of the company on the application of the Waycross Savings & Trust Company, trustee of the mortgage securing \$30,000 in notes, interest on which is in default.

**Dividends Declared**

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1½ per cent, preferred.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Frankford & Southwork Passenger Railway, Philadelphia, Pa., quarterly, \$4.50.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

Massachusetts Electric Companies, Boston, Mass., \$2, preferred.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, \$3.

Virginia Railway & Power Company, Richmond, Va., 3 per cent, preferred.

**ELECTRIC RAILWAY MONTHLY EARNINGS**

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE.		Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus	
1m., Apr., '14	'14	\$56,594	*\$25,931	\$30,663	\$17,541	\$13,122	
1 " " '13	'13	57,448	*27,554	29,894	17,130	12,764	
12 " " '14	'14	775,456	*352,822	422,634	208,192	214,442	
12 " " '13	'13	730,006	*330,172	399,834	203,589	196,245	
COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO.		1m., Apr., '14	\$248,748	*\$154,085	\$94,663	\$44,615	\$50,048
GRAND RAPIDS (MICH.) RAILWAY		1m., Apr., '14	\$101,454	*\$75,925	\$25,529	\$13,537	\$11,992
1 " " '13	'13	100,665	*60,865	39,800	15,010	24,790	
12 " " '14	'14	1,300,544	*834,315	466,229	161,446	304,783	
12 " " '13	'13	1,260,986	*724,134	536,852	176,223	360,629	
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.		1m., Apr., '14	\$3,057,444	\$1,086,110	\$1,971,334	\$1,066,594	\$904,740
1 " " '13	'13	2,905,673	1,132,403	1,773,270	1,101,262	622,008	
10 " " '14	'14	28,353,265	10,737,668	17,615,597	11,034,450	6,581,147	
10 " " '13	'13	27,421,467	11,011,267	16,410,200	10,980,890	5,429,310	
LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.		1m., Apr., '14	\$137,275	\$69,693	\$67,582	\$56,906	\$10,676
1 " " '13	'13	124,493	66,969	57,524	45,818	11,706	
12 " " '14	'14	1,790,096	892,752	897,344	632,643	264,700	
12 " " '13	'13	1,619,396	806,037	813,358	526,906	286,452	
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE.		1m., Apr., '14	\$49,773	*\$37,748	\$12,025	\$15,567	\$3,542
1 " " '13	'13	49,274	*32,424	16,850	14,659	2,191	
12 " " '14	'14	674,730	*451,953	222,777	183,115	39,662	
12 " " '13	'13	641,473	*393,033	248,440	173,508	74,932	
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO.		1m., Apr., '14	\$287,718	\$173,322	\$114,397	\$50,331	\$64,066
1 " " '13	'13	238,546	154,621	83,926	45,214	38,712	
4 " " '14	'14	1,080,884	668,302	412,582	200,155	212,427	
4 " " '13	'13	925,727	582,406	343,321	180,296	163,025	
PORTLAND (MAINE) RAILROAD		1m., Apr., '14	\$77,306	*\$50,147	\$27,159	\$21,435	\$5,724
1 " " '13	'13	74,793	*53,209	16,584	10,298	6,286	
12 " " '14	'14	1,039,980	*658,453	381,527	229,184	152,343	
12 " " '13	'13	1,001,573	*702,603	298,970	123,472	175,498	
PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.		1m., Apr., '14	\$533,973	*\$286,989	\$246,984	\$176,595	\$70,389
1 " " '13	'13	546,231	*273,458	272,773	161,730	111,043	
12 " " '14	'14	6,751,158	*3,335,666	3,415,492	2,082,284	1,333,208	
12 " " '13	'13	6,691,264	*3,291,334	3,399,930	1,815,505	1,584,425	

\*Includes taxes.

# Traffic and Transportation

## New Brooklyn Transfer System

In announcing to the public the new transfer system, of which brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of May 30, page 1233, the Brooklyn (N. Y.) Rapid Transit Company carried a large display of advertisement in all the principal newspapers of Brooklyn in part as follows:

"In proceeding, through the various operating companies, to carry out the enlarged transfer plan, we wish to call attention to several facts which may pertinently be considered in connection with it.

"The new plan increases the total number of transfer points in the territory in which the surface railroad companies of the Brooklyn Rapid Transit System operate, from 721 to 1008.

"The Public Service Commission worked out this increase on the general theory of enabling a person to ride from any given locality on the surface lines of the system to any other locality on those lines for 5 cents (excluding the established 10-cent routes to Flushing, North Beach and Coney Island).

"This theory involved not only the establishment of one transfer on a cash fare at every point where two surface car lines intersect, but, in the opinion of the commission, the establishment of many so-called additional 'feeder privileges,' whereby in some instances four transfers are given for a cash fare, permitting five different rides.

"Unless the companies wished to institute litigation which would be long and tedious, they were forced to accept this more than liberal multiplication of rides for one fare, although they feel that it should not have been insisted upon as an additional exaction under a plan which granted initial transfers at practically every point of intersection.

"In spite of the sweeping character of its order, the commission has, however, done the companies the justice of recognizing frankly the vitality of the eighth commandment—'Thou Shalt Not Steal.' It has in certain instances restricted the transfer privilege to a single direction at certain streets, instead of compelling transfers in both directions, because the latter method would open the door to extensive 'loop the loop' riding.

"'Loop the loop' riding means the pleasant process of riding to a given destination, getting a transfer, doing your business, and riding back home on some other line, using your transfer to avoid paying another fare. Of course, the railroad companies cannot afford to submit to that sort of cheating, and no honest persons, including the Public Service Commission, defend the practice or justify the opportunity.

"These requirements and a few others make the new system a complicated one at best—and quite as difficult for the companies to enforce as for the public to understand.

"To be sure, it is not as complicated as the present system, and a public which has become accustomed to the present system should not have great difficulty in mastering the new system.

"But for a time much good-natured asking and giving of explanations will be needed. We are instructing our conductors to help as much as they can in this matter, and we ask our patrons to do their share.

"One thing it is very important to remember:

"Cash transfers—the yellow and the green ones—will be the ones you use in the great majority of cases. Every cash transfer is good for a single additional ride in either direction on any intersecting street, except the streets named on the back of the ticket.

"As to these excepted streets named on the back of the ticket, some of them are streets where additional privileges are granted under the first exception to the general principle of a single transfer without retransfer, and some of them are streets where transfer privileges are restricted out of respect for the eighth commandment.

"It will take a little time to get accustomed to looking this up on the back of your ticket, but if you will do so, the transfer system will be fairly simple for yourself and everyone else, for the other kinds of ticket are mostly for special uses and not likely to be misunderstood.

"We have made the details of the transfer plan as simple as we could, but we need your help in making it work smoothly.

"We don't know just what the effect is going to be on our revenues.

"To-day we receive 3.74 cents on the average for every passenger we carry on the entire system, and about 3.20 cents on the surface lines. The difference between that return and a full 5 cents per passenger is largely accounted for by the transfer system.

"If this average return per passenger be reduced much further it will seriously threaten our ability to render our present service, to say nothing of our ability to improve it.

"This was why we reserved our legal rights in consenting to try the new transfer order, so that we might contest it if we found our revenues were dangerously affected. We hope such will not be the case, but if it should come, we feel that you will hold good service superior to cheap service, and will support us on the facts as disclosed.

"You will discover many more transfer combinations than those which we have mentioned as you become familiar with the system. We want you to do so, because in so doing you will be co-operating to equalize traffic and thereby to relieve the overcrowding on many of the routes now badly congested.

"This means money, time and comfort for you—and at least some comfort for us. Equalization of and stimulus to car-riding will be our only offsets to the tremendous extension of transfer riding which is sure to follow the creation of 287 new transfer points.

"We have sometimes remarked on the community of our interests with those of the people we serve. The transfer proposition is no exception to this principle."

**Los Angeles Transfer Problem.**—President Wright of the Board of Public Utilities of Los Angeles has sent to the officials of the Pacific Electric Railway and the Los Angeles Railway letters asking for suggestions from the companies in regard to proposed modifications of the present transfer systems.

**Civic Line and Bus Extensions in Toronto.**—According to Comptroller McCarthy of Toronto, Ont., the citizens will be asked before the summer is over to vote on a by-law to authorize the city to raise \$1,000,000 to be expended on motor buses and extensions of the civic railway now operated by the city.

**Fine for Abusing Police Privilege.**—A fine is provided for policemen and firemen of Kansas City, Mo., who loan their badges, by an ordinance recently passed by the City Council. It was explained that many policemen and firemen turned their badges over to friends, who rode free of charge by displaying them. A maximum fine of \$100 is provided by the ordinance, which was passed at the instance of receivers for the Metropolitan Street Railway.

**New Freight Terminals at East St. Louis.**—The new freight terminal of the Illinois Traction System at East St. Louis, Ill., is now nearly completed and will soon be prepared to care for the handling of fresh meat shipments from St. Louis to northern points on the Illinois Traction System and connecting lines. The new service will give Springfield a ten-hour meat supply from St. Louis so that dealers will be able to handle meats more satisfactorily in the summer.

**New York Subway Advertising Privilege Contract.**—The contract which the Interborough Rapid Transit Company, New York, wishes to award to Artemus Ward, as the successor of Ward & Gow, for advertising and news-stand privileges on both the old and new subways and elevated lines has been put over by the Public Service Commission for final consideration on June 12. The contract will run for fifteen years from Jan. 1 last, and calls in that period for a payment to the company of \$11,000,000.

**Pittsburgh Accident Fakir Pleads Guilty.**—James Warner, whose apprehension by the Pittsburgh (Pa.) Railway was noted in the *ELECTRIC RAILWAY JOURNAL* of May 16, pleaded guilty to perjury in the criminal court in Pittsburgh on May 21 and was paroled for one year. Warner was arrested after he had failed to convince a jury in common pleas court that he was entitled to \$5,000 damages

from the Pittsburgh Railways for alleged injuries. He confessed to the court that he had sought to deceive the jury and had sworn falsely concerning his supposed injuries. The company's lawyers were willing that Warner be paroled after his exposure and confession.

**Larger Vestibules on Detroit Interurban Cars.**—The matter of standardizing motormen's vestibules on interurban cars of the Detroit (Mich.) United Railway was one of the principal questions for consideration at the May meeting of the general safety board. It was shown that representatives of every line except the Rapid Railway preferred the larger vestibule, and it was decided that all future changes would be toward the construction of the larger vestibule, except as applied to the Rapid Railway, where the smaller vestibule is generally favored by the men operating the cars. Among other suggestions offered were that new men in substations be put through occasional examinations in the handling of high-tension switches; that superintendents and roadmasters be made permanent members of district safety boards, and that spare headlights be maintained at substations.

**Safety First Emblems for Interurban Employees.**—The Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has issued to the forty members of its committee handsome gold buttons to be worn in lapels as an emblem of the movement. On the edge of the buttons are the words, "safety first," in gold on a blue background. The center is white, carrying in blue, gold and red, a block signal and a diagram showing the route of the two divisions of the company. Less expensive buttons will be distributed among the other employees of the company. The company holds meetings of its safety first committee about every two months. The most recent was at Dearborn on June 3. The buttons distributed recently by the Metropolitan Street Railway, Kansas City, and the Kansas City, Clay County & St. Joseph Railway, were furnished by the Whitehead & Hoag Company, Newark, N. J.

**Rate Hearing Before Missouri Commission.**—John M. Olin, Madison, Wis., has been retained by the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., as its attorney in future commutation hearings. The electric railway has completed its physical valuation at a cost of about \$5,000. Mr. Olin will devote his energies to the intangible valuation. His first appearance for the company was at Kansas City on June 3, when the Missouri Public Utilities Commission heard evidence in requests for the establishment of commutation rates by the company. The physical valuation was made by Sloane, Huddle, Fustel & Freeman. The Kansas City, Clay County & St. Joseph Railway will shortly issue a joint tariff with the Chicago & Great Western Railway regarding grain rates from Kansas City to St. Joseph, Mo. Both companies have hitherto published separate tariffs.

**Photographic Contest by Twin City Lines.**—The Twin City Lines at Minneapolis and St. Paul have announced the photographic contest for \$100 in cash prizes. The contest is being held under the guidance of A. W. Warnock, general passenger agent. A newspaper announcement of it occupies a space 6½ in. wide x 12 in. high. A list of twenty-six scenic features located on the various routes of the railroad system is displayed. The individual prizes range from a first prize of \$25 down to nine minimum prizes of \$1 each. Some of the conditions necessary for fulfillment are that all pictures must be new and must be taken between May 28 and July 5. The pictures may be of any size, and any number may be submitted. The announcement is concluded as follows: "This is simply a contest to encourage the taking of pictures during the month of June, when the Twin Cities are at their best for picture making, and to bring forth new material with which to advertise the Twin Cities."

**Librarian on the Interurban as an Educator.**—In her recent annual report to the city Rosa Leeper, librarian at Dallas, Tex., comments as follows on the influence of the interurban railway as an educator: "The influence of the interurban railroads on the life of the city is shown at the library, both in the circulation and the reference work. When the rules for the government of the library were made in 1901, the distance limit set for borrowers was 3½ miles from the post-office. Later this was changed to a radius of

10 miles from the post-office, thus extending library privileges to more than a third of the county. During the past year we have had several persons ask for further extension, giving as a reason that they had moved out on the interurban beyond the 10-mile limit, though still doing business in Dallas. In the reference department Saturday morning during the school term seldom fails to bring students from the surrounding towns, anywhere within a 70-mile radius, for debate and other reference work."

**New Seattle-Tacoma Fare Schedule Filed.**—The Puget Sound Electric Railway filed recently with the Public Service Commission, experimental passenger tariff No. 6, naming passenger rates, which were to be placed in force on June 1. In general the rates will be 2 cents per mile. For the benefit of regular riders commutation tickets will be sold at a reduction of 30 per cent from regular rates, in books containing twenty round-trip tickets—good for either husband or wife or both at one time, limited to sixty days. Ticket books will also be placed on sale good for children attending free public schools, at one-half the regular tariff rates, good between the hours of 6 a. m. and 6 p. m. on school days during the school year. The rate between Tacoma and Seattle will remain at \$1.25. The striking changes are on the north end of the line near Seattle. The decision of the State Public Service Commission of Washington permitting the company to file a new schedule of passenger rates was referred to in the ELECTRIC RAILWAY JOURNAL of May 23, page 1174.

**Securing Stations in Novel Way.**—The Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has put into effect an unusual plan for securing stations along the route, which has had good results and served to stimulate traffic. No less than five men have been accorded the privilege of erecting depots and storerooms on the company's right-of-way, at points where no agent has been maintained in the past. In consideration for the expenditure by each man the company has appointed him an agent, allowing each a percentage of outgoing business, with a guarantee of \$10 monthly. The average size of the depots is 62 ft. by 22 ft., with a platform 70 ft. in length. The average cost of the buildings is \$1,600. The definite income for the builder on the investment of \$1,600 is \$10 monthly or \$120 annually, about 8 per cent on his investment. His chief income, despite the fact that he usually runs well above the \$10 mark on tickets and freight, is derived from the sale of fruit, newspapers, periodicals and similar lines to passengers or near-by residents. The stations are built on the right-of-way of the company and eventually may be removed to make room for double-tracking or additional switches. The builders, however, have five-year leases, with an option of five more, if mutually agreeable.

**Northampton Wage Award.**—The arbitration board on wages of the employees of the Northampton Street Railway, which comprised Thomas A. McDonnell, chairman; T. G. Spalding, representing the company, and Martin J. Hennessey, representing the men, has made its award, which covers a period of from June 1, 1913, to June 1, 1914. The arbitration was asked for nearly a year ago, and it was then agreed that the finding would cover a period beginning June 1 of last year, and that the men should be entitled to back pay beginning at that time, should the finding of the board show increases of wages. The board does award small increases of wages to conductors and motormen, but, on other points, finds for the company. It makes no change in the arrangement which compels the men to wait until their sixth year of service before becoming entitled to the maximum wages. It establishes no daily rate of pay, but places the wage scale strictly on an hourly rate for actual platform service. It finds that no tangible evidence was given concerning the wages of employees other than motormen and conductors, and makes no changes in the wages of other employees. It finds that cost of living increased up to June 1, 1913, but has decreased since that time. The hourly wages of motormen and conductors are increased in the finding as follows: First year, from 21 cents to 23 cents; second year, 22½ cents to 24 cents; third year, 23 cents to 25 cents; fourth year, 24 cents to 26 cents; fifth year, 24½ cents to 27 cents; sixth year, 26 cents to 28 cents. The carmen asked for \$2.50 a day for the first six months, \$2.75 for the second six months and \$3 thereafter.

## Personal Mention

**Mr. A. L. Valentine**, superintendent of public utilities of Seattle, Wash., is in charge of the operation of the municipal electric railway which was placed in operation in Seattle recently.

**Mr. E. H. Odell** has resigned as secretary-treasurer of the Pacific Claim Agents' Association, Seattle, Wash., on account of ill health. He has been succeeded by Mr. T. N. Henry, as noted elsewhere in this column.

**Mr. E. E. Lillie**, superintendent of the Spokane & Inland Empire Railroad, Portland, Ore., has had his jurisdiction extended to cover the traction division, vice Mr. F. C. Farr, who has resigned to engage in other business.

**Mr. B. C. Edgar**, assistant general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio, has resigned to accept the position of general superintendent of the Nashville Railway & Light Company, Nashville, Tenn.

**Mr. W. C. Campbell** has been appointed assistant general superintendent of the Columbus Railway, Power & Light Company, Columbus, Ohio, to succeed Mr. B. C. Edgar, who has become connected with the Nashville Railway & Light Company, Nashville, Tenn.

**Mr. P. L. Saltonstall**, president of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., has been elected a member of the executive board of the company to succeed Mr. Chauncey Eldridge, who has resigned from Tucker, Anthony & Company, as noted elsewhere in this column.

**Mr. Charles Craigmile** has been appointed assistant superintendent of the Lake Shore & Northern Division of the Empire United Railways, Syracuse, N. Y., and will report to Mr. W. F. Sheehan, superintendent. Mr. Craigmile was formerly dispatcher of the Sheboygan Railway & Electric Company, Sheboygan, Wis.

**Mr. J. P. H. de Windt**, who has been assistant to the president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., will be elected vice-president and general manager of the company, or resident operating head, Mr. J. S. Pevear, the new president, continuing his headquarters at New Orleans.

**Mr. J. S. Pevear**, vice-president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., and president of the New Orleans Railway & Light Company, New Orleans, La., will be the new president of the Birmingham Railway, Light & Power Company, succeeding Mr. A. H. Ford, whose appointment to the Cumberland County Power & Light Company, Portland, Me., is noted elsewhere in this column.

**Mr. Theodore P. Shonts**, president of the Interborough-Metropolitan Company, president of the Interborough Rapid Transit Company and president of the New York (N. Y.) Railways, had the honorary degree of Doctor of Laws conferred upon him by the Ohio Northern University at Ada, Ohio, on May 28. Mr. Shonts was graduated from Monmouth College, Monmouth, Ill. He studied law and practised for a time before he entered railroad work.

**Mr. John G. Tobin** has been appointed superintendent of the Gary & Southern Traction Company, Gary, Ind., to succeed Mr. T. P. Clay, resigned. Mr. Tobin began his railway career with the Cleveland (Ohio) Railway, which he served in the mechanical department for six years. In January, 1912, he accepted a position with the Gary & Southern Traction Company in charge of substations and rolling stock, which position he held until his recent appointment as superintendent of the property.

**Mr. W. K. Loos**, who has been appointed superintendent of the Reading Division of the Reading Transit & Light Company, Reading, Pa., entered electric railway work with the Philadelphia (Pa.) Rapid Transit Company as a motor-man, in which capacity he served for five years. He was next connected with the Philadelphia & Reading Railway as storekeeper for five years. He then entered the service of the Oley Valley division of the Reading Transit & Light Company as a conductor and four years later was appointed

a street inspector. On May 1 he was advanced to the position of superintendent of the Reading Division of the company.

**Mr. William B. Poland**, vice-president and chief engineer of the Philippine Railway, who has been in charge of the construction and operation of the company's lines for a number of years, has left the Philippines to return to the United States probably by way of Australia, Valparaiso, and the Trans-Andean line to Buenos Aires. His address is care of J. G. White & Company, Inc., New York. Construction has been finished, the operation systematized and industrial and agricultural development work along the company's lines in Cebu and Panay organized. It is not expected that Mr. Poland will return to the islands, in which case the property will be left under the management in the Philippines of Mr. R. R. Hancock, at present general superintendent at Iloilo, P. I. This line is a steam railroad.

**Mr. Joseph Johnson**, formerly fire commissioner of New York, has been appointed chief of the transportation bureau of the Public Service Commission for the First District of New York. Mr. Johnson was born at Griffin, Ga. He was educated at St. Mary's College, Belmont, N. C., and received the degree of A.M. from the University of Alabama. He was city editor of the *Atlanta Journal* in 1896 and served on the staff of the *New York American* from 1897 to 1901. He was also war correspondent of the *New York American* during the Spanish-American War. He was with the *New York World* from 1901 to 1903. From 1906 to 1910 he served under Comptroller Hermann A. Metz of New York. He was deputy fire commissioner of New York from 1910 to 1912 and fire commissioner under Mayor Gaynor from 1912 to 1914.

**Mr. Chauncey Eldridge**, one of the advisory committee of three under whose supervision the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., was built by the Wyandotte Construction Company, has resigned from Tucker, Anthony & Company to become connected with a wireless telegraph company at San Francisco, Cal. Mr. Eldridge has been with Tucker, Anthony & Company about thirteen years and assisted in the construction of the Canton-Akron lines, the Columbus, Buckeye Lake & Newark Railway, the Columbus, Newark & Zanesville Railway, the Mesaba Railway, the Hartford & Springfield Street Railway, the Hartford, Rockville & Manchester Tramway and numerous water works. He was a member of the executive board of the Kansas City, Clay County & St. Joseph Railway, but has now been succeeded on the board by Mr. P. L. Saltonstall, the president of the company.

**Mr. Joseph O'Hara**, who has been superintendent of transportation of the Springfield (Ill.) Consolidated Railway since Dec. 1, 1911, has been appointed general manager of the company. Mr. O'Hara was formerly general manager of the Chicago, Aurora & De Kalb Railway, Aurora, Ill. Before becoming connected with that company he was superintendent of the Illinois Valley Railroad, La Salle, Ill. He served in various capacities with the Grand Rapids (Mich.) Railroad for five years and was previously connected with the Père Marquette Railroad for two years, and as superintendent of the Eastern Ohio Traction Company, Cleveland, Ohio, for four years. Mr. O'Hara also was superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Chicago, Ill., from August, 1903, to October, 1907, when he resigned to become superintendent of transportation of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C. He resigned from the Washington, Baltimore & Annapolis Electric Railway on June 1, 1908, to become connected with the Illinois Valley Railroad.

**Mr. T. N. Henry**, who has recently been appointed secretary-treasurer of the Pacific Claim Agents' Association, Seattle, Wash., to succeed Mr. E. H. Odell, was born in Missouri. He was graduated from a normal school in 1887 at the age of nineteen, and engaged in school work in his native State for a year. In 1888 he located at Olympia, Wash. He taught in the public schools of Olympia and the county schools of Thurston County, in which Olympia is situated, until 1894. He was then elected county superintendent of common schools, in which capacity he served until 1897. During 1897 and 1898 he was principal of the

Ward school at Olympia. In 1898 he was re-elected county superintendent of the common schools and was again re-elected to that position in 1900. From 1902 to 1904 he served as chairman and campaign manager of the Republican County Committee of Thurston County. From 1901 to 1903 he was editor and publisher of a school journal. In 1904 he became city editor of the *Morning Olympian*, Olympia, Wash. From 1905 to 1906 Mr. Henry represented the textbook publishers before the city and county text-book commissions of Washington. From 1907 to 1913 he was postmaster at Prosser, Wash. During his incumbency at the office of postmaster he was in 1910-11 president of the Prosser Commercial Club, secretary of the Washington State Horticultural Association and compiler and editor of that association's year book for that year. From 1910 to 1913 he also served as a member of the Washington State Fair Commission under appointment by the Governor of the State. In January, 1914, Mr. Henry was appointed acting secretary-treasurer of the Pacific Claim Agent's Association and acting secretary of the Pacific Claim Agents' Index Bureau. Mr. Henry was the author of the State compulsory education law enacted by the Legislature of 1903, of the Washington State law providing for union high schools and of the State law providing for a system of State examinations and certification of students completing the grammar school course in Washington.

Mr. A. H. Ford, who, as previously announced in the *ELECTRIC RAILWAY JOURNAL*, has been appointed vice-president and general manager of the Cumberland County Power & Light Company, Portland,

Maine, was connected with steam railroads in Louisville, Ky., prior to 1893, in the accounting and treasury departments. In 1893 he entered street railway work in New Orleans as assistant secretary and treasurer of the New Orleans Traction Company, Ltd., shortly afterward becoming secretary and treasurer of that company. He served in that capacity until April 1, 1900, when he accepted the position of manager of the railway department of the New Orleans & Carrollton Railway & Light Company.

When the properties in New Orleans were merged in 1902 Mr. Ford entered the private banking house of Isidore Newman & Sons, New Orleans, where he remained until July, 1904, when he was transferred to New York as manager of the operating department of Ford, Bacon & Davis, engineers. He continued with Ford, Bacon & Davis in this connection until 1906, when he became president of the American Cities Railway & Light Company, the holding company controlling electric railway and light properties in Birmingham, Ala.; Knoxville and Memphis, Tenn.; Little Rock, Ark., and Houston, Tex. On Sept. 1, 1907, Mr. Ford was transferred to Birmingham as president and general manager of the Birmingham Railway, Light & Power Company, which position he has occupied up to the present time. The Cumberland County Power & Light Company, with which Mr. Ford now becomes connected, operates the local railway system in Portland, several interurban lines and a number of electric light properties.



A. H. Ford

#### OBITUARY

Harris Charles Fahnestock, banker and a director of many corporations, died on June 4 at his home in New York. Mr. Fahnestock was born on Feb. 27, 1835, in Harrisburg, Pa. He was treasurer of the Washington & Georgetown Railroad, the first horse railroad in Washington.

Alexander E. Orr, ex-president of the old Rapid Transit Commission of New York City and one of the most distinguished merchants in the city, died on June 3 in Brooklyn. He was eighty-four years old. Mr. Orr was born in Ireland in 1831, came to this country on a visit in 1850 and in the following year took up his permanent residence in New York.

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

#### RECENT INCORPORATIONS

\*Washington & Lincolnton Railroad, Lincolnton, Ga.—Chartered in Georgia to build a 25-mile interurban railway from Washington to Lincolnton. Capital stock, \$100,000. Incorporators: W. B. Crawford, J. B. Cullars, W. T. Florence, C. H. Ward, C. J. Perryman and W. C. Powell, all of Lincoln County, and J. R. Dyson, W. T. Johnson, K. A. Wilheit, William Wynne, Jr., and Garnett Greene, all of Wilkes County.

\*Georgetown (Ill.) Railroad.—Incorporated in Illinois to build a 3-mile electric railway between Georgetown and the new coal mines which are located 3 miles west of Georgetown. Capital stock, \$50,000. Incorporators: James H. Hewitt, R. Sandusky, George Buchanan, J. R. Dillon, C. E. Pritchard, Samuel Bennett, C. E. Lindley, C. B. Spang, O. P. Clark, W. P. Holaday, H. W. Morris and C. S. Paxton.

\*Springfield (Mass.) Transit Company.—Chartered in Massachusetts to build an electric railway in Springfield. Capital stock, \$250,000. Incorporators: Clinton N. Field, Jenness K. Dexter, Henry J. Perkins and Robert A. Knight.

\*East Linden Electric Railway, Linden, Ohio.—Application for a charter has been made by this company in Ohio to build an electric railway between Columbus, Linden and East Linden, a distance of 4 miles. Capital stock, \$10,000. Officers: Philip B. Gaynor, New York, and Paul H. Kohr, secretary. Robert W. Manley, David S. Gray and Edgar L. Weinland.

Cushing (Okla.) Traction Company.—Application for a charter has been made by this company in Oklahoma to build a 10-mile electric railway from Cushing in an easterly direction to the oil fields. Capital stock, \$50,000. Incorporators: Frank Brown, Independence, Kan.; Roy B. Jones and H. Askins, Cushing. [E. R. J., May 16, '14.]

\*Virginia Blue Ridge Railway, Lynchburg, Va.—Chartered in Virginia to build a 25-mile steam or electric railway in Nelson and Albemarle counties. Capital stock, \$150,000 to \$300,000. Officers: John W. Dwight, Ithaca, president, and J. W. Powell, Canisteo, secretary.

#### FRANCHISES

Globe, Ariz.—The Globe & Miami Traction Company has received a franchise from the Council in Globe. Richard West, Miami, president. [E. R. J., May 9, '14.]

\*Sausalito, Cal.—The Board of Trustees of Sausalito has granted a franchise to T. A. Vance, representing a company, to build a funicular railway to rise to a height of 1000 ft. from the bay front in Sausalito to the summit of the heights.

Fresno, Cal.—The Fresno Interurban Railway has received a franchise from the Board of Supervisors over certain sections of Fresno Avenue in Fresno.

Santa Clara, Cal.—The Peninsula Railway has received a thirty-day extension of time on its franchise in which to complete its line from the corner of Franklin Street and Jefferson Street to the town limits on the Saratoga Road in Santa Clara.

Covington, Ky.—The Union Light, Heat & Power Company has received a franchise from the Council to build an electric line in West Covington.

Holbrook, Mass.—The Bay State Street Railway has received a franchise from the Council in Holbrook for an extension from the Post-office Square into the land east of the Square, where an express office is to be located.

Clarksdale, Miss.—The City Council has refused to grant a twenty-five-year franchise to build an electric railway in Clarksdale. The petition was presented by a number of citizens, but it was thought that the franchise called for too much privilege. This is part of a plan to build an electric railway to connect Lyon, Clarksdale and Friars Point. [E. R. J., May 23, '14.]

**Orange, N. J.**—The Public Service Railway has received a franchise from the Council for the extension of its Central Avenue line through Orange.

**Buffalo, N. Y.**—The International Traction Company has asked the Council for a franchise to build a new line from Military Road through Skillen Street to the city line at O'Neil Street in Buffalo, a distance of about 1 mile.

**Elizabeth City, N. C.**—Thomas J. Markham, Elizabeth City, and associates have received a franchise from the Council in Elizabeth City. This is part of a plan to build an electric line to connect Weeksville, Nixontown, Elizabeth City, South Mills, Deep Creek and Norfolk. [E. R. J., May 30, '14.]

**Wilmington, N. C.**—The Tidewater Power Company has asked the Council for a franchise to extend its lines in Wilmington.

\***Columbus, Ohio.**—The East Linden Electric Railway has asked the Council for a franchise to build an electric line from Leonard Avenue and Taylor Avenue in Columbus north to the village of Linden. Paul H. Kohr, secretary.

**Warren, Ohio.**—The Mahoning & Shenango Railway & Light Company has received a twenty-five-year extension of time on its franchise from the Council in Warren, on condition that the company extend its line to Packard Park, double track a section of Market Street and double track Main Street from Market Street to the Erie station at Warren.

**Thorold, Ont.**—The St. Catharines, Merritton & Thorold Electric Railway has received a franchise from the Council to extend its lines in Thorold to the factory district.

**Scranton, Pa.**—The Scranton Railway has received a fifty-year franchise from the Council for an extension of its Luzerne Street line in Scranton.

**Blaine, Wash.**—The Blaine-Lynden Electric Railway has received a franchise from the Council in Blaine. This company plans to build an electric line between Blaine, Lynden and Bellingham. John J. Pinckney, Blaine, president. [E. R. J., May 9, '14.]

\***Moundville, W. Va.**—J. F. Burley, Moundville, and associates have asked the Council for a franchise to build a belt line electric railway in Moundville.

#### TRACK AND ROADWAY

**Huntsville Railway, Light & Power Company, Huntsville, Ala.**—An extension from the present southwestern terminus of this railway in Huntsville into the town of Merrimack is being built by this company.

**Edmonton (Alta.) Interurban Railway.**—A by-law has been passed authorizing the expenditure of \$168,000 by the City Council on street railway extensions in Edmonton. It is stated that this company is considering plans to build a branch line to Fort Saskatchewan, Alta.

**British Columbia Electric Railway, Vancouver, B. C.**—This company has awarded a contract to the Westminster Iron Works for the erection of an ornamental arched entrance to Central Park. The cost is estimated to be about \$4,000.

**Northern Electric Railway, Chico, Cal.**—Work will be begun at once by this company on its extension, which will provide North Sacramento with an electric line. This first unit will provide 1½ miles of railway through the tract of land of the North Sacramento Land Company from the lines of the Northern Electric Railway to the lines of the Southern Pacific Railway.

**San Francisco, Cal.**—The Board of Public Works has awarded the contract to Eaton & Smith for the construction of the Potrero Avenue municipal railway line on a bid of \$143,767. The construction of the track and conduits is to be completed in 120 days from the date of the signing of the contract. It is expected that the line will be ready for operation early in September when the running of cars on the Van Ness Avenue line, with which it will connect, is to begin.

**Big Four Electric Railway, Tulare, Cal.**—The Railroad Commission has granted authority to this company to issue and sell its capital stock to the amount of \$392,000, on certain conditions. This 45-mile electric railway will connect

Tulare, Visalia, Lindsay and Porterville. [E. R. J., Nov. 22, '13.]

**Washington Railway & Electric Company, Washington, D. C.**—Plans are being considered by this company for an extension on Nichols Avenue, Congress Heights.

**Jacksonville (Fla.) Traction Company.**—Plans are being made by this company to double-track its Main Street line from a point between Twelfth Street and the city limits of Jacksonville.

\***New Smyrna, Fla.**—Plans are being considered to build an electric line between the St. Johns River, either at Enterprise or at Blue Spring Landing, and New Smyrna by way of Lake Helen. There is a good prospect that a sufficient amount of money will be raised to carry the project through.

**Chicago, Peoria & Quincy Traction Company, Quincy, Ill.**—It is planned that work will be begun upon the first section of the new interurban line between Hollis, Ill., and Lewistown, Ill., within the next month. Right-of-way is now being secured and stock sales will be begun soon. The new line, as projected, will pass through six county seats and connect Chicago, Peoria and Quincy. [E. R. J., May 9, '14.]

**Joplin & Pittsburg Railway, Pittsburg, Kan.**—During the next few weeks this company plans to award contracts to build about 2250 ft. of new track to the city park in Pittsburg.

**Shreveport (La.) Traction Company.**—An extension of the Fairfield line in Shreveport to South Highlands is being contemplated by this company.

**Hagerstown & Frederick Railway, Frederick, Md.**—This company, which was recently financed, is considering the construction of lines to Brunswick and Emmitsburg. Toward Brunswick, the line now goes as far as Jefferson, about 6 miles away. In the northern end of the county a spur of the railway reaches to Thurmont, about 7 miles from Emmitsburg.

**Winnipeg (Man.) Electric Railway.**—Plans have been approved for the extension of this company's line from lot 83, St. Norbert, past St. Norbert Station. John H. Kern, Moose Jaw, has been awarded the contract by the Council to build the extension from Winnipeg to Transcona.

**Bay State Street Railway, Boston, Mass.**—This company will extend its tracks on Lynnfield Street about ½ mile, to include the present residential section in Lynn.

**Springfield (Mass.) Street Railway.**—This company is asked to build an extension in Springfield from Maple Street, through Ross Avenue, Elm Street, South Street and Washington Avenue to Charles Street.

**Electric Short Line Railroad, Minneapolis, Minn.**—Officers of this company, which plan to build an electric line southward through eastern South Dakota, as a continuation of a line from Minneapolis to the western section of Minnesota, will visit Flandreau and other cities and towns in South Dakota to make arrangements to have the line extended through this section. The company expects to build to Brookings, and from that city southward to Sioux Falls, and ultimately to Sioux City. The new line south of Brookings will be constructed on what is known as the Stewart grade, which extends into Moody county. From there a new grade will be made to Flandreau and to Sioux Falls. It is believed that as the result of the visit to be made by the officers soon arrangements can be made for the construction of the proposed line to this part of the northwest.

**Kansas City, Ozark & Southern Railway, Ava, Mo.**—Plans are being prepared by this company for an extension south from Ava, through Ozark County.

**City Light & Traction Company, Sedalia, Mo.**—During the next few weeks this company expects to rebuild some of its tracks in Sedalia.

**Meridian Light & Railway Company, Meridian, Miss.**—This company has awarded a contract to Griffin & Company, Meridian, to grade its Twenty-fourth Avenue line in Meridian.

**Public Service Railway, Newark, N. J.**—This company has placed in operation its new crosstown line in Camden.

**Jamestown, Westfield & Northwestern Traction Company, Jamestown, N. Y.**—This company has placed in operation its electric line between Jamestown and Bemus Point.

**New York & Long Island Traction Company, Hempstead, N. Y.**—Work on a new line in Queens will soon be under construction by this company, which will connect its present lines in the Jamaica section with the elevated extension on Liberty Avenue, Jamaica. A certificate of extension was filed recently with the Queens County Clerk. The company will extend a line from the Rockaway Plank Road to Liberty Avenue at Ozone Park, where connection will be made with the new elevated line, and will add a loop on Ocean Avenue.

**New Bern-Ghent Street Railway, New Bern, N. C.**—Plans are being considered by this company for an extension from New Bern into Jones County.

**\*Williston & Northern Electric Railroad, Williston, N. D.**—This company has been organized to build a 60-mile electric railway from Williston north along the west side of the Little Muddy Valley. The following officers were elected: A. H. Brown, president; F. R. Zahl, vice-president; H. W. Braatlien, secretary, and N. N. Landrol, treasurer.

**Ohio Electric Railway, Cincinnati, Ohio.**—Plans are being prepared by this company for the continued use of the present piling bridge for car traffic during the construction of the new bridge in Hamilton.

**Cleveland (Ohio) Electric Railway.**—This company plans to lay, in both renewals and extensions, approximately 29 miles of single track. This construction will include 95-lb., 7-in. T-rail on wood and steel ties with the standard Clark joint.

**Columbus, Marion & Bucyrus Railway, Marion, Ohio.**—During the next few weeks this company will award contracts to build a new entrance into Marion.

**Toronto Suburban Street Railway, Toronto Junction, Ont.**—Plans are being made by this company to extend its Weston-Woodbridge line to Brampton, Ont., to connect with its Lambton to Guelph line just west of Brampton. The Lampton to Guelph line is rapidly approaching completion.

**Dunville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.**—The Clinton Township Council has passed a resolution asking the Hydro-Electric Power Commission of Ontario to take over the incomplete Dunville, Wellandport & Beamsville Electric Railway.

**Hershey (Pa.) Transit Company.**—During the next few weeks this company will award contracts to build 10 miles of new track from Hershey to Elizabethtown.

**South Fork-Portage Railway, Johnstown, Pa.**—This company is completing its roadbed between South Fork and Portage, a distance of  $7\frac{1}{2}$  miles.

**Reading (Pa.) Transit Company.**—Plans are being considered by this company to build a line along Twelfth Street in Reading.

**Rhode Island Company, Providence, R. I.**—Work has been resumed by this company on the new electric line to Chepachet, above Greenville.

**Moose Jaw (Sask.) Electric Railway.**—A. H. Dion, general superintendent of this company has notified the City Council that he had been authorized by the directors to proceed with the extension on Hall Street, for  $\frac{1}{2}$  mile from Main Street in Moose Jaw. The Council passed a resolution calling upon the company to extend the line on Hall Street to Eighteenth Avenue, and along that avenue so as to connect with the line now in operation on Athabasca Street East.

**Carolina Traction Company, Rock Hill, S. C.**—During the next six weeks this company will award contracts to build 2 miles of new track in Rock Hill.

**Sioux Falls (S. D.) Traction System.**—This company is now paving about 2 miles of track in Sioux Falls. In the business district a granite block paving is being laid and granite cement concrete is being laid in the residence section. Special work is being done in the way of crossings, turnouts and side tracks, in preparation for paving.

**Bristol (Tenn.) Traction Company.**—This company is broadening the gage of the Holston Valley Railway and electrifying it. This line extends for a distance of 10 miles

east from Bristol and terminates at Big Creek Park on the Holston River.

**Chattanooga (Tenn.) Railways Company.**—Surveys have been completed, but it has not yet been decided when construction will be begun by this company on its 4-mile electric line between Rossville and Port Oglethorpe. Headquarters: 710 Market Street, Chattanooga, Tenn. E. Reed, general superintendent. [E. R. J., March 22, '13.]

**Texas Traction Company, Dallas, Tex.**—An extension of the Gray's Hill line to the street north of the Sherman Hospital in Sherman is being contemplated by this company.

**\*Mineral Wells Interurban Railway, Fort Worth, Tex.**—Plans are being considered to organize this company to build an electric railway to extend from Fort Worth northwest through Parker County, via Springtown and through the northern section of Palo Pinto County, to Mineral Wells, a distance of 50 miles. Those who are likely to organize this company are: E. E. Baldrige, W. E. Connell, S. Davidson, B. J. Tillar, G. T. Reynolds, J. R. Christal, M. Sansom, John P. King, B. H. Davenport and E. D. Farmer. These men were the directors of the Fort Worth-Denton Interurban Railway.

**Northern Texas Traction Company, Fort Worth, Tex.**—Plans are being considered by this company to build an electric line in Handley.

**Marshall (Tex.) Traction Company.**—During the next six weeks this company plans to rebuild 2400 ft. of track on Washington Avenue in Marshall. An 18-in. concrete roadbed will be laid with 72-in. rails.

**McKinney, Bonham & Paris Interurban Railway, McKinney, Tex.**—Surveys are being made by this company on its 77-mile line between McKinney, Bonham and Paris. L. A. Scott, McKinney, chief engineer. [E. R. J., May 23, '14.]

**San Antonio, San José & Medina Interurban Railway, San Antonio, Tex.**—This company will begin construction at once on its line to connect San Antonio, San José and Kirk. There will be one steel bridge 100 ft. long on the line, and towers for conveying current from the Medina dam to supply San Antonio and other cities will be erected along the right-of-way. [E. R. J., May 23, '14.]

**Ogden (Utah) Rapid Transit Company.**—Plans are being made by this company to begin work at once on its extension from the Hermitage, in Ogden Canyon, to Huntsville. Plans are also contemplated for a line to Logan, Lewistown and Preston, Utah. Several short extensions are being built in Ogden.

**Barre & Montpelier Traction & Power Company, Montpelier, Vt.**—During the next few weeks this company expects to pave a portion of State Street in Montpelier.

**South Richmond & Chesterfield Railway, Richmond, Va.**—Plans are being made to begin the construction of this line from Broad Rock Road and Hull Street, Richmond, to Falling Creek. J. C. Robertson, Richmond, is interested. [E. R. J., April 11, '14.]

**Seattle (Wash.) Municipal Railway.**—The City Council has voted \$500,000 of utility bonds to complete the municipal line in Rainier Valley. Plans for the line have been approved by the Mayor.

**Puget Sound Traction, Light & Power Company, Seattle, Wash.**—Plans are being made by this company to extend its Balland Beach line sixteen blocks in Seattle.

**Charleston (W. Va.) Traction Company.**—It is reported that this company has awarded a contract to the American Bridge Company for a 1500-ton steel bridge to be erected over the Kanawha River in Charleston.

**West Virginia Traction & Electric Company, Wheeling, W. Va.**—The double-tracking of this company's line along the National Road and through Fulton to Glenwood station is contemplated.

**Milwaukee Western Electric Railway, Milwaukee, Wis.**—This company is making all the necessary preliminary arrangements preparatory to beginning construction work on its line between Milwaukee and Fox Lake.

**Chicago & Wisconsin Valley Railroad, Madison, Wis.**—This company has asked the Railroad Commission of Wisconsin for certificates of convenience and necessity to build

an interurban electric railway between Janesville and Madison.

**Sheboygan Railway & Electric Company, Sheboygan, Wis.**—Work has been begun by this company laying new ties and ballasting its line between Sheboygan, Plymouth and Sheboygan Falls.

#### SHOPS AND BUILDINGS

**Bristol & Plainville Tramway Company, Bristol, Conn.**—During the next few weeks this company plans to build an addition to its carhouse in Bristol.

**Southern Iowa Traction Company, Centerville, Ill.**—This company's depot at the corner of Washington Street has been completed and is now ready for occupancy. The building has been remodeled.

**Illinois Traction System, Peoria, Ill.**—J. J. Jobst has begun the work of excavating for the foundation for the new \$400,000 interurban station to be erected by this company on Hamilton Boulevard and Jefferson Street in Peoria. Bidders on the construction for the buildings and train shed have been asked to resubmit their bids. The first bids were not uniform. It is expected that the bids will be resubmitted within a few days and that the contract for the structure will be let in a short time.

**Centerville Light & Traction Company, Centerville, Ia.**—Another improvement found necessary by this company will be an addition, 90 ft. x 60 ft., built on the rear of its carhouse, and a 50 ft. x 60 ft. addition on the front of the present carhouses. A new repair shop will also be added, 90 ft. x 25 ft. The work will be done by B. S. Staley and will be begun at once.

**Metropolitan Street Railway, Kansas City, Mo.**—Plans are being considered to build a new depot in Kansas City.

**Ohio Electric Railway, Cincinnati, Ohio.**—This company is asked to consider plans to build a new passenger station at Fort McKinley.

#### POWER HOUSES AND SUBSTATIONS

**Birmingham Railway, Light & Power Company, Birmingham, Ala.**—This company has awarded a contract to the Alabama Power Company to furnish power for its lines in Birmingham.

**Tampa (Fla.) Electric Company.**—To increase the efficiency of this company's power house, six new boilers will be installed in the West Jackson Street power plant during the summer. A new smokestack will be built, made of radial brick and 200 ft. in height. The improvement will cost approximately \$20,000.

**Centerville Light & Traction Company, Centerville, Ia.**—This company has made arrangements with the Southern Railway & Light Company to furnish the power for its lines in Albia.

**Somerset Traction Company, Skowhegan, Maine.**—This company's new substation in Skowhegan is nearing completion. The structure is of brick and concrete construction and is equipped by the Westinghouse Electric & Manufacturing Company. A 300-kw rotary converter has been installed. All apparatus and supplies have been purchased.

**Bay State Street Railway, Boston, Mass.**—This company will double the capacity of its power plant when the additions and improvements now in process at the Mason Street power house are completed.

**City Light & Traction Company, Sedalia, Mo.**—This company is installing a Le Blanc condenser, cooling tower and Tirrill regulator at its power house in Sedalia.

**Interborough Rapid Transit Company, New York, N. Y.**—Two 4000-kw rotary converters and transformers have been installed in this company's substation at 110th Street and Eighth Avenue, New York, N. Y. The apparatus was ordered from the General Electric Company.

**New York Municipal Railway, Brooklyn, N. Y.**—This company is asking for bids on three 4000-kw, one 3000-kw and three 2000-kw rotary converters, all to include transformers and switchboard apparatus. This new equipment is for its new subway system.

**Columbus, Marion & Bucyrus Railway, Marion, Ohio.**—During the next few weeks this company expects to build a new power house in Marion.

## Manufactures and Supplies

#### ROLLING STOCK

**Warren-Bisbee Railway, Warren, Ariz.**, expects to purchase two double-truck cars.

**Arkansas Northwestern Railroad, Bentonville, Ark.**, has ordered one 70-ft. car from the McKee Motor Car Company.

**Bristol & Plainville Tramway Company, Bristol, Conn.**, expects to purchase two double-truck closed cars within the next few months.

**Minneapolis & Northern Railroad, Minneapolis, Minn.**, has received one 55-ft. gasoline-motor freight-and-express car from the McKee Motor Car Company.

**Minneapolis, St. Paul & Sault Ste. Marie Railway, Minneapolis, Minn.**, has received one 75-ft., 200-hp gasoline-motor car from the McKee Motor Car Company.

**Detroit, Toledo & Ironton Railroad, Detroit, Mich.**, is equipping two 50-ft. cars with storage battery equipment ordered from the Railway Storage Battery Car Company. The storage batteries, with an amp. output of 450 amp., will constitute the heaviest storage battery equipment that has yet been installed in storage battery propelled cars in the United States. The cars will be operated at a train speed of 50 m.p.h. Westinghouse motors, air-brakes and control are provided.

**Cambria & Indiana Railroad, Philadelphia, Pa.**, has ordered one 50-ft. storage-battery car from the Railway Storage Battery Car Company. The car-body, which consists of separate passenger, smoking, baggage and mail compartments, will be built by The J. G. Brill Company. The car will be equipped for both storage-battery and trolley operation; on a certain 5 per cent grade section of the line trolley operation alone will be used. The passenger compartment will provide a seating capacity of fifty persons, the smoking compartment ten persons. The interior finish will be mahogany. Westinghouse 25-hp motors, control and air brakes will be provided.

**New Orleans Railway & Light Company, New Orleans, La.**, has issued through its controlling company, the United Gas & Electric Corporation, New York, N. Y., specifications for fifty 47 ft. 8 in. all-steel maximum-traction truck, pay-as-you-enter, arched-roof cars. The specifications provide for a seating capacity of fifty-five persons; length of car body, 34 ft. 8 in.; wheelbase, 4 ft. 10 in.; distance between truck centers, 22 ft.; height from rail to sills, 29 in.; headlining, Agasote; curtains, Pantasote. There will be eighteen transverse wooden slat seats, two longitudinal seats at each end and one removable platform seat. Double doors will be provided at the rear and single doors at the front of the car. Folding steps will be furnished for both doors; the double door, however, will be operated only at the end of the run. There will be no grab handle, but instead an inside vertical grab stanchion. Cables will be inclosed in channel-shaped ducts running along the center of the roof. Horizontal tubes and stanchions will be installed instead of straps. These cars, it is expected, will be ordered within about a week.

#### TRADE NOTES

**Titan Storage Battery Company, Newark, N. J.**, has appointed W. Crighton Harris as chief engineer. Mr. Harris recently resigned from the engineering firm of Crighton, Harris & Company.

**Acme Supply Company, Chicago, Ill.**, has appointed R. C. Munro to a position with its railroad sales department. Mr. Munro recently resigned as western representative of the Wendell & Macduffie Company.

**Rooke Automatic Register Company, Providence, R. I.**, has received an order to place its system of fare collection on all of the cars of the Elmira Water, Light & Railroad Company, Elmira, New York. More than fifty roads are now using in daily service this system of fare collection.

**Electric Storage Battery Company, Philadelphia, Pa.**, has appointed Nelson B. Hazeltine, formerly Philadelphia district sales manager for the Adams-Bagnall Electric Company, Cleveland, Ohio, to a position in its sales organiza-

tion, with headquarters at the New York office, 100 Broadway.

**Trussed Concrete Steel Company, Detroit, Mich.**, has removed its general sales offices to its plant at Youngstown, Ohio. The publicity department of the company will remain in Detroit. In addition an eastern engineering and selling organization will be established in New York to handle Michigan business.

**Esterline Company, Indianapolis, Ind.**, manufacturer of "Golden Glow" headlights, has widely extended the territory of the E. R. Mason Company, its Eastern representative. Heretofore, the E. R. Mason Company has handled the line in New York only, but beginning with the first of June it will cover in addition the entire New England States, New York; New Jersey, Delaware and eastern Pennsylvania.

**Allgemeine Elektrizitäts Gesellschaft, Berlin, Germany**, has received from the American Museum of Safety the gold medal of the Travellers' Insurance Company, Hartford, Conn., which hitherto has been awarded only to the Pennsylvania Railroad Company and the New York Edison Company. The medal is given in recognition of the Allgemeine Company's achievements in conserving life and limb in its German workshops.

**H. M. Bylesby & Company, Chicago, Ill.**, announce the resignation of R. E. Wilsey, vice-president and manager of the bond department, and F. W. Stearns, vice-president and legal representative of the company. It is reported that Mr. Wilsey will enter the bond business on his return to this country after a trip abroad. W. H. Clarke, formerly assistant manager of the bond department, has been appointed manager of that department.

**Prince-Groff Company, New York, N. Y.**, manufacturing "Pressurlok" water gage systems, the "Wedglok" track drilling system and "Kwikgrip" pipe wrenches, has recently elected a new staff of officers and also moved its general offices to 50 Church street, New York. The new officers are Sherman W. Prince, president; Clarence B. Groff, vice-president, and George W. Steinmetz, treasurer. Charles H. Spotts has been appointed sales manager.

**Edward T. Stotesbury** has retired from the board of directors of the Cambria Steel Company, the vacancy caused by his resignation having been filled by the election of E. Silck, vice-president and general manager. Mr. Stotesbury has also resigned from the board of the Cambria Iron Company, which is controlled by the Cambria Steel Company, and has withdrawn from the executive committee of the board of the Pennsylvania Steel Company.

**Nachod Signal Company, Inc., Philadelphia, Pa.**, has recently fitted up a demonstration room at its offices, 50 Church street, New York, where automatic signals controlled by trolley contactors are shown in operation on miniature track plans, and with moving cars. Electric railway managers may thus get information on signaling most conveniently and in a short time by inspecting this demonstration. The company is showing single-track signals, double-track signals and highway-crossing bells.

**H. W. Johns-Manville Company, New York, N. Y.**, has appointed Allan Wallace as traffic manager with office at the company's headquarters in New York City. Mr. Wallace was formerly connected with the traffic department of the Grand Trunk Railway. He was afterward made assistant to the manager of the Lehigh Valley-Grand Trunk Fast Freight Line, with headquarters at Buffalo, N. Y., and subsequently became general agent of the Grand Trunk Railway, leaving the service of the latter company to enter commercial life in the capacity of traffic manager, later handling railway sales. This company has moved its Duluth office to larger quarters at 327 West First Street.

#### ADVERTISING LITERATURE

**Goldschmidt Thermit Company, New York, N. Y.**, has issued a catalog describing its system of thermit welding for locomotives and railroad shops.

**Brown Hoisting Machinery Company, Cleveland, Ohio**, has issued catalog P describing and illustrating various installations of its overhead hand traveling cranes.

**P. Wall Manufacturing & Supply Company, Pittsburgh, Pa.**, has issued a catalog describing its steel specialties, among which are steel gongs for locomotives, foot, roof and

hood gongs for street railways and galvanized steel oil tanks and waste cans.

**Kindling Machinery Company, Milwaukee, Wis.**, has issued a catalog describing and illustrating its "Squeegee" street washing machine and its sand spreader. The catalog contains reports of successful tests of the street washing machines which were conducted in New York and Washington, D. C.

**Walter A. Zelnicker Supply Company, St. Louis, Mo.**, has issued Bulletin No. 153 listing its special offerings and other used materials, among which are boilers, cranes, crushers, engines, flat and gondola cars, concrete mixers, pipe switches, tracks and trucks, and including an illustrated page on new goods and specialties.

**Esterline Company, Indianapolis, Ind.**, has issued a complete catalog on "Golden Glow" railway headlights. This publication is printed in colors showing the lighting effects obtained with the headlights. The questions of parabolic reflectors, glass parabolas and incandescent bulbs are fully discussed, and headlights adapted for recessed or extended dash, hood-mounting and high power headlights for interurban and electric locomotive service are illustrated and described.

**Babcock & Wilcox, New York, N. Y.**, have issued a bound catalog on the subject of chain grate stokers, which in attractive appearance and general method of compilation constitutes a companion book to the catalog on superheated steam recently issued by them and described in the *ELECTRIC RAILWAY JOURNAL* of May 23, 1914. The stoker catalog includes, among a number of interesting illustrations, views of actual installations of the Commonwealth Edison Company, Public Service Company of Northern Illinois, Pennsylvania Tunnel & Terminal Railroad, Twin City Rapid Transit Company, Chicago Elevated Railway and Louisville Railway.

**Lumber, Tie & Timber Vulcanizing Company, New York, N. Y.**, has issued a catalog describing its method of quickly curing lumber green from the saw. Railroad ties, it is claimed, may be cured by this treatment in six to twelve hours. The treatment consists in loading the lumber direct from the sorting chains on to cars and running the cars into a steel cylinder covered with a magnesia or asbestos covering in order to minimize loss of heat due to radiation, and provided with rapidly closing vacuum-type doors. Owing to the constant pull of the vacuum all cells of the wood are kept normal, thus tending to reduce shrinkage. Further shrinkage is practically eliminated due to the distribution of the chemicals and the elimination of moisture.

**Electric Service Supplies Company, Philadelphia, Pa.**, has issued a folder descriptive of Keystone trolley catchers. The folder, to be distributed in Great Britain, has on its front cover an effective illustration showing a Keystone catcher installed on a single-truck, double-deck car of the type used almost exclusively in London. These folders are being distributed in Great Britain at this time to take advantage of the discussion there regarding the demand made by the car men for either vestibules or wind screens. With either of these placed on the cars now in operation the personal attention which has been given the trolley rope by the conductor or trolley boy would be very much hindered and would necessitate installing trolley catchers to "watch the poles."

**Automatic Coin Wrapping Machine Company, New York, N. Y.**, has issued a catalog describing the Batdorf motor-driven automatic machines for separating, computing, wrapping and packing coin. In the coin wrapping machine the coins are fed into a hopper. The machine then automatically counts the predetermined number of coins for the package; tears off the wrapper from the roll of paper and securely wraps it around the coins; crimps in the ends of the wrapper and while wrapping this package the machine is counting the required number of coins for the next package. This machine counts various denominations of coins at the rate of 350 coins a minute. The coin handling machine automatically counts coins at the rate of 750 per 1000 coins a minute. Among the electric railways which are mentioned in the catalog as using this coin handling system are the Pittsburgh Railways, United Railways, St. Louis, Mo., and Denver City Tramway Company.