

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVII.

NEW YORK, SATURDAY, MARCH 4, 1911

No. 9

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.

CURTIS E. WHITTLESEY, Secretary and Treasurer.

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor.

Associate Editors:

RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.

News Editors:

G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building

CLEVELAND OFFICE.....1015 Schofield Building

PHILADELPHIA OFFICE.....Real Estate Trust Building

EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, \$3.00 per year; Canada, \$4.50 per year; all other countries, \$6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving old as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 copies are printed.

NEW YORK, SATURDAY, MARCH 4, 1911.

CONTENTS.

Consolidation of Prepayment Car Companies.....	359
Cost of Stopping Interurban Cars.....	359
Work of the Block Signal Committee.....	360
The Rate Decision.....	360
The Illinois Electric Railways Association and the Central Electric Railway Association.....	360
Work for the Prevention of Accidents.....	361
London Transit Problems.....	362
Apprenticeship in Electric Railway Shops.....	363
Indianapolis, New Castle & Toledo Electric Railway.....	364
Piece-Work Records in Boston Armature Shop.....	370
Rail Corrugations.....	372
Electric Railway Conditions in France.....	373
Renewals as Defined by the Board of Supervising Engineers, Chicago Traction.....	374
Report of Block Signal Committee to the Indiana Railroad Commission.....	377
Inspection of Railway Material Discussed by New England Street Railway Club.....	378
Talks on Accidents to Employees of the Cleveland, Southwestern & Columbus Railway.....	379
Development of McKinley Lines During 1910.....	381
Single-Phase Railways Abroad.....	382
Atlanta Shop Notes.....	383
Suggested Tieless Roadbed Construction.....	384
Merger of Interests of Pay-As-You-Enter Car Corporation and Pay-Within Car Company.....	384
Pressed Steel Gasoline Track Inspection Car.....	385
Coasting Recorders for Milwaukee.....	385
Recent Turbine Developments and Efficiencies.....	386
Single Truck Pay-As-You-Enter Cars for Quincy, Ill.....	387
Pennsylvania Railroad Orders Nine More Electric Locomotives.....	388
Turn-In Car at Dayton, Ohio.....	388
London Letter.....	389
News of Electric Railways.....	390
Financial and Corporate.....	393
Traffic and Transportation.....	396
Personal Mention.....	398
Construction News.....	400
Manufactures and Supplies.....	403

Consolidation of Prepayment Car Companies

We have already expressed the opinion that the prepayment feature has been the most important improvement which has been introduced in car design since the adoption of electricity for street railway service. For some time after the successful establishment of the pay-as-you-enter plan in Montreal many railway managers in the United States were skeptical as to whether the system would work satisfactorily on their properties. But experience has proved that these fears were unfounded. The consolidation which is being announced this week of the Pay-As-You-Enter and Pay-Within interests unites the two companies which have been the chief, if not the only, commercial exponents of the prepayment feature of car operation in this country. This consolidation was brought about, it is understood, because in developing their systems these companies found that it was impossible for either to make further progress without infringing the patents of the other, and is a natural and logical outcome of the business situation which has faced these companies during the past two years. It should be of benefit to the electric railway industry, because it will combine the strength and experience of both organizations in this important field of car construction.

Cost of Stopping Interurban Cars

The cost of stopping and starting an interurban car is one of the innumerable items of operating expense which are insignificant when isolated but in the aggregate attain large proportions. In a paper on "Automatic Block Signals for Electric Railways," which was printed in a recent issue of the ELECTRIC RAILWAY JOURNAL, W. K. Howe stated that the cost of stopping and starting a 40-ton car from and to 40 m.p.h. was 3 cents. A few years ago a prominent steam railroad signal engineer estimated the cost of stopping and starting a six-car passenger train from and to 45 m.p.h. to be 35 cents, so that the two figures compare very closely when reduced to a common basis. If these costs are correct it is evident that considerable capital expenditure is justifiable on many roads with heavy traffic in order to eliminate unnecessary stops and slow-downs on account of sharp curves or other obstructions. Mr. Howe applies the cost given to a block signal installation and shows that an investment of \$8,750 is warranted by eliminating stops at a single siding for 20 trains in each direction per day. Aside from using the cost as an argument for the expenditure of money to effect a saving, it is worth while to point out that there is no profit in stopping a car twice to pick up and let off a passenger who pays only 5 cents for a short ride when the actual cost of carrying him is 7 cents or more. Most interurban roads have adopted a minimum fare of 10 cents, which is none too much considering the cost of the service given for the shortest ride.

Work of the Block Signal Committee

The data sheet which has been sent out by the joint committee on block signals of the Engineering and Transportation & Traffic Associations gives some indication of the line of investigation which will be pursued during the next few months by this important new committee. The questions to which answers are requested may be divided into two classes: first, those designed to elicit information regarding the operating conditions affecting signal installations, such as speed of cars, braking distance and kind of propulsion current; and, second, those pertaining to existing or contemplated installations of block signals. Three of the members of the joint committee are operating men and three are electrical engineers, but they cannot be expected to supply from their own knowledge of conditions all of the information necessary for drawing up conclusions regarding the signal requirements of electric interurban railways. Data on existing installations of signals should be the best guide for the committee, because many methods and devices which were all right in theory have proved failures in actual practice, and objections which appear paramount on paper often do not materialize. This is more particularly true of the features of signal installations which directly affect the movement of trains, such as the number and location of signals and the method of displaying indications. The electrical details for the most part are comparatively simple to study and judge on their merits. With the co-operation of all member companies which now have block signals of any type in use and with the assistance of manufacturers of signal devices the committee should be able to formulate a code of requisites to be fulfilled by every signal installation, and perhaps in addition a similar code of desirable characteristics covering conditions where the traffic density warrants extra expenditures for more extensive signal protection or greater facility of train movements. If such a code or codes can be drawn up in time for presentation at the convention next October the committee will have accomplished all that can be reasonably expected of it during the first year of its existence. That much will be a long step in advance.

The Rate Decision

Whatever may be the ultimate result of the decisions of the Interstate Commerce Commission in the railroad freight rate cases, interurban roads as a whole are not affected by the attitude of the governmental authorities toward the interstate tariffs. The position of the interurban lines, which furnish what is distinctly a local service, is not comparable with that of the steam railroads. The older established steam properties have had the benefit of many years of successful operation, and their present prosperity appears to have formed the groundwork for the decisions of the commission that they were in no need of additional revenues. Furthermore, no matter what the excesses in capitalization of the steam railroads may have been at the time of their construction and early financing, the great advances in the values of the rights-of-way and terminals are believed in most cases to have made capitalization and value practically equal at the present time. The interurban lines have not yet had the benefit of similar years of development. In many localities they were constructed without large expenditure for roadbed and equipment, and they were built to a large extent by promoters. But they have proved for the localities which they serve very useful

agencies of transportation and they deserve the same public encouragement and support which were extended to the steam railroads in the period of development of those properties. The passenger rates of steam and interurban lines, through advances in interurban rates wherever franchise conditions permit, are becoming more nearly equal than in the past. We believe that the unmistakable tendency is for advances in interurban passenger rates to continue in the future and that the competition between steam and electric roads will be more in service and less in rates. In the freight and express features of their business interurban lines furnish a rapidity of transportation that is not equaled by even the old-line express companies. For this unique and special service they are entitled to much higher rates than those which prevail on steam railroads.

THE ILLINOIS ELECTRIC RAILWAYS ASSOCIATION AND THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The new constitution of the Illinois Electric Railways Association, which was adopted at the first regular meeting of that association, held in Chicago on Feb. 17, provides that active membership shall be confined to electric railway companies in the State of Illinois, but that by a two-thirds vote of all members present at any regular meeting the scope of the association may be extended to include any other State or States. For the present, therefore, the Illinois Association has decided not to consolidate with the Central Electric Railway Association, although that body made a strong effort to bring about such a consolidation and no doubt its members will be greatly disappointed at the failure of their negotiations.

We can see, however, that there are many logical reasons which urge the Illinois roads to have a separate association through which they can advance their own special interests within the State. This statement is made with a full appreciation of the good work done in the past by the Central Electric Railway Association and the promise of even greater accomplishments in the future. The Central Electric Railway Association is an active, energetic and flourishing organization whose membership includes many of the best interurban railway operating and executive officers in the country. It has been a powerful factor in promoting the interchange of traffic between interurban roads in the middle West, in developing profitable long-distance riding and in advancing the art of interurban electric railroading in all its phases. For these reasons membership in the Central Electric Railway Association should be very useful to many, if not most, of the railways in Illinois, in spite of the fact that with but one exception there is no physical connection between the interurban railway companies in Illinois and those belonging to the Central Electric Association. But the question is not whether individual companies in Illinois should join that association, but whether the Illinois roads do not also need an association of their own.

There is certainly enough work to be undertaken to occupy the energies of both organizations, and the field of each need not and should not interfere in any way with that of the other. For instance, matters of purely local interest in Illinois can very properly be taken up by the association representing all of the Illinois street railways, interurban, elevated and city

lines alike, while the broader matters of standardizing the mechanical equipment of interurban cars, block signals and the development of through passenger, express and freight traffic can undoubtedly be taken up more effectively by the larger body. In a sense, the same question has come up in New England, where both the New England Street Railway Club and the Massachusetts Street Railway Association have done excellent work, but it has not been found that the activities of one body have interfered in any way with those of the other. It is true that in that case one organization has a membership of individuals and the other of companies, but both have the cordial support of the electric railway interests in the territory concerned. There is nothing in the constitution or by-laws of the Illinois Electric Railways Association to prevent a member company of that body from also being a member of the Central Electric Railway Association. In fact, one road, the Chicago, Lake Shore & South Bend Railway, which has its Western terminus at Kensington, Ill., has joined both organizations, and we believe that all other large interurban companies in Illinois would well follow its example.

As yet the Central Electric Railway Association has been largely, if not distinctively, an organization of interurban railways. Undoubtedly in thus largely confining its attention to interurban subjects it has accomplished a great deal more good than if it had attempted to take up all subjects connected with electric railway operation. If, however, it should seem wise in the future for the association to expand its scope so as to take up city railway problems as thoroughly as it has those connected with interurban operation and thus attract to its membership the street railway companies in the principal cities of Ohio, Indiana and Michigan, we believe that a proposal to join would appeal to the large city properties in Chicago.

In brief, it is our opinion that there can be hardly too many electric railway associations, provided each receives sufficient support from those interested in its work to allow it to accomplish good results. During the past few years electric railway associations and clubs have grown enormously in number, size and usefulness, and there are now in existence 18 sectional organizations of this character in different parts of the country. None of these has encroached on the work of the American Electric Railway Association or of its affiliated organizations, nor has the increase in size and influence of any hampered the development or field of any other. Association work is educational in its character, and as more of it is undertaken its field of usefulness seems to widen. This is partly because in any branch of learning an ever-increasing number of new problems presented for solution are disclosed as the horizon of actual knowledge broadens. Another reason is that the more one engages in association work the more efficient he becomes in it and the greater is the progress made.

We do not mean to imply from this discussion that the time may not come when certain of these associations can be consolidated, and this will be the natural tendency in Ohio, Indiana and Illinois as connecting links are built between the interurban systems in those States. With these facts in mind we believe that a most cordial welcome should be extended by the electric railway fraternity to the new organization in Illinois. The best wishes which can be extended to it are that it shall serve the electric railway interests in that State as efficiently as has the Central Electric Railway Association those of Ohio, Indiana and Michigan.

WORK FOR THE PREVENTION OF ACCIDENTS

It is axiomatic to say that all efforts that are directed toward the prevention of accidents are humane and deserve the support of officials and employees. General advice to trainmen, however, is as important as specific rules and regulations, and each class of effort should supplement the other. We have published accounts of the work which is being done by E. F. Schneider, general manager of the Cleveland, Southwestern & Columbus Railway, in the endeavor to eliminate accidents, and wish to call further attention to the personal nature of the appeal which he directs to the employees. In another part of this issue of the *ELECTRIC RAILWAY JOURNAL* we publish abstracts of two of the interesting papers presented by Mr. Schneider recently before the employees.

The talks which Mr. Schneider makes are strong appeals to the better instincts of the employees. They are given periodically before the men of the different divisions. Each talk is given but once before each gathering. The keynote of the motive with which the talks deal is the complete elimination of accidents on the Southwestern system. In order that this ideal condition may be kept in mind the men are implored to consider the fearful consequences of accident. That is to say, they are urged to consider the effect upon the lives and health of those who may be involved in accidents. They are told frankly that the management wants to end the year without discharging a trainman for any cause.

While there is a wide difference in the methods that prevail with different companies and while a variety of practices have been introduced through the individual attempts of managers, it seems important to emphasize the prime need of continued work in this direction. New men enter upon their duties with a short acquaintance with operating practices, but without the familiarity with danger that is sometimes felt by older employees. If the effort of the company ends when it gives the employee a rule book, the trainman's knowledge will be derived largely by methods of self-teaching and intercourse with fellow-employees. This might start him on a fairly safe course if it was supplemented by a respect for danger that was greater than the average man holds. But with most men some stronger compelling force is necessary.

Such periodical talks as those given by Mr. Schneider have the effect of rousing the men frequently to a sense of the hazards which they control. They are not given so frequently as to risk a loss of interest in the subject. While the subject cannot be varied from "the prevention of accidents," the arguments can be diversified and put forth with new earnestness. This result appears to have been attained successfully by Mr. Schneider. Machine-like regularity of attention to rules of safety is not the sole aim to be accomplished by the managers of railways who undertake campaigns of this character. No matter how efficient and dependable the machinery of the system may have been in the past, its ultimate control lies with the human beings who must be stirred to a realization of their responsible part in the hazards of operation. Rigidity of discipline has its place and it is an important one, but if employment is easy and men are indifferent, disciplinary methods alone will not accomplish the results that should be attained.

A movement that is founded wisely upon the better impulses of the men is an appeal to humane considerations that will not be totally fruitless.

LONDON TRANSIT PROBLEMS

The annual "Blue Book" of the London Traffic Branch of the British Board of Trade always contains matter of interest to the transportation engineer. One reason for this may be that this commission, now in the fourth year of its existence, had its origin as the result of the suggestions of the Royal Commission on London Traffic, whose members, it will be remembered, visited this country in the fall of 1903 and later brought out a monumental report of eight volumes on London traffic conditions. It is also undoubtedly true that by a combination of circumstances the entire London transportation situation is in a somewhat critical condition in which developments of the most far-reaching importance, from a traffic standpoint, may occur at almost any time in the early future.

Of foremost interest is the present status of the steam railroad companies whose lines radiate from London. Fully to understand the problems which confront these roads the reader should realize the great competition from electric surface lines and motor omnibuses which these properties have experienced within the last ten years, so far as their suburban traffic is concerned. The rivalry of the street railways with penny fares, and in some cases with halfpenny fares, has been bad enough, but the tremendous increase in motor buses has made the matter even worse. Nor does this competition show signs of abating. The tramways are constantly extending and the motor bus companies have been able by mechanical improvements to decrease their maintenance charges and by consolidation to reduce their transportation expenses. Hence the motor omnibus service can be considered a permanent addition to the transportation facilities of London and one with which the steam railroads, as well as the tramways, will have to contend.

The reasons which are driving the steam railroads in the London district toward electrification, therefore, are different from those in America. In this country, in many if not most cases, electrification is looked upon in the light either of a necessity to avoid combustion in tunnel operation or of a luxury for which the suburban passenger or the city resident must pay, if the railroad is to make the change. But by the steam railroads in the British metropolis electrification is considered more as a means of salvation from present difficulties, involving sacrifices it is true, but providing perhaps the only way by which these roads can win back the fickle commuter and the short-distance rider and can restore the suburban traffic to its old standards.

Undoubtedly the results of the electrical equipment of the South London division of the London, Brighton & South Coast Railway, now known as the South London Elevated Electric Railway, will go a long way toward encouraging the acceptance of such a viewpoint. This line, which is 9 miles in length and is equipped with the single-phase system, was put into operation on Dec. 1, 1909. The results of operation for the first six months of 1910 show that the passenger traffic increased the enormous amount of over 91 per cent, or from 1,958,129 to 3,743,160. During this time the daily train mileage on week days was increased from 687 to 1465, or approximately 113 per cent. Part of this traffic, in the opinion of the chairman of the board of directors of the company, was that which had previously been enticed away by the tramways, but in all

probability a considerable portion was entirely new business. It is true that with the commencement of electrical operation the company reduced its fares and revised its season-ticket rates, so that the entire gain cannot be stated to be due to the adoption of electricity. But the company is so well satisfied with the service that it is planning immediately to equip two additional sections of its suburban system serving populous districts, most of which are intersected by tramways. It is not surprising that these results should have had a very marked effect in stimulating the other London suburban steam railroads to consider whether the situation can be saved and is worth saving. Practically all of the companies have felt the effects of this competition, the East London probably the most, as its suburban traffic has fallen off 61 per cent during the past eight years. In some cases the railroad companies are now reducing fares, in others they are investigating the merits of electrical operation, and in still others they are showing a disposition to abandon the short distance riding to the tramways.

In the meantime the passenger traffic by all of the other general means of transit in Greater London is advancing by leaps and bounds. It is estimated that, disregarding the traffic on the steam railroads and that in cabs and private carriages, the number of journeys per inhabitant in Greater London in 1881 per annum was 56.6. This had increased in 1891 to 95.4 and in 1901 to 128.7. The growth during the last eight years has been especially rapid, increasing in 1903 to 142.9; in 1905 to 153.2; in 1907 to 169.2, and in 1909 to 189.6. Of this traffic the local underground railways in 1909 carried 29 per cent, the tramways 49 per cent and the omnibus companies 22 per cent. This per capita figure is a large one for a community like Greater London, even with its total population of nearly 7,500,000, because, unlike most American cities, London is made up of a great many local centers of population, each to a large extent having its own individual mercantile industries and even political interests.

What can be done to meet the increasing demands on the transit facilities of London which these figures of constantly growing traffic show? This is the problem which is facing the government authorities and railway managers in that city. There are many courses to follow and each will contribute a part toward a solution of this problem. They include the improvement and consequently more extended patronage of the existing steam railroad systems, which, as shown, have by no means reached the limit of their carrying capacity. An increase in the facilities for the transfer of passengers on the different underground railways will also accomplish much and indeed has already done so, because all of the underground roads now recognize the advantage of this interchange. The greatest relief however, in the opinion of the traffic branch of the Board of Trade, lies in the construction of a comprehensive system of arterial roads, partly for the accommodation of the growing volume of road traffic, but also very largely to admit of a multiplication of tramway tracks. To determine the relative traffic efficiency of different widths of roadways an enumeration was conducted by the board of the vehicles traversing different important streets in London, and a "coefficient of obstruction" was determined upon for each class of vehicle. This coefficient varied from 10, which was assigned to a slow two-horse trade vehicle, to $\frac{1}{2}$, which was the rating assigned to a bicycle. In a similar way, a horse cab received a coefficient of 2, a motor cab a coefficient of

1, and a horse omnibus a co-efficient of 7. Electric cars were credited (or debited) with 10, as a "coefficient of obstruction," or "traffic unit," the term to which the first expression was abbreviated for convenience in the report.

Based on these figures, the commission has recommended a width of at least 100 ft. for its main arterial roads and has expressed its belief that a road of this breadth should accommodate two electric railway lines and three lines of vehicle traffic on each side of the road. Altogether the commission believes that the needs of the city require the construction of practically 100 additional miles of such roads within the Metropolitan area, as well as the widening of many of the existing streets. A program such as that proposed by the commission necessarily will take a long time to carry out, and perhaps it will never be completed in its entirety on account of the expense, but it is at least daring in its conception. There is no doubt, to judge from the report, that something should be done to improve the now overtaxed condition of the streets in London.

APPRENTICESHIP IN ELECTRIC RAILWAY SHOPS

Apprenticeship undoubtedly formed the first way of learning a trade and up to from 40 to 50 years ago was the usual method followed. With the enormous expansion of corporate and railway enterprises, however, and the increasing tendency toward specialization in manufacture, the practice of training apprentices to become skilled workmen fell somewhat into disuse. The reason for this undoubtedly was that the necessity of providing skilled assistants in a shop was felt more strongly by a man who was the owner of a shop and also the employer of the men than by a salaried foreman. It was easier for the foreman and probably, for the time, cheaper for the large corporation by which he was employed to have the shop force recruited from men who had learned their trade in smaller shops than to engage upon a course of apprentice education. A broader view of the situation, however, discloses the short-sightedness of this policy and the falsity of the arguments upon which it is based, and most of the largest and most progressive steam railroad and manufacturing companies now provide means by which young men can enter the employment of the company as apprentices and acquire an expert knowledge of the business in which the company is engaged.

The subject has a direct bearing on electric railway matters because there is a generally acknowledged lack at the present time of skilled men in many departments of shop work, especially in that of car equipment, inspection and repair. In this field the demand far exceeds the supply. In fact, most of the skilled labor now engaged in this work can be said to have been self-taught, and it is to determine the best method of developing such men that President Harvie, of the American Electric Railway Engineering Association, has appointed a committee on apprenticeship courses to report at the next convention.

To those who are unacquainted with the extent to which manufacturing and railroad companies have engaged in the practice of training apprentices the proceedings of the recent convention at Boston of the National Society for the Promotion of Industrial Education will be a revelation. One of the parts or sections of this society is devoted to the subject of apprenticeship and corporation schools, and at the last annual meeting addresses were given by those who had been closely con-

nected with schools of this character conducted by the General Electric Company, the Westinghouse Electric & Manufacturing Company, the Solvay Process Company, the American Locomotive Company and the Atchison, Topeka & Santa Fé Railway. In general, the course given by these companies is about the same and includes real instruction in all of the different branches of the work to which the young man has apprenticed himself and the payment to him, during his course, of a living wage. All of the speakers indicated in their remarks that the apprenticeship system was worth in direct returns all that it cost the company, because it provided a supply of skilled mechanics or other workmen who had been trained to work according to the methods of the company and were better suited and fitted to its needs than those hired outside.

In several of the addresses emphasis was laid upon the success of the apprenticeship system in producing the kind of employee who thinks rather than the kind who displays no intelligence in his work. Of course, the apprentices are required to work like other men in the shop, and experience has shown in these apprentice schools that it is inadvisable to make shop work subservient to school work, but the men are encouraged to think and to ask the reasons of the methods which they are taught to follow.

A regularly organized apprenticeship system possesses two important advantages over the plan by which young men are taken into a shop simply in the capacity of helpers. As such their chances of learning more than one single department of the work are small and they have not the availability for general employment that a broader training would give to them. Again, the effect of work whose purpose and theory a man understands but dimly is to rob him of initiative and he soon forgets to use his reasoning powers. For instance, a man may work constantly at wiring a car and know no more about the connections than that it is necessary to connect a terminal with one tag in one place and a terminal with another tag in another place and then test the circuits with a magneto, but he will not, as a rule, make as good a workman as one who knows the reason for the different connections which he is making.

A special feature brought out in the discussion at the Boston convention was that the value of apprenticeship courses is by no means limited to the large companies. In fact, the smaller companies can employ the system even more satisfactorily than larger ones. The only requirement is the selection of certain skilled workmen to give a part of their time to teaching the young men in regard to the work which they have to do.

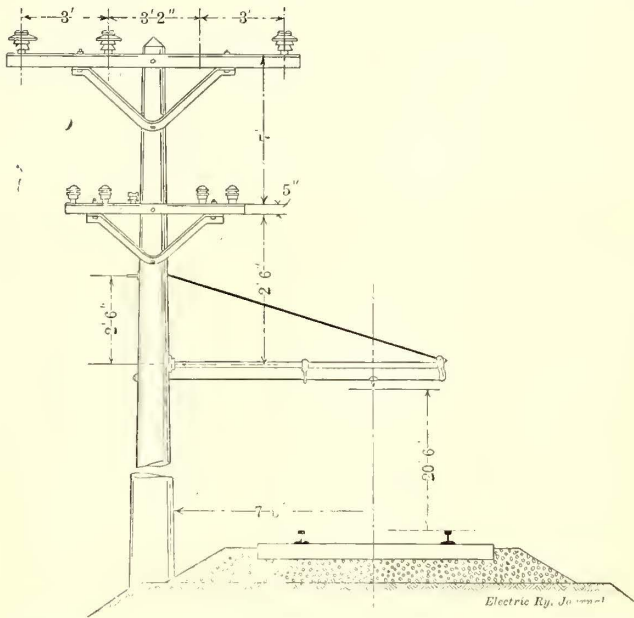
An apprenticeship course, it should be understood, is quite distinct from the courses in force on some railway lines designed especially for graduates of technical schools or colleges. The latter have received their general education and need a technical knowledge of the practice in different departments of a railway company to fit them to fill some position in the transportation, engineering or other department of the company. The apprenticeship course, on the other hand, is intended especially for the development of machinists in the shop department and for car repair and construction men.

In this connection it is worthy of note that the fourth annual conference of the apprentice instructors of the New York Central Lines took place in New York Jan. 27. The course has been in force since March 1, 1906, and has been extended to ten shops of the system. On July 1 of last year 617 apprentices were on the rolls of the company.

INDIANAPOLIS, NEW CASTLE & TOLEDO ELECTRIC RAILWAY

BY PAUL H. WHITE, CONSULTING ELECTRICAL AND MECHANICAL ENGINEER OF THE COMPANY

In June, 1910, the Indianapolis, New Castle & Toledo Electric Railway Company put into operation an electric railway line which is of particular interest because of its excellent roadbed, simplified power equipment and large "sheep-nose" cars. This road owns a private right-of-way from the eastern limits



Indianapolis, New Castle & Toledo—Typical Cross-Section of Line and Track Construction

of the City of Indianapolis, 40.25 miles, to New Castle. Entrance to Indianapolis is had over the tracks of the Indianapolis Traction & Terminal Company. The interurban road has its own tracks and a terminal station in New Castle, which is a manufacturing city of 15,000 inhabitants, located in the center of a rich agricultural district.

HISTORICAL

When the promoters first planned the New Castle project they had just successfully built the Indianapolis & Southern Railroad and sold it to the Illinois Central Railroad. Studies in connection with the construction of that property led them to believe that Indianapolis needed a belt railroad that would encircle the city and derive substantial earnings by transferring freight for both electric and steam roads. This belt line, they thought, should have a big city freight and express terminal, and with that in view they spent about \$300,000 for a private right-of-way, over which trains could be brought to the terminal property at Tenth and Massachusetts Streets, close to the business district. The Indianapolis, New Castle & Toledo interurban line, it was planned, would use this terminal entrance and would be built as a high-grade, electrically operated freight and passenger line, connecting Indianapolis with Toledo and the Great Lakes.

The belt railway and the high-grade interurban road projects were too large to be carried on during the financial depression of 1907, and, although the construction work was well advanced on the New Castle section of the interurban road, receivers were appointed Oct. 10, 1907. No work was done on the project by the receivers until September, 1909, when the courts gave the Union Trust Company of Indiana, the receiver, authority to spend not more than \$460,000 in completing the road between Indianapolis and New Castle. At the time these instructions were issued the subgrade was about 90 per cent completed, 18 out of 45 miles of track were down and 2 miles of track were ballasted and bonded. The power-house building

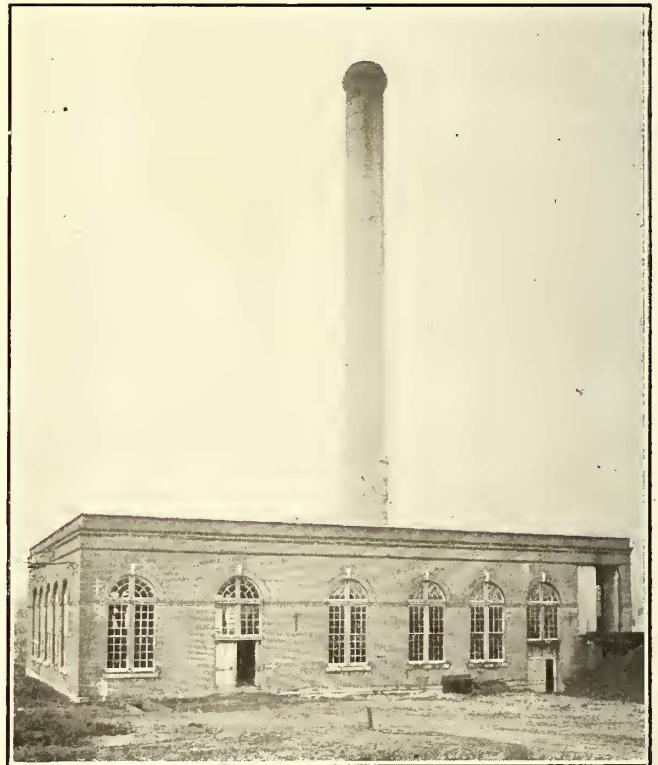
had been erected and the boilers and stokers had been purchased. The pole line was about 75 per cent completed, and substation buildings were under construction. It became advisable later to abandon the substation work that had been done previously and relocate the substations according to more modest designs. All the bridges, which include a number of massive reinforced-concrete structures, were completed at the time of the receivership with the exception of one.

The writer, who was consulting engineer and formerly general manager of the Indianapolis & Martinsville Traction Company, was placed in charge of the completion of the power generation and distribution work and the purchase of cars and all other electrical work. A. R. Holliday, formerly with the Pennsylvania Railroad, was put in charge of the completion of the track and roadbed.

About a year ago the receivers began issuing certificates maturing in three years. After the construction work had been completed to the city limits operation was postponed for three months on account of difference of opinion regarding entrance into Indianapolis between the receivers, the public and the Indianapolis Traction & Terminal Company, whose tracks were to be used. After these differences had been adjusted 5800 ft. of track had to be built to connect with the Indianapolis street railway system leading to the Indianapolis terminal.

TRACK AND ROADWAY

The New Castle line is fortunately situated in not having any grade crossings with steam roads and in reaching the Traction Terminal in Indianapolis over city track, which is said to be shorter and faster than that used by any other interurban line reaching Indianapolis. Between the eastern city limits and New Castle the roadbed of the new interurban line parallels a steam railway for practically the entire distance and



Indianapolis, New Castle & Toledo—New Castle Power Station with Local Converter Equipment

is on a private right-of-way, which at no place is less than 66 ft. wide. A generous amount of earthwork was done, so that between terminal cities the road has grades and curves which compare favorably with those of the parallel steam road. All water crossings are spanned by reinforced-concrete structures with ballasted decks. These are of particularly heavy and substantial construction, as evidenced by several of the accompanying illustrations.

The track construction of the new road conforms to existing interurban standards. The rails weigh 70 lb. per yard, are connected with continuous rail joints and are bonded with No. 0000 American Steel & Wire Crown bonds. Cross bonds are placed approximately 1000 ft. apart. Fifteen sidings have been installed on the 40.25 miles of private right-of-way connecting the city limits of the terminals. All of these are stub-end sidings pointing in the same direction, so that the uniform practice of having all the cars running in one direction head in and back out of the sidings at meeting points may conveniently be followed. The switches are thrown and protected by Buda semaphore-blade switchstands.

A shelter house has been placed at each highway for the accommodation of waiting passengers. These houses are of frame construction. A lumber concern built all of the shelter houses at its plant and delivered them to the railroad company at a cost of \$55 each.

OVERHEAD CONSTRUCTION

Energy for the operation of the cars is generated in a modern

through trolley wire for a distance of 300 ft. ahead of switch points. This unusually long trolley lead makes it possible for the conductor to change the trolley pole while the car is slowing down and then be ready to run ahead to throw the switch as soon as his car is stopped. Thus some time is saved in taking a siding.

The No. 000 trolley wire is supplemented throughout the entire length of the road by a 650,000-circ. mil stranded copper cable carried on the cross-arms which support the telephone wires. The trolley feeder circuits are protected by Garton-Daniels lightning arresters spaced about 1000 ft. apart. Duplicate telephone circuits of No. 12 copper wire extend the full length of the line. One circuit is reserved for train operation and the other for the general business of the road. The train-handling telephone circuit includes jack boxes spaced one-half mile apart. The Stromberg-Carlson Telephone Manufacturing Company supplied the telephone apparatus, which includes an instrument mounted in the forward compartment of each car. Each of these instruments is provided with a windlass and



Indianapolis, New Castle & Toledo—Interior of New Castle Power House

plant located near New Castle, the eastern terminus of the road. From this plant a 33,000-volt transmission line extends to three intermediate rotary converter substations. The transmission line is looped through each substation, and provision is made for sectionalizing the line at each substation. The locations for the intermediate substations were so chosen that no meeting point is farther than 2 miles away from one. This feature and the generous amount of trolley feeder provide an operating voltage which is notable for its steadiness and is a very important factor in maintaining close schedules.

TRANSMISSION LINE

A view of the pole-top construction is shown. The high-tension circuit consists of 12.4 miles of No. 4 copper and 22 miles of No. 3 copper. The three high-tension wires are carried on Locke No. 312 36,000-volt porcelain insulators mounted on a single 10-ft. cross-arm. It is interesting to note that, while these insulators were installed three years ago and now have been in full service for eight months, not one has been found defective.

TROLLEY CONSTRUCTION

Current is distributed to the cars through a No. 000 grooved trolley wire carried on 9-ft. tubular bracket arms and fitted with Ohio Brass Company's overhead materials. At each siding the trolley wire serving the side track is hung parallel with the

150 ft. of connecting cord which terminates in a jack plug.

POWER STATION

The power station of the new road is located about one-half mile west of New Castle, the eastern terminus of the line. As originally designed it was planned to use this power station for feeding a considerably greater mileage than is now operated. The plant at present has a greater generating capacity than is needed, and there is ample room for the installation of additional equipment. The building is of fireproof design, rectangular in shape and subdivided into turbine and boiler rooms. The turbine room is served by a 20-ton hand-operated crane supplied by the Northern Engineering Works. In addition to two turbo-generators and the electrical control apparatus, this room contains a 40-kw, 125-volt marine-type steam exciter set and a rotary converter equipment, which supplies current to the adjacent section of the interurban line.

BOILER PLANT

The boiler-house equipment includes three 400-hp Edge Moor boilers, with Green chain grate stokers, and three Dean outside-packed pot-valve pumps. Coal for the power plant is delivered directly above a bunker extending the full length of the firing aisle and fronting on it. The fuel is shoveled directly onto the hoppers of the chain-grate stokers. The ashes are collected in pits under the boiler fronts and are carried out of the

buildings on industrial railway cars. A reinforced-concrete steel stack furnishes draft for the boilers. This stack is located about the center of the boiler house and is of the Alphons Custodis type.

The boiler auxiliary pumping equipment and a Cochrane feed-water heater are grouped at the center of the boiler house. Three boiler-feed and house pumps are mounted on concrete foundations, which support them 2 ft. above the boiler-room floor and thus give room in which to adjust and repack the valves. The Cochrane heater is supported by a steel platform at a height of 11 ft. 6 in. above the floor. Either of the three pumps may be used for boiler feeding, boiler washing or low-speed pumping.

The high-pressure steam piping, which was supplied by the Best Manufacturing Company, has been laid out on the loop system to give maximum flexibility in event of deranged operating conditions. The main steam header is back of the boiler settings, and the leads to the turbines are taken under the turbine-room floor, so that they may not interfere with the handling of materials by the overhead crane.

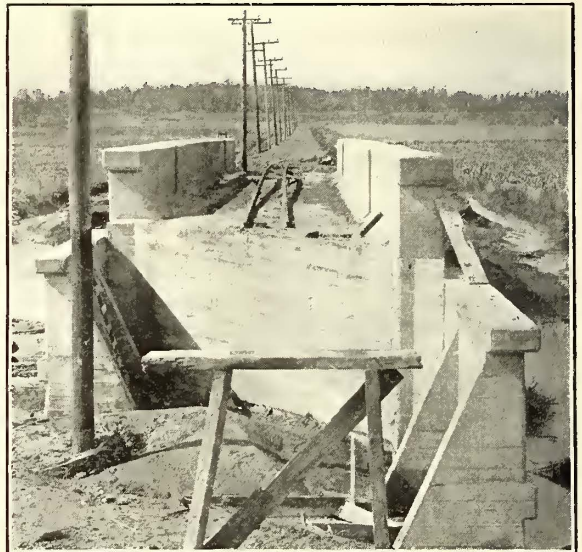
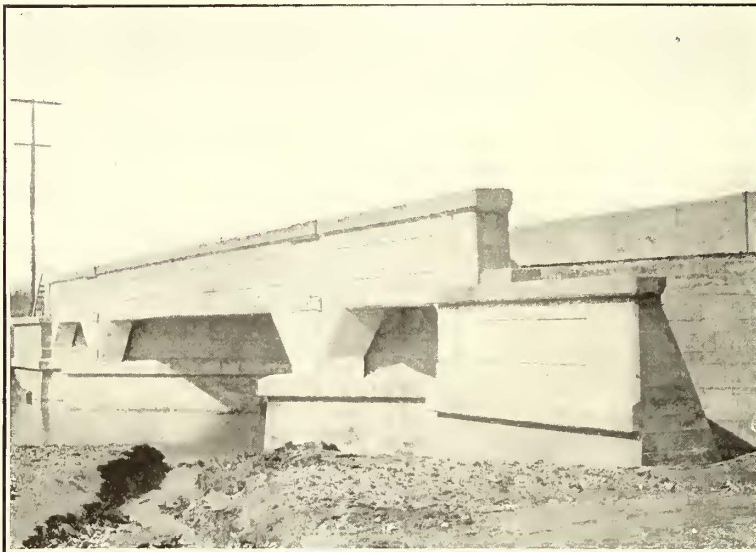
GENERATING UNITS

The main generating units are two General Electric horizontal turbine-driven, 370-volt, 25-cycle, three-phase, 1500-kw sets. The generators of these sets are cooled by air forced

the turbine axes. The exhaust outlets from the turbines pass down through the floor to connect with the opposite ends of a large inverted "T." These connections are made by means of large right-angle bends and include hand-operated valves. The middle upright leg of the "T" connects with the condenser shell. One of the right-angle bends is so designed that it may be swung through 180 deg. and thus assume a position which would make possible direct connection with an additional condenser unit should this be purchased.

The condenser is served by an Alberger dry-air pump installed on the main floor. Circulating water is drawn from a nearby river and forced through the condenser by a 12-in. electrically operated turbine pump. This pump, which has a capacity of 4000 gal. per minute, takes its suction from the river and discharges into a conduit 1500 ft. long, made of 20-in. wood-stave pipe. The discharge water from the condenser is led to a sump outside of the building, from which the boiler-feed supply is drawn.

Exciting current for the turbo-generators is furnished by either of two units. One is a 35-kw, 125-volt induction motor-generator set operating at 750 r.p.m. and the other is a 50-kw General Electric marine engine set, the engine operating at 400 r.p.m. Exhaust steam from this exciter set is piped to the feed-water heater.



Indianapolis, New Castle & Toledo—Typical Concrete Bridges with Floor for Ballast

through them by Sturtevant fans mounted on extensions of the turbine shafts. These fans take air directly from the turbine room, forcing it through the generating windings, and discharging it outside of the building through a duct carried under the turbine-room floor. The turbines operate under steam at 175 lb. initial pressure and 50 deg. superheat. They run at 1500 r.p.m.

CONDENSING EQUIPMENT

As the capacity of each unit is sufficient to meet the overload demands of the entire road, only one condenser unit has been installed. This condenser is of the surface type and Alberger manufacture. It has 3600 sq. ft. of cooling surface. Piping connections are arranged so that either turbine may be coupled to it through a short connection. Each turbine has an independent atmospheric exhaust valve leading to a spiral pipe exhaust main. Cast-iron pipe has been used for the parts of this main which are installed in a horizontal position.

The vacuum connections between the two horizontal turbines and the surface condenser located between them are of interest because the piping has been designed to provide for using the single condenser with either turbine, pending an increase in power demand, and also to provide for the convenient installation of an additional condenser whenever it becomes necessary to operate both turbine units. As stated, the condenser is installed above the turbine-room floor, and its axis is parallel to

ELECTRICAL CONTROL CONNECTIONS

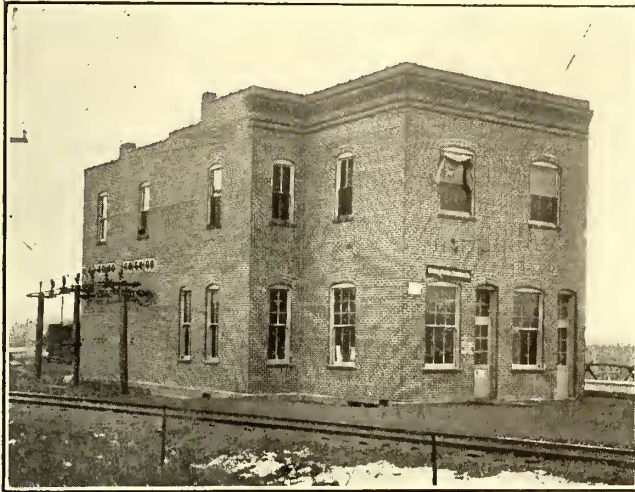
The original plan for this power station included an elaborate arrangement of busbar compartments in the basement, but the construction engineer appointed by the receivers, for reasons of economy, installed the electrical switching and other control apparatus above the turbine-room floor according to a very simple plan which has given very satisfactory results. All wiring, both high and low tension, except the leads between the generators and the machine switches, is installed above the floor level. This makes certain that any disturbance will be noted quickly and facilitates the inspection work.

The electrical equipment provides for switching the output of the generators on the generator side of the transformers. Each phase is controlled by an automatic carbon-break circuit-breaker which may be operated by a solenoid or by hand. These machine switches feed current into a 370-volt, three-phase copper bus erected on a steel framework directly behind the control board. Line switches similar in design to the machine switches connect the busbars with the secondary leads of a bank of oil-insulated transformers, which step up the voltage from the busbar potential of 370 to the line potential of 33,000 volts.

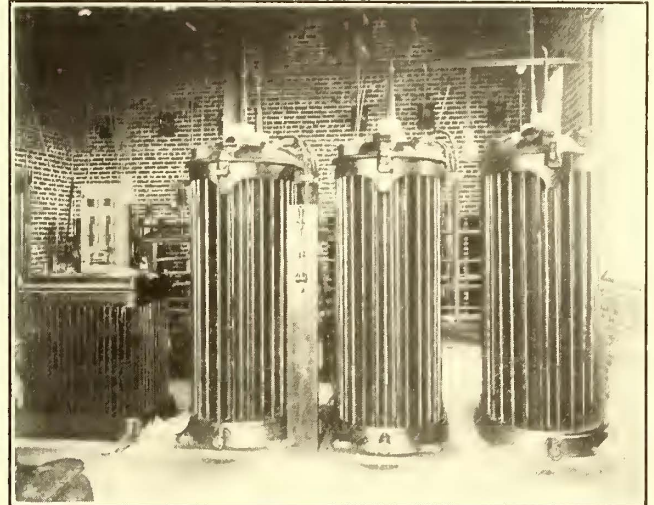
Normally three of these transformers are connected in delta and a fourth transformer is available for emergency. Switches of the knife type are provided so that the spare transformer

may quickly be connected in place of one of the others, or the four transformers may be grouped in two pairs connected in open delta and thrown on the line in multiple to furnish a 1000-kw capacity of transformation from 370 volts to 33,000 volts. The high-tension connections for the four transformers are made with bare copper wire supported on post insulators anchored in the power-station wall. A set of electrolytic lightning

design of these substations has been simplicity, with due regard to continuity of service. The substation buildings are of fire-proof construction, 23 ft. wide and 30 ft. 6 in. long. One of the substations—that at Shirley—was built in connection with a depot which has a waiting room, ticket office and freight room on the ground floor. The second floor contains eight rooms



Indianapolis, New Castle & Toledo—Exterior of Substation at Shirley



Indianapolis, New Castle & Toledo—Transformers in Substation at Shirley

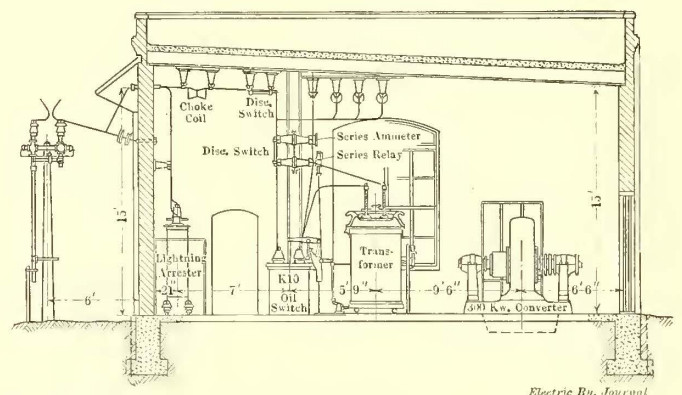
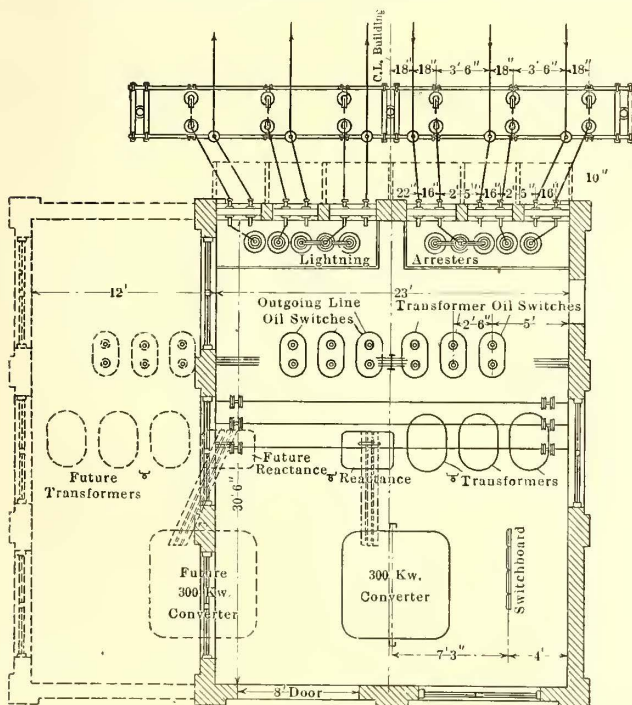
arresters is installed on a fireproof gallery close to the outlet of the 33,000-volt line wires. The horn gaps are inside the building.

Direct current for feeding the New Castle end of the trolley wire is obtained from a rotary converter installed in the power house. This 300-kw unit takes its supply of current directly

arranged as a residence for the agent and substation operator. This station is now in charge of a man and his wife. The wife operates the substation and performs the duties of ticket and express agent during the daytime and the husband is on duty at night.

The electrical features of the substations are very simple. Thirty-three-thousand-volt current is led into the building through porcelain wall insulators. Taps for an electrolytic lightning arrester equipment and its horn gaps are just outside of the wire entrances. The electrolytic arresters, of which there are four cells, are mounted on an insulated platform just inside the substation wall.

The high-tension wires are carried on porcelain pedestals secured to the ceiling of the substation. Three bus wires, to which the transmission line is connected through hand-operated knife switches, extend across the width of the substation and are supported on disk strain insulators, as shown in the floor



Indianapolis, New Castle & Toledo—Plan and Section of Substation

from the generator bus. The General Electric Company supplied the major part of the electrical apparatus for the New Castle line.

STATIONS

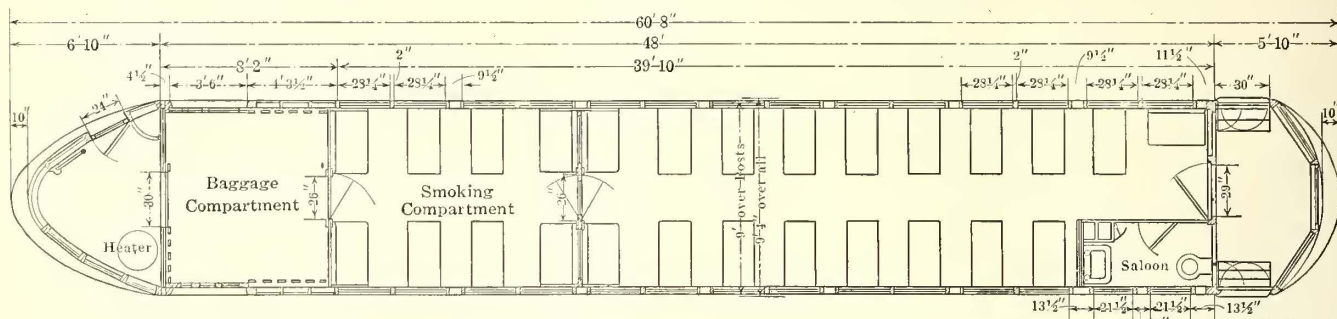
Three substations feed the trolley at points about 9 miles apart and are similar in design. A plan and sectional elevation of one of the substations is presented. The keynote in the

plan. Taps from these three buses are led through disconnecting switches down to the tops of three type F, form K-10 oil switches, which serve to connect the incoming transmission line with the step-down transformers feeding the rotary converter. The oil switches are designed to handle 100 amp at 45,000 volts. They stand directly on the substation floor. Each switch has a time-limit relay on it.

The step-down transformers, of which there are three, are 110-kw oil-insulated units. Low-voltage alternating current is fed to the rotary converter through a reactance coil. The low-voltage cables between the reactance coil and the rotary are the only parts of the substation wiring which are below the floor level, and they are incased in iron pipe. Half-voltage trans-

ROLLING STOCK

The rolling stock equipment of this new road includes six large four-compartment passenger cars, two motor express cars and seven freight and miscellaneous trailers. The large passenger cars were built by the Jewett Car Company. A floor plan and half-tone engraving of one of these cars are shown.



Indianapolis, New Castle & Toledo—Plan of Standard Combination Car

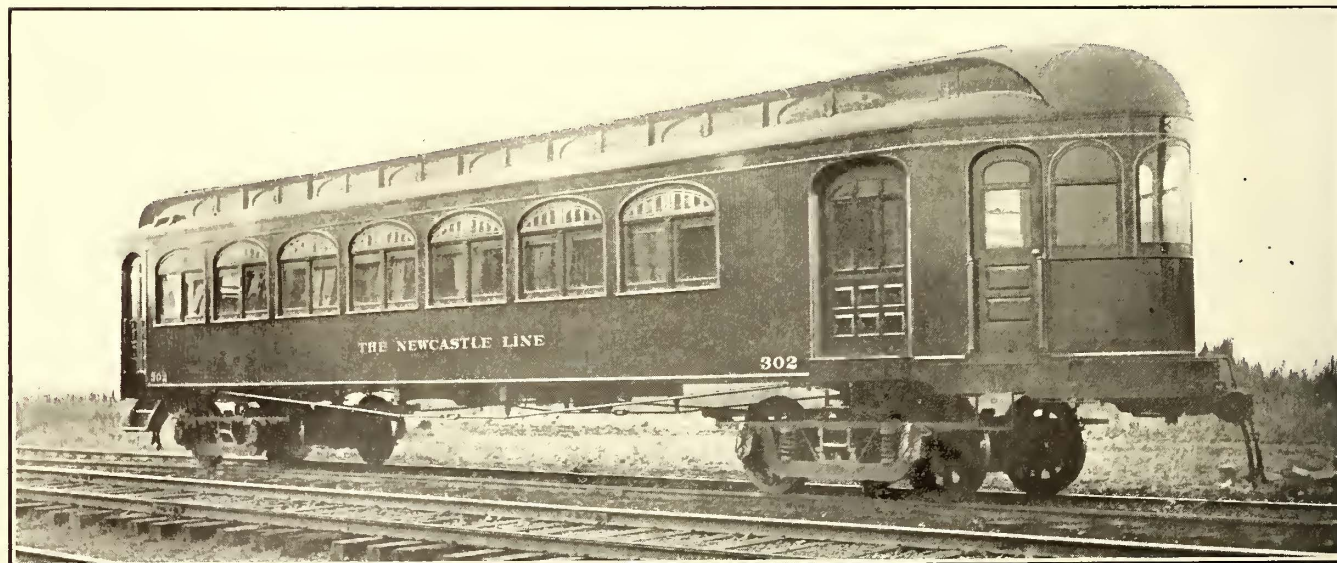
former connections are provided for starting the rotary, the starting switches being mounted on the top of the reactance coil case. This is the only low-tension alternating-current switch in the substation. The rotary converter is a 300-kw unit operating on 370-volt alternating current and delivering 600-volt direct current. The switchboard which controls the output of the rotary has one direct-current machine panel and two direct-current feeder panels. The circuit-breakers on the trolley feeders have low-voltage trips, so that when the alternating-current supply from the power house falls in voltage the substation equipment automatically is cut off from the trolley wire.

The high-tension line is looped through two of the substations. The outgoing lines are controlled by K-10 oil switches similar to those used for cutting off the transformers supplying the rotary converter. The outgoing alternating-current feeders are protected by electrolytic lightning arresters similar to those on the incoming lines.

SALE OF POWER FOR PUMPING

The railway company supplies the village of Shirley with

The photographic view of the exterior was made before the pilot was attached. The over-all length of the car is 60 ft. 8 in., which is made up of a rear platform and bumper, 5 ft. 10 in. long over all; smoking and coach compartments, 39 ft. 10 in. long over all; a baggage compartment, 8 ft. 2 in. long over all, and a motorman's compartment, 6 ft. 10 in. long. The car is arranged for single-end operation and has steps at both sides of the rear platform. The toilet room, which is located at the rear of the car, is 6 ft. long and has been furnished with especially fine fittings, including a Duner flush hopper, a nickel-plated wash bowl and a linen closet. The floor of the toilet room is covered with interlocking rubber tile, and the side walls are finished in white enamel. The main passenger compartment of one of these cars has seats for 36 people. The car is 9 ft. 4 in. wide over all and has a 29-in. aisle. The smoking compartment seats 16 people. The doors at the forward end of the smoking compartment and the rear end of the main compartment swing toward the center of the car, and the door in the intermediate bulkhead swings in either direction.



Indianapolis, New Castle & Toledo—Car with Parabolic Front

power for operating the pumps used to furnish water for fire protection. Water is stored in an elevated tank, and a 25-hp motor is used to drive a pump which keeps this tank filled. The pump motor is fed with three-phase current at 370 volts, taken from the secondary side of the substation transformers. The contract for the sale of this service provides for the delivery of current at 3 cents per kw-hour, with a minimum monthly charge of \$25. When the charge amounts to more than \$50 a month a reduction of 10 per cent is made.

PARABOLIC FRONT END

The motorman's compartment in this type of car has a novel shape because the front end of the car follows the curve of a parabola. This compartment has one exit door at the right-hand side of the car. The center forward window glass is cylindrical in shape and is fixed solidly in position. The windows on either side are arranged to drop and so located that it is easy for the motorman to reach out to throw a switch. The controller is located at the very front of this "sheep nose," the

heater at one corner and the coal bin in the other. This arrangement of the front end of the car gives the motorman ample space to suit his convenience. It is thought that the pointed end decreases the wind resistance to a notable amount when the car is operating at high speeds, and that, with this rounded front end and a steel-sheathed pilot, the car will be able to force its way through practically any snowdrift. The end framing of the car is carried forward to the bumper, and so a very strong structure is formed to resist butting.

The body of one of these cars weighs 35,000 lb. and an entire car weighs 55,000 lb. complete. Each car is mounted on two heavy Baldwin M.C.B.-type trucks, with 37½-in. spoke wheels. The journal bearings are 5 in. x 9 in., the gear fit 7½ in. and the wheel fit 7⅞ in. The car is propelled by four GE-205 motors with K-34 controller. General Electric straight air brakes are used. All of the electrical wiring of the car is inclosed in conduit, which is installed between the center sills. The cars are intended for single-end operation only and each is equipped with Van Dorn couplers.

The special equipment on these cars includes: General Elec-



Indianapolis, New Castle & Toledo—Interior of Standard Combination Car

tric air brakes; Van Dorn No. 21 couplers; Peter Smith hot-water heating system; General Electric and Crouse-Hinds headlights; Symington journal boxes; four GE-205 motors; Sherwin-Williams paint; Hale & Kilburn seats; Wilson trolley retrievers; Shelby trolley poles; U. S. No. 13 trolley bases and Kalamazoo trolley wheels.

REPAIR SHOP

The repair shop of the new road is located on a piece of property, 20 acres in extent, close to the power house just west of New Castle. The shop is a brick structure inclosing two pit tracks, each long enough to accommodate two large interurban cars. One section of the shop building has been set off as a shop storeroom, and repair machinery is being installed in a shop bay facing the pit tracks.

OPERATION

The Indianapolis, New Castle & Toledo Electric Railway has the following operating organization: M. E. Graston, general manager; C. F. Witt, auditor; Harry Buskirk, roadmaster; George H. Brannon, traffic agent; R. E. Hollis, chief engineer power plant and substations; E. H. Clark, master mechanic; R. E. Harris, chief dispatcher. Train operation is conducted under the rules approved by the Indiana State Railroad Commission. The dispatcher is located on the New Castle terminal station. Cars are operated on hourly headway, making the run of 45 miles in 90 minutes, which includes 20-minute running time on city tracks in Indianapolis. The fares between Indianapolis and New Castle are 75 cents one way and \$1.40 round trip. This reduction under the 2-cent-per-mile rate, which ob-

tains between all other stations on the road, was made on account of steam railroad competition.

AUTOMOBILE FEEDER LINE

One novel source of traffic for this road is an automobile 'bus line operating between Maxwell interurban station and the town of Greenfield, a county seat. Greenfield has service to Indianapolis over another interurban road, but the owners of the 'bus line find it profitable to operate three automobile 'buses over their 6-mile highway route. This 'bus line sells through tickets to Indianapolis from any point on the 'bus route by way of Maxwell and the Indianapolis & New Castle interurban road. Similarly the interurban road sells through tickets to points on the automobile 'bus route.

One freight train is operated for a round trip each day. General merchandise, manufactured products and milk largely make up the freight business. Recently a sterilizing station has been built on the right-of-way near the midpoint of the interurban line. Milk is delivered to this station by the farmers and then it is sterilized for reshipment into Indianapolis. About 55 cans a day are now handled. At another point on the road a special traveling crane has been erected for transferring radiators from wagons to a platform, from which they can be trucked into freight cars for shipment to Indianapolis.

ANNUAL REPORT OF PRAGUE ELECTRIC RAILWAY

The municipal electric railway of Prague, the principal city of Bohemia, has furnished the American consulate some figures indicating the business done in 1910, the thirteenth year of operation. The system has been extended to four additional suburbs during the past year, until it extends over 52 miles. Almost every line has been double-tracked. The rolling stock consists of 347 motor and 202 trailer cars, 8 snow plows, 10 freight cars and 1 sprinkler. During 1910 49,500,000 passengers were carried, an increase of 6,637,542 over the previous year. The receipts were \$1,389,738, or \$201,181 greater than in 1909.

There are 917 conductors and motormen, 42 switchmen and 32 inspectors, aside from the common laborers and higher officials. On paying fare the passenger is given a ticket for the distance to be traveled, the minimum fare being 2½ cents and the maximum 6 cents. All tickets are good for transfers within the zone in which the ticket is valid. The minimum fare is valid within a zone of six stations from the starting point, and the maximum tickets are good anywhere on the line. An inspector enters the service at \$6.09 a week, and has gradual increases until he has served 11 years, at which time he receives \$8.12 a week, or \$422.24 a year. He then receives an increase of 25 per cent, which makes his salary \$527.80, at which amount it remains until he has served the corporation 35 years, when he is pensioned, receiving as a pension his full salary of \$527.80. Conductors and motormen are taken on trial for three months, and for the first year of service receive \$0.53 a day, or \$193.45 a year. They receive gradual increases until they have served 11 years, when their compensation amounts to \$0.69 a day, or \$251.92 a year. Then they receive an increase of 25 per cent, which makes their salary \$314.90 annually, where it remains until they have served 35 years, when they also receive pensions amounting to their full salary, \$314.90. Switchmen and ordinary laborers also begin at \$0.53 a day and receive gradual increases until they have served nine years, when their salaries amount to \$237.10. They then receive an increase, which makes their salaries \$285.82, at which amount they remain until they are pensioned after 35 years of service at \$285.82 per annum. Ordinary laborers work 12 hours a day, motormen 10 hours and conductors 14 hours. Laborers are given one free day in every five and motormen and conductors one in every seven. Aside from the compensation of the conductors they expect and often receive from each passenger a tip of 2 hellers, which amounts to two-fifths of a cent, when they show the passenger any special courtesy on request, such as supplying information about connections, location of points of interest, etc.

In the old shop these prices were posted at the department office, but the present practice of subdivision enables them to be consulted with less loss of time and separates the prices for one class of work from those in force for another. An employee who specializes in armature winding is not reasonably concerned with the cost of work outside his own field, and while the posted lists are open to the inspection of all employees their subdivision has proved to be a convenience.

Six hundred and forty principal operations are listed in the tabulation of piece-work prices. Under the heading "Armature Windings" are listed such tasks as: "Strip; disconnect leads; connect leads; change commutator; insulate armature; wind

are arranged to meet the requirements of both piece and day work, on a regular and overtime basis, and are stamped by a clerk registering on a 24-hour dial basis. Piece-work cards (Fig. 3) show the times of starting and stopping each job and the day of the week upon which the particular job was handled, the order number, total number of pieces done in the week, and the rate and amount due for this particular job, countersigned by the foreman or assistant in charge of the section when the work was performed. Thus, if John Smith, workman No. 94, worked on the piece basis upon job No. 245 (GE-73 field coil) from 9 a. m. Thursday until 5:45 p. m., or as it is called in the blank, 17:45 o'clock Monday, his total number of pieces being three, the rate of \$3 would give him a credit of \$9 for his work covering this period. Overtime work is shown upon a red card. A green card is used to record the time spent upon regular day work, with the rates per hour assigned to the employee. Figs. 4 and 5 are reproductions of the front and back

SHOP RECORD OF PIECE WORK NO.														
ESTABLISHED PRICE			PER...			PREVIOUS COST			ESTIMATED ACTUAL			GAIN TO CO PER PIECE...		
Week Ending	Order Number	No. Pieces	Am't Paid for Piece Work	Hours Worked	Hour Rate	Amount et Hour Rate	Week Ending	Order Number	No. Pieces	Amount Paid for Piece Work	Hours Worked	Hour Rate	Amount et Hour Rate	

Fig. 6—Boston Piece-Work Records—Back of Piece-Work Price Card

armature; insulate front head; solder; splice leads; clean; test, etc." Under "Armature Banding" are "soldering heads, bands, etc." Under the heading "Field Coils" are such entries as "strip and clean shell; strip and reinsulate; wind; inspect and scrap; prepare for impregnating, etc." The tabulations also provide for all the various operations. A typical entry in the table is as follows:

FIELD COILS GE-73
Order No. 161
No. Price.
 Strip, insulate, wind complete... 245 \$3 (large coil)

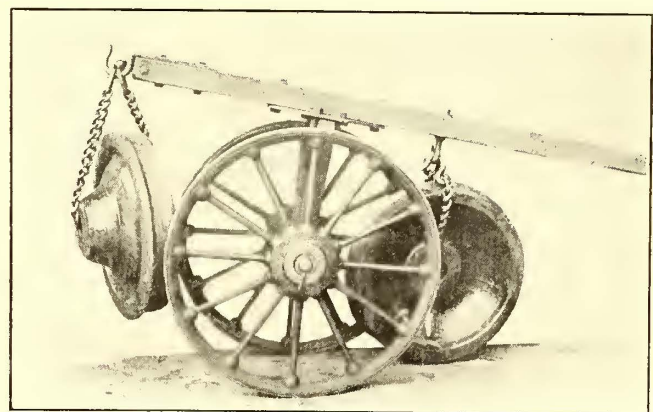
The details of every job are filed at the department office on an index card about 5 in. x 8 in. in dimensions. A sample card (Fig. 1) is shown for the above job, which is numbered 245 in the piece-work record and which falls under the general order number 161. All operations on the GE-73 motor fields are given the above order number, but each principal task for which a price is specifically paid on the piece-work basis has a separate job number. Each card shows in detail the precise character of the work included under each piece-work job. Thus, job No. 245 includes stripping, insulating, winding, putting on terminals, leads and connections, re-riveting shell and completing the coil of the GE-73 motor. The cards show the date at which the quoted price went into effect and the price established, the average previous cost on the day wage basis, the number made under day work and day work wages per hour, the estimated previous cost per job, etc. On the back of the card (Fig. 6) are spaces for the tabulation of data upon which the piece-work price is based, if desired. These spaces include such points as the amount of work done in a given time, various rates, former costs and the gain to the company by piece work. These cards form the company's primary record of piece-work costs and serve as standards of reference. In case any employee questions the amount of work which he is required to do under a given job number he is shown the card and its specific statement of all operations in the job. The date on the card precludes any claim that a certain operation has been in force a less time than it actually has, and the signatures of the responsible shop officers and the vice-president or his representative show that the approval of the higher officials of the company has been given to the duties and price set forth.

The company is protected against work being turned in a second time by the use of receipts (Fig. 2), which are given at the conclusion of each job, after inspection, and by the practice of removing inspected work for succeeding operations or sections of finished material. As the inspector passes upon a given quality of piece work he issues a receipt to the workman and sends a duplicate to the office, thus furnishing a means of checking the time cards turned in to the office. The time cards

of a card showing the total day and piece work performed by a given employee on a weekly basis. These cards after being stamped and examined in the department office and checked with the receipt duplicates are sent to the auditing department and used as the basis of the weekly payroll. A weekly statement is made up by the armature department showing the number of employees working in the shop, the total payrolls and the total wages paid for piece work. A monthly statement is also made up, which includes these data and, in addition, the gain to the employees over the regular pay for the same number of hours, the loss, if any, the gain to the company, the percentage of piece-work wages to the total payrolls, and the percentage of increase in wages of men on piece work over the day rate

CARRIAGE FOR HANDLING CAR WHEELS

The accompanying illustration shows a wheel carriage developed in the shops of the Brooklyn Rapid Transit System for handling wheels. It consists of a pair of spoked wheels and an axle which carries a whiffletree. One hook is attached to the end of this shaft, and a second hook at another point, as shown in the illustration. The wheels to be transported are lifted up



Brooklyn Wheel Handling Carriage

by chain slings which are passed through the hubs and over the hooks. By means of this counterweighting scheme two men can move about a pair of wheels weighing as much as 875 lb. each. Usually one man is at the front end of the shaft and the other at the rear. The company is planning to replace this method in its East New York shops by an electric telfer system, owing to the large number of wheels which are handled there. However, a carriage of this kind commends itself for smaller installations where it would not pay to put up automatic labor-saving apparatus.

RAIL CORRUGATIONS

BY K. SIEBER, ENGINEER, NÜRNBERG, GERMANY

Assume a corrugated rail to be so firmly embedded that it will practically not bend. A wheel moving very slowly would follow the valleys and crests in the rail exactly and, at a point like position "A" in Fig. 1, would exert greater pressure than in position "B," where the convex wheel surface is in contact with a concave rail surface. In several special cases, cal-

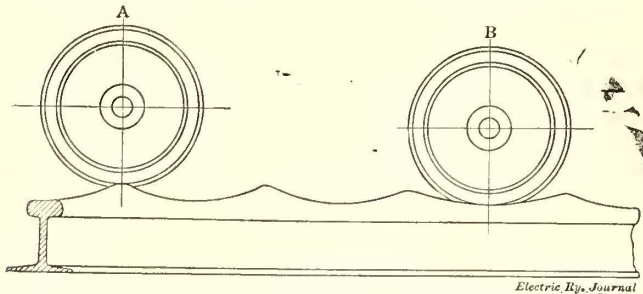


Fig. 1—Car Wheels on Exaggerated Outline of Corrugated Rail to Show Their Positions on Crests and in Depressions

culated by me, the specific pressure of the rail in position "A" was 65 per cent to 100 per cent greater than in position "B." From this fact it is evident that slow-moving vehicles cannot generate concave spots, but that their effect is to smooth down the crests. But when a car is moving rapidly the centrifugal force of the wheels will tend to decrease the pressure at crest "A" and to increase it at depression "B," and there will be a critical speed where the pressure at "A" will exactly equal that at "B."

It is difficult to discover the causes of corrugation by observing the rails themselves, because there is practically no regularity in the origin of rail corrugation. Sometimes it appears in a few days and at other times only after several years. From many years of observation and study of literature on this subject I have concluded that the following statements may be safely accepted as correct:

(1) Corrugations increase in the direction of travel. Sometimes, on account of an extra deep depression, one corrugation will overlap the next and gradually merge into it.

(2) The lengths of adjacent corrugations are not usually equal, but if the average of 50 to 100 in a line is taken, it will be found that the greater the car speeds the greater the average length of the corrugations. This relationship is shown in Fig. 2.

(3) Although the number of rail vibrations per second is not constant at normal car speeds, some definite conclusions are possible. Thus hard and heavy rails have a higher number of vibrations than those which are light and soft. Rails weighing 47 kg per meter (94 lb. per yard) with a tensile stress of 65 kg per square millimeter (41 tons per square inch) had 75 vibrations per second in a foundation of broken stone, while rails in the same foundation weighing 63 kg per meter (126 lb. per yard) with a tensile stress of 80 kg per square millimeter (51 tons per square inch) had vibrations varying from 95 to 120 per second. The number of vibrations was independent of the types of motor or car body suspension and of type of trucks. Even maximum traction trucks exerted no special influence.

(4) Corrugations appear only when the speed exceeds a certain limit. The speed limit is lower for track in rigid foundation than for track in elastic foundation.

(5) Corrugations do not appear on the treads of rails on short-radius curves.

(6) On the rails in curves of large radius there are deep and short corrugations on the outer rail while the inner rail has long and shallow corrugations or none at all.

(7) With the exceptions noted above, corrugations may occur under practically all conditions of track. On tangents they are usually found on the side of the rail against which the wheel flange bears, but they are also found on the opposite side. They occur on up-grades and on down-grades; on

low rails and on high rails; on tight and loose gages; on braking and on coasting sections; on T-rails and on grooved rails. Statements to the contrary would never have been made if those engineers who made them had waited long enough. Some corrugations, for instance, do not appear until after eight or ten years' operation. Excepting for the cases under Nos. 4 and 5, one cannot say that a rail never showed corrugations unless it was prematurely thrown away.

(8) Heavy rails on a rigid foundation always develop corrugations most quickly on the inner rail. The more rigid the foundation, or the better the anchorage, the more quickly the rails corrugate.

The following is a short consideration of the various theories concerning the origin of corrugation which were published in the *ELECTRIC RAILWAY JOURNAL* for Sept. 3, 1910, page 370, in an article by J. H. M. Andrews entitled "Some Notes on Rail Corrugation."

(1) Chattering of car trucks with outside-hung motors.

Corrugation occurs also on rails over which only trail cars are operated. In most cases the chattering is the result, not the cause, of corrugations. Chattering ceases as soon as the corrugations have been removed from a given rail.

(2) Defects existing in the rails before they are put in service.

Defects can accelerate corrugation, but their absence will not prevent it. If there are no initial irregularities on the head of a rail, they will be formed eventually by sand, dirt, movement of the rail material on account of braking, operation on curves, sparking on the wheels due to poor return circuits, etc. The only question is whether the seeds of trouble will fall on fertile ground. The originator of theory No. 2 assumes that the defects are not only in the top of the rail but also exist more or less throughout the general structure. These defects are ascribed by him to the rolling process. On the other hand, numerous observations have failed to show corrugations on sharp curves and on sections where cars are operated slowly. At low speed the corrugations are short, and at high speed they are long. They are longer on the inner side than on the outer side of curves. They always increase in the general direction of travel and not in the opposite direction. If an elastic foundation is replaced by a rigid one, the corrugations increase rapidly. All these phenomena are dynamic effects and have nothing to do with defects in rolling.

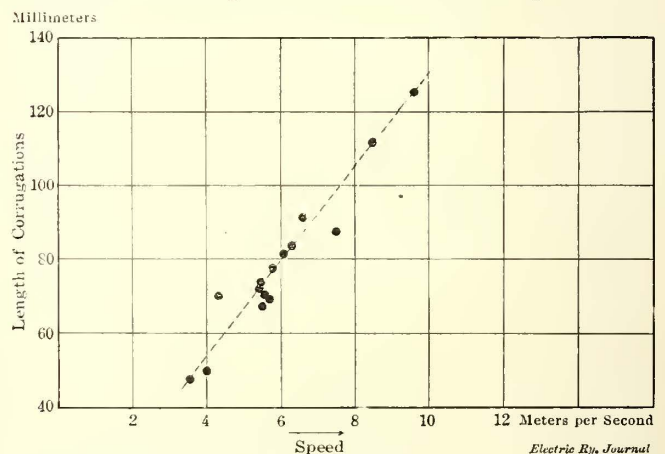


Fig. 2—Relation of the Length of Corrugations to the Speed of Car Operation

(3) Side pressure of the wheel flanges and dirt on the rails. Corrugations appear even where there is no side pressure from the flanges. I have seen some very dirty rails on which there were no corrugations. The flanges always press on the outer side of the curve; even on tangents the car tends to zig-zag over a series of successive curves.

(4) Sliding of the wheels on rails, due to rapid and intense braking.

Corrugations appear on sections where braking never occurs.

(5) Tight track gage.

Corrugations have appeared on normal gage, tight gage and loose gage track.

(6) Flat spots in wheels.

Corrugations have occurred on railway systems where there are few flat wheels, or none at all.

(7) Too rapid acceleration.

Corrugations have appeared on track where acceleration never occurs.

(8) Rolling out and elongation of the upper fibers of the metal.

Corrugations occur not only where the rail material is pushed backward, as on the inner side of curves and on sections where braking occurs, but also where the material is pushed backward, as on the inner side of curves and on acceleration sections. The forward rolling motion accelerates and intensifies the formation of corrugations, whereas the backward rolling delays them. However, this rolling process is not the sole cause, for if it were, sharp curves and steam railroad tracks in particular would have corrugations throughout.

(9) Corrugation is due to vibration either of the rails or of the whole track structure on account of loosening.

In this case the cause probably has been confused with the effect.

The tenth reason given in Mr. Andrews' article, but not numbered therein, is that corrugations arise from the lateral movement or vibration of rails having weak webs which buckle or bend. These vibrations, combined with those of the wheel

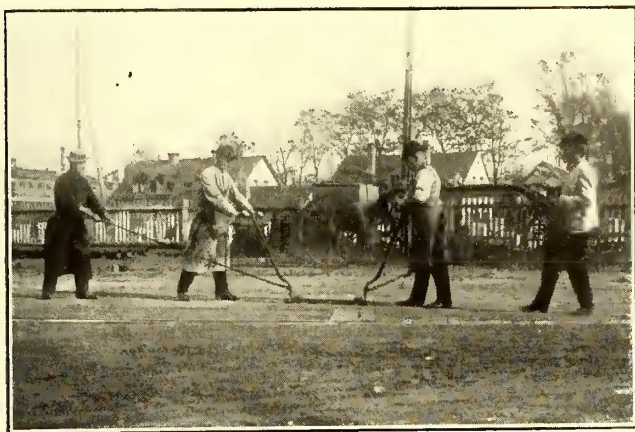


Fig. 3—Grinding Out Corrugations by Hand in Nürnberg, Germany

moving about a horizontal axis, result in the constant rise and fall of the center point of the wheel. The lateral movements of the rail materially encourage the growth of the waves, but they are of consequence only when the other conditions causing corrugations are present. They are not sole causes, since corrugations have occurred even on rails with double webs and on rails with reinforced concrete webs which could not possibly vibrate to a serious extent.

In connection with this discussion of various theories of rail corrugation I should like to recapitulate my own:

Corrugation is possible only when the track structure is too rigid in comparison to the axle load and the wheel diameters. Such a foundation promotes the growth of those irregularities which eventually develop into corrugated rails.

I would recommend the following means as suitable for preventing corrugations:

(1) The track and substructure should be so constituted that under a normal load the rail or tie will give at least 1-16 in. This is attainable with rails weighing 80 lb. to 120 lb. per yard bolted to wooden ties in 7 in. to 10 in. of broken stone, or with the rails laid directly on 12 in. of gravel. The ballast for heavy traffic might be a mixture of gravel and broken stone.

(2) The tensile stress of the rail and ties should not exceed 65 kg per square millimeter (41 tons per square inch).

(3) Concrete should never be permitted to come into direct

contact with the rails. A strip of wood paving or some other elastic structure should be used alongside the rails if noiseless paving is desired.

(4) The rail joints should be as light as is consistent with strength.

The objection may be urged that this construction would result in too frequent changes in track and wheel tires; but even if softer tires and rails are used, the wear will be comparatively small if more care is taken at the car repair shops, for instance, in mating opposite wheels and in keeping the axles in the same truck parallel. Sharp curves may be built up of heavy, hard material, but even in this case a certain degree of caution should be exercised because of the rapid destruction of the upper surface at switches and at crossings.

On railways with heavy traffic, where light rails would have to be removed frequently, despite all precautions, nothing else remains to be done except to install heavy rails and accept corrugation as a matter of course. Its worst difficulties, however, may be avoided by proper maintenance. If the rail corrugations are ground off as fast as they appear, the ultimate expense will be much less than if they are allowed to go unchecked. In Nürnberg corrugations are ground off by hand at intervals of from one to three years according to the frequency of service and the kind of track construction. As shown in the accompanying illustration, Fig. 3, four men move the grinder over the rail head by means of long handles. The average annual cost of removing corrugations is about \$120 per mile. Our well-proved fundamental rule is to undertake no repairs on the track structure without first grinding the rails.

ELECTRIC RAILWAY CONDITIONS IN FRANCE

BY A FRENCH CORRESPONDENT

Various causes have combined to stimulate electric railway construction in France to a greater extent than has been the case for the last ten years. One of these is the reduced cost of electric power brought about by an increase in the number of large power stations and the development of hydraulic plants; another is the growing difficulty of handling satisfactorily the constantly increasing loads on the main lines, especially the passenger traffic in the suburban districts near Paris. Owing to the fact that the State guarantees the interest on the securities of many of the steam railroad properties, any large expenditure for new equipment must first be approved by the government, and a company must show a pretty strong case before it secures sanction for electrification. Moreover, several of the French railroad companies which most need electrical equipment have been obliged to call upon the State for provision of their guaranteed interest and can hardly expect an appropriation for additions and improvements unless the earning capacity of such improvements is clearly demonstrated.

Still a third reason which delays electrification by the steam railroads is the elaboration with which the plans have to be prepared for the approval of the government before they will be considered. For example, in the case of the Western State Railway, the propositions of its commission on electrification made a "dossier" of which only twenty copies were required, but these had to be printed and the cost to the company was \$6,000.

The Western State Railway is among the companies which are considering the subject of electrification most carefully. This road conducts by far the largest suburban traffic in France. On 50 miles of its line the passenger business has increased yearly by one million since 1900. The number of departures from its St. Lazare station is about 80,000,000 per annum and of this number about 60,000,000 is local traffic. During the rush hours some 40,000 passengers per hour are transported from this station. The company also brings into Paris about two-thirds of the food supplies of the city. The electrification plans of this company, if carried out, will involve an expenditure of \$60,000,000. The money is to be raised by a State loan.

On the Eastern Railway the conditions are somewhat different. The suburban system of this road meets severe tramway competition, and electrification is being considered to provide a more frequent and rapid service. The Orléans company, which electrified 12 miles of its local system some years ago, is considering extensions to its system, including the electrification of one of its southern lines.

Outside of Paris there may be 50 miles of single track which have been converted from steam to electricity. In the near future this will be increased to 250 miles. The accompanying map shows the extensions proposed to the local steam railroad lines leading out of Paris. In this map the heaviest lines show the existing electric roads, the lines of medium width the roads about to be electrified. The lightest lines represent other steam railroads near Paris.

In Paris the conditions of urban transportation have been much modified by the extensions of the Metropolitan underground roads and the opening of the Nord-Sud tube. The reorganization of the tramway and omnibus system of the Compagnie Générale des Omnibus, which had its franchise for surface traction inside Paris renewed this year, as described in the

RENEWALS AS DEFINED BY THE BOARD OF SUPERVISING ENGINEERS, CHICAGO TRACTION

Rules were adopted on Feb. 15 by the Board of Supervising Engineers, Chicago Traction, to govern charges to the renewal funds for which provision is made in the ordinances under which the Chicago City Railway, the Chicago Railways, the Calumet & South Chicago Railway and the Southern Street Railway are operating. The rules in full as they are issued by the board are published below, but "traction valuation commission" has been substituted for "T. V. C.," the abbreviation used by the board. The reports of the traction valuation commission placed original values on the several railway properties as follows: Chicago City Railway, \$21,000,000; Chicago Railways, \$29,000,000; Calumet & South Chicago Railway, \$5,000,000; Southern Street Railway, \$775,000; Chicago Consolidated Traction Company, \$3,930,684.51. The rulings of the board have been accepted by the companies. With an introductory statement published by the board, they are as follows:

RENEWALS

"The traction ordinances of Feb. 11, 1907, refer to the subject of renewals in the following manner:

"Section 7. The cost of renewals shall be paid as provided in Section 16 hereof, but such expenditures (and only such expenditures) as are made for the purpose of extensions of or additions to property shall be thereafter considered as additions to capital; provided, however, that in the replacement of any principal part of the property, either existing or hereafter acquired, there shall be charged to capital the excess amount that the new property cost over the original cost of the property displaced."

"Section 16. The company shall deposit with one or more of the said depositories, in a separate fund, appropriately designated, a sum equal to eight (8) per cent of the gross receipts of said street railways and property for the preceding month, which shall constitute a reserve fund for taking care of renewals and depreciation of said street railways and property. * * * No payments shall be made by said company out of said fund except on the written certificate of the Board of Supervising Engineers for renewals, which are hereby defined to be the replacement of any principal part of said street railways or of their equipment or appurtenances."

"The two main points to be construed by the board under the foregoing provisions of the ordinance are:

- "(a) 'Original cost.'
- "(b) 'Principal part.'

"These points and other collateral issues, particularly the distinction between renewals and that of maintenance and repairs, were discussed at various times by the board throughout the year 1910, which discussions have led to the following conclusions:

GENERAL RULINGS

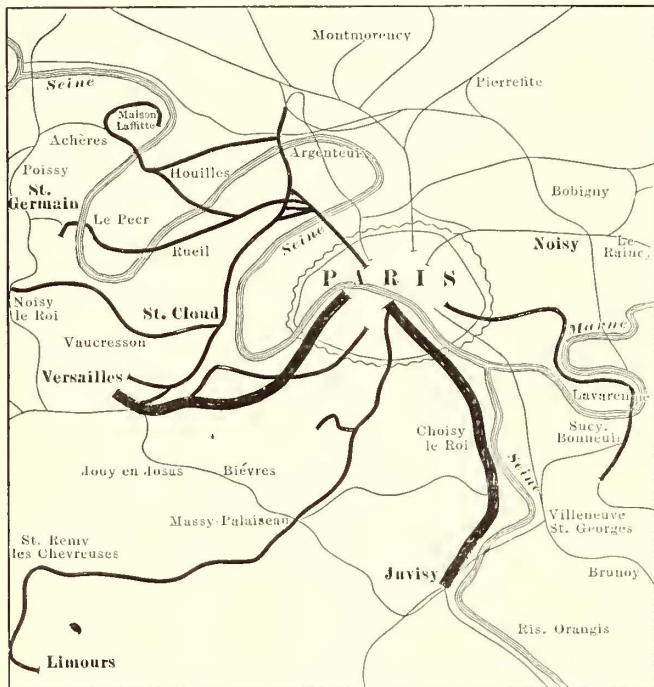
"1. The 'original cost' of any property renewed shall be the cost of the property displaced.

"2. Property which has not been rehabilitated.—The traction valuation commission value shall be taken as the 'original cost.'

"3. Property that has been rehabilitated.—The rehabilitated cost, but not the rehabilitated cost plus the traction valuation commission value, shall be taken as the 'original cost.'

"4. Property semi-rehabilitated.—The traction valuation commission value, plus the cost of semi-rehabilitation, less the traction valuation commission value of the part replaced in the process of semi-rehabilitation, shall be taken as the 'original cost.'

"5. Paving which has not been rehabilitated.—25.29 per cent of the traction valuation commission value shall be taken as the 'original cost,' that being the estimated amount included in the allowed valuation of \$50,000,000 for the Chicago City Railway and Chicago Railways companies' properties; 5.08 per cent of the traction valuation commission value shall be taken as the 'original cost' for the Calumet & South Chicago Railway Company. Traction valuation commission values shall be allowed



Map of Paris and Suburbs, Showing Present and Proposed Electrified Steam Lines

ELECTRIC RAILWAY JOURNAL for Oct. 1, 1910, was, of course, based upon the new conditions. In other parts of France there is also much activity.

Up to the present time the single-phase system has not been considered with very great favor. However, the Midi Railway in the south of France is equipping some 150 miles of double track on this system and trial equipments of cars and electrical locomotives, ordered from various manufacturers, are now being delivered. A few tramway lines are also making a trial of the single-phase system.

As yet there are no 1200-volt systems in service in France. Certain of the tramway companies are now suffering from the policy followed 10 years ago of installing inadequate electrical equipment and cheap construction. Owing to their high maintenance charges most of these companies have never been able to pay a dividend, and the rapid deterioration of cheap rolling stock will force upon many of them an entire renewal in the near future of both cars and tracks.

On the other hand, the increase in the use of large turbine units has steadily reduced the cost of power, and several tramway systems have found it more economical to shut down their power stations and purchase power from large central stations.

as shown in the traction valuation commission reports for the Southern Street Railway and Consolidated Traction properties.

"6. The first paragraph of Section 15 of the ordinances shall be construed as referring to repairs only.

"7. The minimum charge to capital or renewals shall be \$200, this rule being adopted for the purpose of simplifying accounting.

"8. In case of a renewal in kind there shall be no addition to capital account, except in special cases, which shall be considered and ruled upon by the board at the time application for work order is submitted by the companies. By renewal in kind is meant the replacement of existing property by new property of similar general character and construction.

"9. Salvage in all cases shall be credited to the renewal fund.

"10. Special cases may arise in connection with all classes of reconstruction work to which these rules cannot be specifically applied. In such cases the board shall give special consideration as to the proper classification of the cost of such work at the time application for work order is submitted by the companies.

DIVISION "D"—TRACK

"1. The principal parts of track construction are as follows: (a) Rails and fastenings; (b) ties; (c) foundations; (d) special work; (e) paving.

"2. Old track rehabilitated with new standard track construction.—The cost of new work shall be divided between renewals and capital, as prescribed in the ordinances.

"3. Replacement of $\frac{1}{4}$ mile continuous distance of single track, or a stretch of track between two special work layouts, shall be considered as a unit representing a principal part for straight or curved track outside of special work.

"4. In case of a renewal of rails and fastenings (standard construction) all other track work occasioned thereby shall be considered as a part of the charge to renewals, but there shall be no charge to capital unless the total cost of the renewal work shall exceed the total cost of an equal length of standard track construction, complete, and then only after special consideration.

"5. Replacement of $\frac{1}{4}$ mile continuous distance of paving 8 ft. wide, or the full width of the pavement in the right-of-way between any two special work layouts, shall be considered as a unit representing a principal part for the renewal of paving.

"6. Special work.—A straight standard single-track crossing, either electric or steam railroad, or its equivalent, shall be considered a principal part for special work renewals, except in the replacement of layouts containing curves, in which cases a decision as to the proper charge to renewals shall be made at the time request for work order is submitted to the board.

"7. In order to simplify accounting and economize work the following computations shall be made to determine the cost of rehabilitated track work and special work for renewal purposes and to establish a proper basis for charge to renewal account:

"(a) The traction valuation commission value of track and paving to be set aside and considered separately:

"(b) An estimate to be made fixing a unit cost on new special work for each type, this estimate to be applied to the various individual layouts of new special work of each of the railway companies. This estimate to include a percentage for overhead. The aggregate cost thus determined of all pieces of special work in track to be deducted from the total track account, as shown on the books of the board, after setting aside traction valuation commission values as above.

"(c) The remainder to be considered as the aggregate cost of straight track or curved tracks rehabilitated to date, not included in special work.

"(d) A computation should then be made estimating the cost of each of the different types of rehabilitated straight track construction (including curved track not in special work), and the cost of each type so determined shall be multiplied by the number of miles of each type of track, respectively.

"(e) The aggregate so found will then be compared with the total charges against track account, excluding special work

and traction valuation commission values as above, but including paving outside of right-of-way, track elevation expense and all other expenses incidental to track construction, including overhead expense.

"(f) The difference between the aggregate of the estimates and the amount shown on the books of the board (excluding special work and certain traction valuation commission values as above) is to be distributed pro rata over the various miles of track of different track construction, and the unit cost thus determined will represent the cost per mile of track for each type, for the purpose of establishing a basis for charges to renewal account.

"(g) Estimates for paving inside right-of-way to be calculated upon the same general plan and carried separately so that a unit cost for the different types of paving may be available in cases where the paving is renewed without any renewal of track being made.

"(h) The totals of traction valuation commission values as above, rehabilitated special work and track values and paving values, should equal the total track and paving accounts on the books of the board.

"These computations shall be made separately for each company.

DIVISION "E"—ELECTRICAL TRANSMISSION AND DISTRIBUTION

"1. The principal parts of the electrical transmission and distribution system are as follows: (a) Poles and fittings; (b) trolley; (c) span wire and fittings; (d) special work overhead; (e) overhead feeder; (f) underground feeder; (g) cross bonds and negative auxiliary return cable; (h) conduits, manholes and vaults; (i) submarine cables; (j) joint bonds and auxiliary cable at special work; (k) dispatching system.

"2. The replacement of $\frac{1}{4}$ mile continuous distance of pole line, either side pole or center pole construction, shall be considered as a unit representing a principal part for a pole line, including all other necessary work occasioned thereby.

"The ordinary replacement of cross-arms and pole fittings from time to time shall be charged to maintenance.

"3. The replacement of trolley wire on 1 mile continuous distance of single track or $\frac{1}{2}$ mile of double track shall be considered as a unit representing a principal part for the renewal of trolley wire; anything less to be charged to maintenance.

"4. The replacement of span wires on 1 mile continuous distance of single track or $\frac{1}{2}$ mile of double track shall be considered as a unit representing a principal part for the renewal of span wire, including all other necessary work occasioned thereby.

"5. Special work overhead.—Replacement of a complete layout of special work overhead, in case the cost is \$200 or more, shall be considered as a unit representing a principal part for the renewal of special work overhead (which includes through work and bridge work), and all necessary work occasioned thereby.

"6. The replacement of 1 mile continuous distance of overhead feeder shall be considered as a unit representing a principal part for the renewal of overhead feeder, including all other necessary work occasioned thereby.

"Where overhead feeder is taken down and placed in stock and subsequently used on outlying lines, the job from which it is claimed shall be credited at the scrap value of the material taken down, and the work on which it is subsequently used shall be charged at the same value.

"7. The replacement of $\frac{1}{4}$ mile continuous distance of underground feeder shall be considered as a unit representing a principal part for the renewal of underground feeder, including all other necessary work occasioned thereby.

"Substitution of underground for overhead feeder not to come under the rule relating to renewals in kind; the excess cost of the work of such substitution and all other necessary work occasioned thereby over the original cost of the work replaced shall be considered a proper charge to capital account.

"8. Replacement of $\frac{1}{4}$ mile or the distance between two track special work layouts for auxiliary negative return cable and

cross-bonds shall be considered as a unit representing a principal part for the renewal of auxiliary negative return cable and cross-bonds, including all other necessary work occasioned thereby.

"9. The replacement of special work, bonding or auxiliary cable will follow the ruling of the board in each specific case in accordance with paragraph 6 for track work.

"10. The renewal of a conduit line is considered a very remote possibility, and such replacements as are occasioned by conduits breaking or excavations at street intersections or at intervals under tracks, made by the city or other public utilities, shall be charged to maintenance. In case for some reason it should be necessary to close up a manhole and vault and build another one at a different location the cost shall be charged to maintenance.

"11. The replacement of the length of submarine cable between the manholes on each land side shall be considered as a unit representing a principal part for the renewal of submarine cable, including all other necessary work occasioned thereby.

"12. A telephone or signal system outside of buildings and used for dispatching or operating cars shall be considered a principal part for renewal. The replacement of the system as a whole would be a proper charge to renewals, but the replacement of individual parts, such as instruments, signal or connecting wires, and general repairs, shall be charged to maintenance.

"13. The same general plan shall be observed in valuing electrical transmission and distribution property for the purpose of determining the proper basis for charge to renewal account as is prescribed in connection with the valuation of track for the same purpose.

DIVISION "K"—CARS

"1. The principal parts of cars are as follows: (a) Body and its component parts; (b) electrical equipment and its component parts; (c) air-brake equipment and its component parts; (d) trucks and their component parts; (e) miscellaneous equipment.

"2. In case any one of these principal parts becomes obsolete or worn out in service and is replaced, rebuilt or reproduced, the cost of such replacement, rebuilding or reproduction shall be charged to renewals.

"3. Car bodies.—In case a car body is replaced in kind and a portion of the equipment replaced by new equipment and another portion of the equipment overhauled and used again, the entire cost of the work shall be charged to renewals.

"4. Electrical equipment.—Same as car bodies. The winding of an armature or the replacement of any part of the electrical equipment in individual cases shall be charged to maintenance, but, for example, in cases where the controllers on a group of cars are replaced by improved controllers, for reasons of economy or otherwise, the cost would be a proper charge to renewals.

"5. Air-brake equipment.—Same as car bodies.

"6. Trucks.—Same as car bodies. Replacement of wheels shall be charged to maintenance.

"7. Miscellaneous equipment, such as headlights, fenders, guards, etc.—Ordinary replacement in individual cases shall be charged to maintenance. In cases, however, where, for example, new headlights are placed upon a group of cars, or upon cars equipping an entire line or division, or the cars running out of a particular car house, the expense shall be charged to renewals. In case seats are replaced on a single car the expense shall be charged to maintenance; but if such changes are made on a group of cars or on cars equipping an entire line or running out of a particular car house the expense shall be charged to renewals.

"8. Ordinary repairs or general overhauling or repainting shall be charged to maintenance.

"9. Where a car is demolished or damaged in whole or in part by a collision or other accident, the cost of repairing the damage or replacing the car shall be charged to maintenance, excepting that when a car is destroyed by fire the pro-

visions of the ordinances governing insurance shall be applied.

"10. The same general plan shall be observed in valuing cars for the purpose of determining the proper basis for charge to renewal account as is prescribed in connection with the valuation of track for the same purpose.

DIVISION "G"—BUILDINGS

"1. The principal parts of buildings are as follows: (a) Foundations; (b) walls; (c) coping; (d) roof; (e) cut-stone or terra-cotta trim; (f) mill work—sash, doors and windows, wainscoting, etc.; (g) carpentry; (h) glazing; (i) iron shutters; (j) steel rolling doors; (k) floors—wood, concrete, tile, composition, brick; (l) plumbing, sewerage and water supply; (m) structural steel and iron; (n) sheet metal work—skylights, flashing and down-spouting; (o) heating plant and accessories; (p) lighting system; (q) telephone system—interior; (r) chimneys or stacks; (s) miscellaneous equipment—1, lockers; 2, racks; 3, bins; 4, tables; 5, benches, etc.; (t) painting and decorating; (u) sidewalks, driveways and fences.

"2. The buildings now being used by the companies are of such a character of construction that, with adequate and timely repairs, ordinary wear and tear would not necessitate the complete renewal of any one portion of a building, with such exceptions as are hereinafter noted, until time had brought about a complete disintegration of the entire structure. There may be occasions when, for reasons of expansion, for the purpose of concentrating facilities or for some other extraordinary purpose, it would be necessary to destroy and replace a building, either in whole or in part, with a larger building, or with a different character of building, in which event the rules of renewals would apply as laid down in the ordinances.

"In the case of buildings destroyed by fire and subsequently rebuilt the question of accounting is covered by the sections of the ordinances governing insurance.

"3. The foundations are as near as may be possible impervious to ordinary wear and tear, and should not require replacement under ordinary conditions during the life of the building.

"4. The pointing of walls, cementing of cracks in coping, patching of floors, replacement of broken lights and skylights, new flashing, new down-spouts, painting, plastering, calcimining and decorating are all in the nature of repairs and maintenance and should be so charged.

"In cases where walls and smokestacks crack or chimneys are blown down or destroyed the repairs shall be charged to maintenance.

"5. Defects and individual replacements in lighting systems, plumbing, sewerage and water supply system are taken care of as they develop, and unless some improvement calls for an entire change in the method of lighting, sewerage, plumbing or water supply there would be no occasion for a charge to renewals.

"6. Miscellaneous equipment, as enumerated above, is seldom replaced in whole, and, as a rule, with ordinary repairs should last throughout the life of the building. In a case, however, where a set of wooden racks, lockers or bins is replaced with metal construction it would be proper to apply the rule for renewals as prescribed in the ordinances.

EXCEPTIONS

"7. Fire walls.—In case of a complete renewal of any one or more of fire walls in or about the buildings the expense would be a proper charge to renewals.

"8. Roofs, old style, wood foundation, felt, tar and gravel covering.—In case of an entire replacement of the felt, tar and gravel covering, or of the entire roof, either in kind or with a roof of different construction, the cost would be a proper charge to renewals, except in case the new roof was of a better type and cost more than the old roof; then a proper division of the charge should be made as between renewals and capital.

"9. Concrete roofs not covered.—It is probable that these roofs will remain in good condition for as long a time as the first tar and gravel roof covering would last, the same as though they were covered. When they become cracked or leaky a covering should be placed on the concrete, which covering would be a proper charge to capital account.

"10. Book tile and concrete slab roofs, with tar felt covering. Tile or slate roof.—The replacement of either roofs or roof coverings (weatherproofing), complete, is a proper charge to renewals.

"11. The recoating of a tar and gravel roof is a proper charge to maintenance.

DIVISION "I"—POWER PLANT MACHINERY AND EQUIPMENT

"1. The principal parts of power plant machinery and equipment are as follows: (a) Machinery foundations; (b) engines; (c) generators; (d) economizers; (e) traveling cranes; (f) switchboard; (g) wiring; (h) piping and covering; (i) condensing equipment; (j) heaters and purifiers; (k) boilers; (l) pumps; (m) grates and stokers; (n) coal and ash-handling apparatus; (o) coal and ash-storage bunkers; (p) breeching; (q) miscellaneous equipment.

SUBSTATION MACHINERY AND EQUIPMENT

"2. The principal parts of substation machinery and equipment are as follows: (a) Machinery foundations; (b) rotary converters; (c) transformers; (d) reactances; (e) oil switches; (f) high-tension bus and structure; (g) switchboard; (h) traveling cranes; (i) wiring a.c. and d.c.; (j) air-blast apparatus; (k) storage battery.

SHOP MACHINERY AND TOOLS

"3. The principal parts of shop machinery and tools are as follows: (a) All classes of shop tools and machinery.

"4. The replacement of any one of the foregoing items in paragraphs 1, 2 and 3 complete would constitute a proper charge for renewal account or, in case the replacement was an improvement over the item replaced, the excess cost, if any, would be a proper charge to capital.

"In instances where a machine has received constant repairs over a period of time, the cost of such repairs being charged to maintenance, and eventually some portion of the machine requires complete renewal, the cost of which might represent a large sum of money, such an expense would not be in the nature of ordinary repairs or maintenance, but should be considered as extraordinary maintenance and upon consideration by the board could be construed by it as properly chargeable to renewal account; as illustrations—the replacement complete of tubes in a water-tube boiler; the reconstruction complete of brick settings under a battery of boilers; the complete rearrangement of the piping system; the rewinding of a generator; the replacement of plates or cells in a storage battery.

"5. Machine and tool equipment.—The first installation of machine and tool equipment, such as cutting tools, dies and jigs or other appurtenances and attachments, should be charged in the same manner as the tool or machine itself either to renewals or to capital, but subsequent replacements of such appurtenances or attachments are properly chargeable to repairs.

"Replacement of hand tools is properly chargeable to maintenance.

"6. Furniture and fixtures; office; power plant; substation; shops; car stations.—Any additional items over and above existing furniture or equipment will be a proper charge to capital in case the cost is \$200 or more. Any replacements of existing furniture or equipment complete would be a proper charge to renewals in case the cost was \$200 or more. All replacements or new purchases costing less than \$200 would be properly chargeable to maintenance.

DIVISION "P"—TUNNELS

"1. Tunnels and subways under viaducts.—The tunnels under the Chicago River have been built with the idea that, with proper maintenance under normal conditions, they would last for an indefinite period of time. If, by reason of accident or because of some unforeseen structural weakness, it should become necessary to rebuild the tunnel in whole or in part, the disposition of the cost would be the subject of special consideration.

"2. The renewal of tracks and electrical transmission system in the tunnels is covered by general rules relating thereto.

"3. The replacement of the lighting system, complete, would

be a proper charge to renewals, but the replacement of lamps, globes, individual parts and general repairs should be charged to maintenance.

"4. The replacement of a drainage system complete shall be charged to renewals.

"5. The replacement of a pump shall be charged to renewals.

"6. The replacement of a wooden subway under a viaduct by a cement subway shall be charged to renewals, and the excess cost over the cost of the wooden subway, if there be an excess, shall be charged to capital.

BRIDGES AND VIADUCTS

"As the companies at the present time do not own and have no equity in the bridges and viaducts traversed by their tracks, the question of renewals is confined to the tracks and transmission system. These are covered by the general rules relating to each."

The rules have been approved for the board of supervising engineers by the following: Bion J. Arnold, chairman; Geo. Weston, representing Chicago; Harvey B. Fleming, representing Chicago City Railway and the Southern Street Railway; John Z. Murphy, representing Chicago Railways; A. L. Drum, representing Calumet & South Chicago Railway; F. K. Parke, secretary and auditor; L. H. Davidson, assistant secretary.

REPORT OF BLOCK SIGNAL COMMITTEE TO THE INDIANA RAILROAD COMMISSION

The committee of interurban officials appointed by the Indiana Railroad Commission to consider the subject of block signals made the following report to the commission on Feb. 24:

"The committee appointed by you to investigate the question of block signaling on interurban railroads begs to submit the following further report:

"Through a member of the committee examinations have been made of the following systems:

"1. The system of the National Electrical Manufacturing Company, of Elgin, Ill.

"2. The system of the Hall Signal Company, of New York.

"3. The system of the Nachod Signal Company, of Philadelphia, as in use on the Mahoning Valley line, between Youngstown, Ohio, and Sharon, Pa.

"Additional information has also been received from the United States Electric Company, Chicago, and the Kinsman Block System Company, New York, in relation to their respective systems of short track circuit signaling.

"The committee has also received additional information as to tests with light signals of the continuous track circuit system of the General Railway Signal Company, and is endeavoring to secure additional information with relation to certain other systems of block signaling.

"The committee to-day has had a personal conference with a representative of the Kinsman Block System Company, who advises us that the short track circuit system of that company with the semaphore type of signal will be ready for installation April 1, 1911. The Kinsman company has been asked to submit a proposition for the experimental installation of the first developed signals of that company of the semaphore type, and it is hoped that such an experimental installation may be made early in April.

"The committee desires to have a further meeting in Chicago at the time of the convention of the American Railway Engineering & Maintenance of Way Association on March 21 to 23, when an exhibit of a number of various types of signals for steam and electric roads will be made.

"The committee asks that further time be granted for investigation and report and suggests that the date be fixed April 15, at which time it is hoped that the experimental installation of the Kinsman system may be under way, if not completed."

The report is signed by the committee as follows: A. W. Brady, C. D. Emmons, C. N. Wilcoxon, W. J. Irwin, M. H. Hovey and R. I. Todd.

The report was approved and the time extended as requested.

INSPECTION OF RAILWAY MATERIAL DISCUSSED BY NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on the evening of Feb. 23, with Vice-president Franklin Woodman in the chair. After the usual dinner a paper was read by Henry Gulick, president of the Gulick-Henderson Company, Pittsburgh, Pa., on "The Inspection of Electric Railway Material and Equipment." The author pointed out that inspection of materials and testing are important and closely associated, first to secure greater safety and, second, to increase efficiency by better workmanship. Failures of equipment or material in service can affect every department of an entire organization. Integrity, fidelity, experience, agreeable personality and withal a stiff backbone are the qualifications of a successful inspector. If the inspector is on the ground at the beginning of an order much time can frequently be saved by the prevention of bad workmanship and the use of improper materials.

Mr. Gulick emphasized the point that tests are of value only when they represent something definite. The requirement that one axle for each certain number of a given heat shall be made longer for test is entirely unreliable. A much better plan is to ask the manufacturer to make an extra axle for each lot to be tested. Clearly defined sets of specifications reduce the chances of false interpretation or misunderstanding to a minimum. Where chemical analyses and physical tests are both prescribed the greatest care must be used to avoid conflicts. For this reason a very thorough knowledge of manufacturing processes as well as the service requirements is needed in the drawing of new specifications. No manufacturer ever improves his product until forced to do so by the urgent needs of the service. The author criticized the making of rigid specifications without backing them up by test requirements, and urged the writing of specifications with sufficient leeway for both physical and chemical requirements. For important materials the maximum and minimum limit should be made flat and absolute for acceptance or rejection. As an operating official the railway man can give but limited attention to the selection of materials, and unless some serious failure comes to draw special attention to the fact there is a tendency for the material in question to become a secondary consideration. If it were possible to have measured and recorded every loss due to improper material, including loss of efficiency, loss due to failure, cost of replacements, losses due to poor construction, etc., the aggregate would be amazing. It is not well for heads of departments to become accustomed to small failures which are easily classified under the term replacements. If these avoidable losses were reduced to a minimum they would counterbalance some of the increasing costs which are looming specter-like before the traction operator.

Regarding the inspection of specific equipment parts and details, Mr. Gulick pointed out the importance of examining ties and rails before they are shipped to the railway company, and urged more careful study of wheels of the steel type. Actual trial in service seems necessary with wheels thus far. Open-hearth steel should be used in the manufacture of solid steel wheels, but the railway company cannot readily specify chemical details as yet in this equipment. The mounting on the same axle of two wheels of the same hardness will tend toward more even flange wear and will increase the life of the wheel. In a short time improved records of mileage will be a definite guide as to the proper grade of steel to use, and the time will come when every heat of steel used will be rechecked. The importance of keeping a close record of wheel mileage cannot be exaggerated. Tire thickness is the most important point in the physical examination. Much can be learned regarding wheels by physical inspection and measurement.

In the inspection of axles the utmost care should be used, and the inspection begun where the blooms are made, with a reasonable supervision at each stage of the process. Very close records of axle manufacture and inspection are desirable, but it is important to bear in mind the fact that as the details specified

are increased the possibility of some small error in the treatment is increased. This may result in jeopardizing the element of safety, especially if the manufacturer is not thoroughly experienced in every part of the process. It is entirely possible, however, to prescribe the tests in detail and thus to insure like material within the limits specified. When forgings are permitted to cool after hammering and then reheated together in certain lots and to a given temperature there is every reason to assume that a random test will be representative of the lot. In case axles or shafts are warmed after treatment or cooling, they should not be straightened cold but should be reheated. It is good practice to have the manufacturer machine all over forged axles and shafts for important service.

The best results in truck building are obtained by building the frames in jigs, with the greatest care in assembly. The comfort of passengers is greatly increased by the use of a frictionless side bearing mounted with small clearance. It is improper to mount the first wheel from the collar or end of the axle and to measure from the outside of the wheel hub, for the reason that the height of the hub on the outside of all steel wheels is one dimension which is never accurate, since practically all orders call for the distance from the flange to the back of the hub to be as accurate as possible, and the front height of the hub is the accumulation of necessary variance. Neat fits, close riveting and square frames are important on steel cars.

DISCUSSION

Paul Winsor, chief engineer of motive power and rolling stock, Boston Elevated Railway, said he was a thorough believer in specifications and inspection. The company is constantly improving in its specification work and getting better results. Thus, inspection has bettered the quality of trolley wire purchased, and careful specification has increased the number of bidders. To hold the manufacturer to specifications throws no little light upon his own production conditions and facilitates the fabrication of better material.

G. W. Palmer, Jr., electrical engineer, Boston & Northern Street Railway, also expressed his particular interest in specifications. For some time his company has tried to purchase as much material as possible on this basis. The work covers not only the composition and properties of materials, but conferences with the manufacturers upon what is practicable for them to produce. Manufacturers do not always have knowledge of chemical constituents. In one case the percentage of acetone extract in rubber insulation for wire was extraordinarily high. It was found that the manufacturer had no chemical knowledge and passed out his product with no regard to satisfying the chemical requirements of the purchaser. There is a crying need for the use of inclusive specifications when materials are compared on the basis of competitive bids. After the specification is written it is of equal importance to follow it up in the mill. Proper preparation, systematic inspection, testing and rejection must all come into play to insure the best results.

John Lindall, Boston Elevated Railway, spoke briefly of the value of specification writing as a means of training the railway man to secure equipment more in line with his needs.

C. G. Bacon, Jr., engineer of the Carnegie Steel Company, emphasized the thorough inspection in the mills of his company, there being at least eight inspections of steel wheels in the processes of manufacture. He said that there is little incentive for the manufacturer to go to the purchaser with an improvement unless he knows that it is needed and is prepared for a thorough consideration of the cost question.

M. V. Ayres, electrical engineer, Boston & Worcester Street Railway, said that competition in supplies calls for the use of specifications in order to secure the best results. He felt that the work of the American Electric Railway Engineering Association in connection with standards was along the right line and that more should be done. It would be a great advantage if the companies had several classes of specifications of the association for different kinds of materials and equipment. Inelastic, frozen specifications are harmful, and specifications should be amended from time to time in order to escape this criticism.

A. D. Woods, of Arthur D. Little, Inc., Boston, said that many misunderstandings arise from improper specifications, and that practically all electric railway supplies can be purchased by specifications. He emphasized the importance of testing, and said that tests show that the lowest priced article is sometimes the most expensive. Companies of small size can often save from \$10,000 to \$25,000 a year by purchasing coal on specifications and by proper tests for their conditions.

In closing, Mr. Gulick said that inspection is simply counting the purchaser's money, and that the care with which nickels are counted in the transportation department should be extended to the purchase of supplies.

TALKS ON ACCIDENTS TO EMPLOYEES OF THE CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

Talks to trainmen and other employees of the Cleveland, Southwestern & Columbus Railway, designed to prevent accidents, are given regularly by E. F. Schneider, general manager of that company. Frequent references to the work of Mr. Schneider, which was started when he was the claim agent of the company, have been published in the *ELECTRIC RAILWAY JOURNAL*. Abstracts of two talks given by Mr. Schneider recently are published below. At each of the meetings Mr. Schneider began by reading "The Southwestern Creed," which was published in the *ELECTRIC RAILWAY JOURNAL* for Jan. 14, 1911, page 94. The remarks were illustrated by incidents which had recently occurred on the line.

TALK OF MR. SCHNEIDER AT MEETINGS WITH TRAINMEN ON FEB. 7, 8 AND 9, 1911

"The new method of trying to appeal to the better nature in man—of asking him as an abstract principle to do right because it is simply right to do, to do things without fear of punishment, without hope of reward—seems to be deficient at the present time. The men who have fallen down within the last few days feel as bad about it as I do. They all wish it hadn't happened. What are we going to do about it? What am I going to do about it? Does it absolutely take that rigid enforcement of the discipline of the old school to get results? I cannot believe it yet. You may force me to do it, but I am going to take one more chance. I am going to give you men the benefit, and ask you to shoulder part of this burden and have a watchful and careful eye, not only upon your own actions, but upon your fellow employees. Will you atone for the faults of the past by being that much better in the future? If you do, well and good. If you do not, you are lacking in that spirit which I had a right to suppose you possessed.

"There is always an element of service from the employee to the employer which is the spirit of the man. You can call it the spirit of honesty or loyalty or conscientiousness or anything you choose, but the employer knows it when you give it to him. It is a big help and has a real and tangible value, and this is the service we are asking of you.

"Heroism, in my estimation, at any rate in the application to our business, is a relative term. Heroism is often an impulsive exercise of the naturally inclined tendency to save human life or human beings from harm, and that can be illustrated in no better way than by the fact that the motorman or conductor or employee of a railroad who is daily engaged in a hazardous business would be one of the first to lend aid, often at the risk of his own life. Suppose a mother and a daughter were out driving, and the horse became frightened and ran away. I can imagine that horse running away in front of one of our stations where a number of our employees often congregate. I can picture in my mind's eye a number of our men who would not hesitate a moment to risk their lives in order to stop that horse in its mad flight. What is it in man that causes him to act so quickly, so impulsively? It is the value of human life, on which he and every one has learned to put an incalculable estimate.

"When we put that same natural, inherent, impulsive tendency to preserve life in actual operation in our daily life, when we

use the same heroism, but modified to fit into our daily life and occupation, when we allow the good and true which we naturally possess to dominate instead of allowing the untoward influences to occupy our mind while on duty, when we are willing to take our run in the morning, or do the duty assigned to us for the day, with a heroic mind, with a true heart and in the true spirit, then we shall see the dawn of a new era.

"You might just as well say that you can't prevent contagious diseases as to say that you can't prevent accidents. You all know of the infectious diseases that have been carried and transmitted by mosquitoes and you know how yellow fever has been practically exterminated by the use of oil which kills the mosquitoes' larvæ. You can prevent disease. You can prevent accident. According to the Rockefeller Institute for Medical Research of New York, many old fallacies have been exploded. It has been said that 75 per cent of the modern doctors are not fit to advise us. Notwithstanding these figures you know that the amount of disease which has been prevented has been very great. Then you must admit that if with 75 per cent of inefficient practitioners you can produce the marvelous results which have been produced during the last 25 years in the prevention of disease, then 100 per cent of good, strong, honest, able-bodied, clear-headed, high-minded trainmen and employees can produce relatively much greater results in the prevention of accidents, and with 100 per cent of efficiency in men we will produce 100 per cent efficiency in results, and we will run the Southwestern without any accidents.

"We are now starting on the fourth year of this system of preventing accidents. To me this is the crucial year. What we have done you all know. I am particularly anxious to make a record this year, for I believe that if we stand the test this year the system will have passed the experimental stage, and we can stand before the world as an example of what can be done

"The other day at the hotel a man told me that the personnel of the road had changed wonderfully during the last four years; that he could see a marked difference in the attitude and feeling of the men. What does this mean? Have the old men been replaced by better men? No, they are, as far as we have been able to keep them, the same old men. Would there be any benefit in trying to improve our service and lessen accidents by replacing the older men with newer and less expensive men? No, the oldest man is the cheapest from a monetary standpoint. What has caused this marked change? In my estimation this fact has become established among you which makes you more optimistic and which in itself creates a better feeling in the mind of each individual. You all know you will get a square deal. You all know we do not like to change. You all know we try to correct instead of trying to discharge. You all know there is more respect from others for you and your business if you, by your own dignity of bearing, make a respectable business of railroading.

"We are trying to make records in 1911. There is one record above all others I should like to make during this year. I should like to say that we have not discharged a trainman during the whole year. That would mean that you men were so efficient, so careful, so good that not one of you was compelled to leave the employ of this company. In my estimation there is nothing which would establish you and your character in the minds of the public more than to be able to say that the Southwestern had not found it necessary to discharge a trainman or employee for flagrant violation of the rules or for dishonesty.

"I want to ask one favor, and that is when the general manager or superintendent is out on the line do not pass the word along. Let us view things as they are. We, of course, want you on your good behavior all the time, but don't deceive us by doing things differently when we happen to be on your run. We may be able to correct things that need it, and in trying to put on a fictitious appearance you do not benefit yourself, your fellow employee or the company. Some of our best conductors think they are called upon to pass the word along the

line when they discover a 'spotter.' No man has been hurt on this road when he was an honest or efficient man. If you can help make an honest man of a conductor who has not been right, if you can help make an efficient man of a motorman who is not as careful as he ought to be, you have accomplished something.

"The highest standard for our men as to honesty, sobriety, character and efficiency is to be the watchword for 1911.

"I want you all distinctly to understand that the actual fact of your turning in an accident report does not react against you. Our reports are coming in regularly and promptly, and very seldom do we have occasion to find fault with the report or the number of witnesses procured. We never have had accident reports made out for as trivial matters as at the present time, and I wish to commend you upon this part of the work.

"It certainly has been a satisfactory year in this department, and with the feeling there now is among our employees, that personal interest which each one of you have, and in which you are so loyally supporting the company, we will surely make a better record in 1911. I cannot tell you how much I appreciate this great work you are doing, and I know it must be a source of great gratification to you individually to know and to feel that your company is the advance guard in elimination, the actual elimination of accidents."

TALK OF MR. SCHNEIDER AT MEETINGS WITH EMPLOYEES OTHER THAN TRAINMEN ON JAN. 4 AND 6, 1911

"I have told the trainmen, and I now want to tell you, that the methods we have introduced here and which up to this time have been fairly successful are being criticised by other managements as wholly inadequate and unpractical. I believe these managers would say that a little education is a dangerous thing. Instead of taking advantage of the advanced position of all laboring men and reasoning with them and appealing to them, they are the fellows who want to rule with a rod of iron. They want to have the old-fashioned military guardhouse methods, and, to my mind, gentlemen, those methods for obtaining the good and true that is in men are things of the past. We must appeal to the good that there is in man. We must appeal to the reason of our employees, for they are reasonable and reasoning men. Our reputation as a road on this great and vital question is, therefore, at stake. We must prove to the world that we are on the right track.

"The primary reason, then, for this meeting is so to understand the conditions which prevail that you men can cooperate with each other, not only in your own department, but with all other departments, to the end that we may run the Southwestern without accidents of any kind. Let me give you a quotation that I saw in a paper the other day: 'When you hear a man remark that accidents will happen you may be pretty sure he has been doing something he shouldn't.'

"According to recent statistics in the city, 60 per cent of the passengers carried on street cars are ladies, and I am sure that the greater number of accidents we have on our cars are accidents to women. This does not show that chivalry to which our women are entitled. The pride of every man should be to shield them from harm.

"The dangers in and around a power plant and substation you well know, and they are many. You have safeguarded yourselves and each other to the extent that we have recently had comparatively few accidents to our employees. It is, however, one of the places where eternal vigilance is especially necessary.

"One becomes accustomed to the dangerous part of this business, and therein lies the trouble. The daily contact with the danger often makes one careless, and an engineer, oiler, substation man or lineman is often so accustomed to the dangers that surround him that he loses respect for them. Always be on the safe side.

"To substation men and those in charge of the power house I would again add a word of caution when linemen are out on the road hunting for trouble. Safeguard them as you would your own life. They are deserving of all the care and caution you can exercise for them.

"This time of the year you linemen are subject to the weather conditions, and it is indeed a hard lot. You are more subject to danger when you are cold and numb than when the weather is more favorable. Have a care not only for yourself, but try also to help think for your fellow lineman and give him all the help you can.

"Injuries, especially those which happen to employees, frequently occur because men do not stop long enough to think. You linemen will laugh at this example. A railroad man wanted to measure the distance from a railroad crossing track to our high-tension line and took a steel tape line and threw it over our high-tension wires. Just think of such a fool-hardy trick!

"We have had six cases of injured eyes in succession, until your superintendent asked me to buy goggles in order to protect the eyes of our employees. I have been through the shop several times recently and have noticed on each occasion that some one went to the emery wheel and used it without putting on the goggles provided.

"This company is anxious to safeguard you in every way possible, and we are constantly thinking of making your work more safe. If you have any ideas as to how to make the tools and machinery you are working with more safe, be sure and let us know.

"This is the most dangerous time of the year for the track. The sudden drops in temperature are especially hard on steel, so that often a piece of steel will break with comparatively a slight blow, or without a jar or blow of any kind. Frogs, crossings and switches are all subject to these climatic conditions, and with the snow and ice to contend with you have a very responsible position. The safety of our passengers depends largely upon your vigilance and your trustworthiness, and I feel sure you will co-operate to the fullest extent, so that your part of this great work will be done in such a manner that no signs of omission or commission can be laid at your door.

"We are all cogs in this great piece of machinery. You and I fit into our respective niches, at least for the time being. Any cog which becomes broken or loose destroys the effectiveness of all the machinery. You are an essential, an integral part of this great system. It seems to me we all ought to be proud to be a part of this great system, the only system that I know of which is putting forth every effort, which is straining every nerve, which is leaving nothing undone in order that its employees may realize and may feel that they are just as necessary and just as essential to the building up of this road as any one else, and that it is a privilege as well as a pleasure to be connected with a road whose motto is first and always 'A road without accidents.'"

LONDON TRAMWAYS REPORT FOR 1910

The annual report of the chairman of the County Council of London, England, states that 30 miles of electric tramway were opened in 1910. On Dec. 31, 1910, there were 136 route miles, of which 119 miles are electrically operated. During the year conciliation boards were adopted to deal with rates of wages and general conditions of labor. No case in which a decision is rendered by a conciliation board can be reopened within 12 months, and the plan of conciliation is to be in force until six months after notice has been given by one side to the other of a desire to terminate it, but no such notice is to be given before Oct. 31, 1912. The average daily number of cars in operation is 953 electric cars and 120 horse cars. During the year 451,439,216 passengers were carried, of whom 210,000,000 passengers paid penny fares. The number of car miles run was 43,160,186. The total capital expenditures on the undertaking up to March 31, 1910, were £10,709,504. The total receipts were more than £2,023,000, and the operating expenses were £1,234,000, so that there was a balance of about £789,000. After allowing for debt and other charges, the surplus carried to appropriation account was £192,109, of which £123,231 was carried to the renewals fund and £59,978 to the general reserve.

DEVELOPMENT OF MCKINLEY LINES DURING 1910

On Feb. 28 the publicity department of the Illinois Traction System, under the guidance of F. G. Buffe, had inserted in numerous daily and weekly newspapers throughout Illinois eight-page supplements containing illustrated descriptions of the last year's progress on the McKinley lines in Illinois. These supplements were circulated to cover every town reached by the System. The publicity department prepared all the reading matter, illustrations, borders, etc., and supplied the matrices or stereotype plates for each paper. The reproductions in some papers were in colors. The arrangement of engravings and reading matter was similar to the magazine section of a Sunday newspaper. Sixty-three half-tone engravings, some of which were 5 in. x 15 in. in size, a number of ornamental border sketches and headings, together with a map of the road, were used in this supplement.

The subjects included the following: McKinley Electric Bridge at St. Louis; Latest Triumph of Illinois Traction System; Shops and Terminals; Equipment and Power; Belt Lines Completed; Illinois Traction Cities; Safety; Stations, Bridges and Buildings; Illinois Traction Officials; Chicago, Ottawa & Peoria, in Northern Illinois; How Big Systems Are Organized; Sleeper Trains; "The Road of Good Service" and Its Executive, Operating and Traffic Officials.

In general these subjects have largely been treated in past issues of the *ELECTRIC RAILWAY JOURNAL*, but a few extracts from the large display supplement follow: The freight and express terminal at St. Louis, which will comprise 24 acres of freight yards, is now almost completed. Belt lines for rapid freight handling have been built at Granite City, Edwardsville, Decatur and Springfield. Among the new freight equipments are six electric locomotives built at the Decatur shops. Reference is made to the sleeping car service between Peoria and St. Louis, to the straightening out of track over several sections and to the extensive installation of dispatchers' and automatic block signals. Announcement is also made of the construction of new substations, the enlargement of the Decatur and Venice shops, and the construction of observation parlor cars. Several large coal storage centers are being

Last year the Illinois Traction System operated over 220,155 passenger trains; over 13,000,000 people were carried on the interurban lines and 60,000,000 people on the different city lines. The freight business amounted to over 500,000 tons. The traffic department has recently added a milk and dairy agent to its organization to assist the farmers in enlarging this profitable source of income. Milk trains are now run on the southern division into St. Louis. This business is rapidly growing.



Typical Passenger Station at Localities Where No Substation Is Required

In the northern part of Illinois the lines of the McKinley system are being extended toward Chicago. The Chicago, Ottawa & Peoria Railway, better known as the Illinois Valley Division, now has 90 miles of road, connecting the manufacturing cities, rich farms and extensive coal mines of the Illinois Valley. Much of the right-of-way between Morris and Joliet has been secured. The franchise for the entrance into Joliet has been obtained, and before another summer the 22 miles from Morris to that city will have been completed. The next extension will be toward Chicago, whence a connection will be made from Streator or some other point for a continuous line to St. Louis. This road is under the same management as the Illinois Traction System, although it is part of the Western Railways & Light Company. W. B. McKinley is president and H. E. Chubbuck is vice-president executive.



Freight and Express Terminal Under Construction in St. Louis

constructed. The one built at Mackinaw Junction will have a storage capacity of 15,000 tons, while the Riverton installation will have a capacity of 10,000 tons. Where coal is not plentiful it will be stored under water in concrete-lined reservoirs. The new combination freight and passenger stations for small towns are of the handsome design shown in an accompanying illustration. These buildings are of red and buff brick with roofs of red tile.

The road was started 11 years ago by Mr. Chubbuck, who left it to assume charge of all the McKinley interests. H. J. Vance is general superintendent directly under Mr. Chubbuck, with headquarters at La Salle. At Marseilles it has bought the water-power rights and is constructing a 4000-hp hydroelectric plant. This line has interchange arrangements with the Chicago & Northwestern and the Rock Island railroads, principally for the transfer of coal and other heavy freight.

SINGLE-PHASE RAILWAYS ABROAD

The *Elektrische Kraftbetriebe und Bahnen* has just published a list of the single-phase railways equipped by the two principal German manufacturing companies, Siemens-Schuckert-Werke and Allgemeine Electricitäts Gesellschaft. These lists are printed herewith.

SINGLE-PHASE ROADS WITH A. E. G. EQUIPMENT.

Name of Road.	Voltage.	Frequency.	Number of Motor Cars or Locomotives.	Motors per Car or Locomotive.	Capacity per Motor.	Motor Capacity Total Horse-power.
Royal Prussian Govt. R. R.:						
Spindlersfeld.....	6,000	25	2	2	100	500
Blankenese-Ohlsdorf.....	6,000	25	54	3	115	19,550
Blankenese-Ohlsdorf First Order.....	6,000	25	25	2	200	10,600
Blankenese-Ohlsdorf Second Order.....	6,000	25	17	2	200	7,400
Oranienburg Experimental R. R.....	6,000	25	1	3	350	1,400
Oranienburg.....	6,000	25	1	2	300	600
Dessau-Bitterfeld.....	10,000	15	1	1	1,000	1,000
			1	1	800	800
			1	2	950	1,900
Stubaital R. R.....	2,500	42	4	4	40	720
Borinage.....	600	40	20	2	40	1,680
Royal Swedish Govt. R. R.:						
London-Brighton R. R.....	6,000	25	2	2	115	575
London-Brighton R. R.....	6,000	25	16	4	115	7,820
London-Brighton R. R.....	6,000	25	30	4	150	20,100
Padua-Fusina.....	6,000	25	10	2	80	1,760
Padua-Fusina.....	6,000	25	3	2	80	480
Menzelschacht (Mine).....	2,300	42	2	3	40	240
Hibernia, Gelsenkirchen (Mine).....	165	50	3	2	15	90
Kirchbichl, Tirol (Mine).....	150	40	1	1	15	15
Letschberg R. R.....	15,000	15	2	2	800	1,600
Pamplona-Sanguesa.....	6,000	25	5	4	80	1,600
Karlsruhe-Herrenalb.....	8,000	25	11	2	85	2,635
Chemins de fer du Midi.....	12,000	16 2-3	1	2	800	1,600
Neapel-Piedimonte.....	11,000	25	11	4	80	3,520
Thamshavn-Lökken.....	11,000	25	2	4	80	960
Rjukan R. R.....	10,000	15	3	4	125	2,125
Mittenwald R. R.....	10,000	15	2	2	800	4,800
Vienna-Pressburg.....	10,000	15	3	1	800	5,400
			5	1	600	
			245		101	470

Several of the roads included in the list of the Allgemeine company have been carried out through the A. E. G. Union Company of Vienna or the A. E. G. Thomson-Houston Company of Milan, Italy.

Some further information has also been made available with regard to other installations. The Prussian government railroads have decided that the standard electric locomotive for trunk line service should carry single-phase motors having an aggregate one-hour rating of 1800 hp when running at 307 r.p.m. This equipment will give a speed of 120 km per hour (74.4 m.p.h.) to an engine with one leading, one trailing and three driven axles.

The Vienna-Pressburg Railroad, which was originally planned for three-phase operation, is to be operated with single-phase current at 15 cycles, and 10,000 volts. Another Austrian road which will use the same standard is the Mittenwald Railroad, a mountain line which connects with a Bavarian railroad on which the same frequency and voltage are used. A most interesting case is that of the Rhätisch Mountain Railroad in Switzerland which connects directly with the Bernina Railroad. Despite the fact that the latter road is now operated at 800-volt direct current, the new line will have 10,000-volt, 15-cycle, single-phase equipment. The Swiss line is about 74 km (46 miles) long. The current will be taken from a station at Brusio which also supplies the Bernina Railroad. Converter equipment at Bevers or Pontresina will convert three-phase energy at 25,000 volts, 50 cycles, to the single-phase trolley potential frequency mentioned. The Siemens-Schuckert and Oerlikon Company jointly will furnish multiple catenary con-

struction with automatic tension devices for the 47-km (29-mile) section between Zernez and Pontresina. The overhead construction from Zernez to the Schuls terminus will be furnished jointly by the Alioth Company and the Allgemeine Electricitäts Gesellschaft. The locomotive equipment will comprise one 600-hp and six 300-hp units from the Allgemeine company and Brown, Boveri & Company; one 600-hp and one 300-hp

SINGLE-PHASE ROADS WITH SIEMENS EQUIPMENT.

Name of Road.	Voltage.	Frequency.	Trolley Length in Miles.	Number of Motor Cars or Locomotives	Motors per Car or Locomotive.	Capacity in Horse-power per Motor	Total Horse-power of Motors.
Royal Prussian Govt. R. R.:							
a) Blankenese-Ohlsdorf.....	6,300	25	40.30	6	2	175	2,275
First Order.....			1.86	8	2	180	2,880
Second Order.....							
b) Dessau-Bitterfeld.....	10,000	15	21.70	1	1	1,100	1,100
1. Locomotive.....				1	1	1,800	1,800
2. Express.....				1	1	800	800
3. Locomotive.....				1	2	1,250	2,500
4. Freight.....							
Gran'duke Badish Govt. R. R.....	10,000	15	37.20	10	2	525	12,600
Wiesentalbahn.....							
Royal Swedish Govt. R. R.:							
1. Tomtebodavartan.....	20,000	25		1	3	110	330
2. Kiruna-Riksgransen.....	15,000	15	93	2	1	1,250	2,500
a) Locomotive.....				13	2	1,250	32,500
b) Freight Locomotive.....							
Murnau-Oberammergau.....	5,500	16	16.12	5	2	100	1,000
				1	2	175	350
Roma-Civita Castellana.....	6000-550	25		4	4	40	800
First Order.....				4	2	40	320
Second Order.....							
Seebach-Wettlingen.....	15,000	15	13.33	1	6	225	1,575
Vienna-Baden.....	550	15	40.30	19	4	60	4,800
				1	2	30	60
Rotterdam-Haagscheveningen.....	10,000	25	47.43	19	2	175	8,750
First Order.....				6	2	175	2,800
Second Order.....							
Midland-Railway.....	6,600	25	20.77	2	2	175	875
Provinzialbahn Parma.....	4000-400	25	37.20	10	2	75	1,800
Spiez-Frutigen.....	15,000	15	12.40	3	2	225	1,800
Waitzen-Budapest-Gödöllö.....	10,000	15	35.96	11	2	150	3,900
				4	2	240	1,920
Haute Vienne.....	10,000	25		35	2 and 4	60	6,960
St. Pölten-Mariazell.....	6,500	25	65.72	14	2	250	7,500
Mülheimer Mining Corporation.....	250	50	4.34	5	2	18	180
Total up to September, 1910.....			487.63	188			104,675

unit from the Siemens-Schuckert and Oerlikon companies; one 600-hp and one 300-hp unit from the Alioth and Allgemeine companies.

WESTINGHOUSE WIRE-TYPE TUNGSTEN LAMPS

In the article on wire-type tungsten lamps in the issue of this paper of Feb. 18 an error was made in transcribing the last paragraph in stating that "the Westinghouse Lamp Company is now prepared to recommend them [the wire-type lamps] for electric railway cars." The statement should have read that the Westinghouse Lamp Company has not tried these lamps in electric car service, but the satisfactory results obtained from their use on steam roads and in industrial plants indicate that a satisfactory tungsten lamp for street railway service may be expected in the not too distant future.

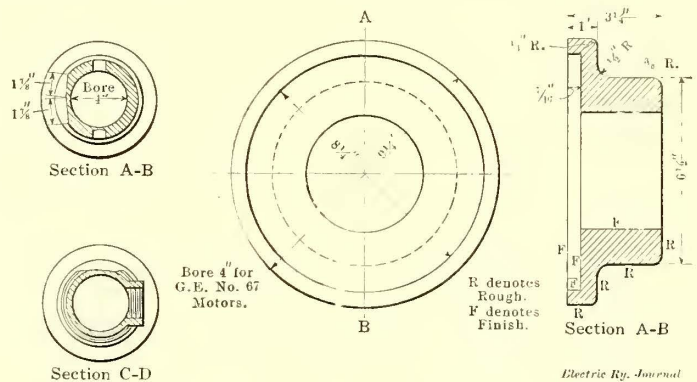
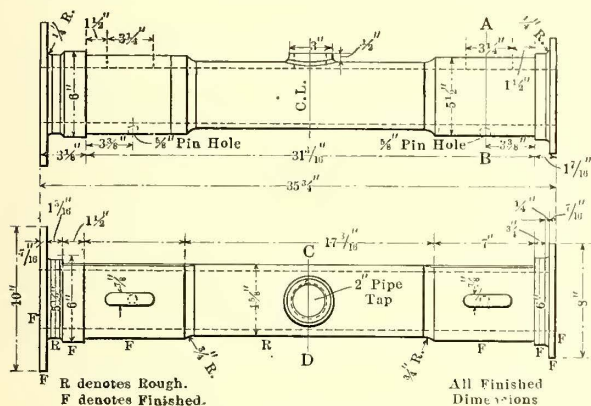
ATLANTA SHOP NOTES

Since 1907 the Georgia Railway & Electric Company has enlarged its shop facilities by the construction of a machine shop 200 ft. x 200 ft. in area, built with brick walls, concrete floors and tar and gravel roofs. The painting and car construction shop, as well as part of the storeroom, are also being rebuilt during the present year in brick and concrete. All of the shops are fully protected with sprinklers and hydrants. The following paragraphs will describe some of the shop practices carried out by W. H. Glenn, vice-president and general manager of railroads, and A. M. Moore, master mechanic.

Cars are sent to the shops only when ordered in by an inspector. Once the car enters the shop it is thoroughly overhauled with the exception of paint touch-ups, which are made every 15 months to 18 months. Individual records are kept of all maintenance charges per car to permit comparisons of different classes of equipment in the same service. Approximate mileage records based on trip sheets are also kept on wheels, axles, armatures and other parts.

TROLLEY WHEEL AND FOUNDRY PRACTICE

Trolley wheels made of 89 parts copper, 10 parts tin and 1 part antimony are giving an average life of 5000 miles at a cost of 15.8 cents per 1000 miles. The wheels are oiled nightly at the top of the car. In 1908 the total cost for all current-collection labor and material, namely, wheels, harps, poles, washers, etc.,



Details of Brass Axle Sleeve for GE-67 Motor and Cast-Iron Axle Collar Used with Sleeve

from the base up, was only 19 cents per 1000 miles. The trolley bases are kept at a tension of 15 lb. to 20 lb.

The trolley wheels and many other brass and iron parts are made in the company's own foundry. In 1909 it produced 348,965 lb. of iron castings for 0.0132 cent per pound, against a market cost of 0.0175 cent per pound, and 17,222 lb. of brass at 15 cents per pound against a market cost of 20 cents per pound. The manufacturing price included labor. After allowing \$200 investment charge, the net profit for the year was \$2,188.53. The 1910 output in brass was about 50 per cent greater and the iron 30 per cent greater than in 1909. The company uses Dixon crucibles and Whiting cupolas.

AXLE-BEARING SLEEVES AND ARMATURE BEARINGS

The accompanying drawings show the standard forms and dimensions of the brass axle sleeves and shrunk-on cast-iron axle collars used with the GE-67 motor equipments. Similar sleeves and collars are in use with the Atlanta company's other motors. The use of axle-bearing sleeves involves a somewhat higher first cost than ordinary axle bearings, but this is more than balanced by the reduction in maintenance. The gears and pinions continue to stay in better mesh than when the bearing weight is concentrated at two points. As the sleeved axle penetrates the gear case for 1 1/2 in. there is no trouble from grit or dirt. The sleeves are made of scrap metal with enough new metal to work them properly.

Armature bearings are made of More-Jones armature metal, which is giving an average life of 50,000 miles on oil-lubricated motors.

LUBRICATION AND CARBON BRUSHES

All motors are lubricated under a mileage contract with the Galena-Signal Oil Company. The older motors are still lubricated with grease, although different oil cups have been tried. The cost of motor lubrication per 1000 miles for the last three years has decreased as follows: 39 cents in 1907 for 8,267,555 car-miles; 30 cents in 1908 for 8,799,000 car-miles; 22 cents in 1909 for 9,088,298 car-miles.

The Atlanta company used about 14,000 carbon brushes in 1909, but during the following year it did not use more than 4000 brushes because of the extensive adoption of the Speer and Le Carbone types. The former brushes are used on the GE-67 motors and the latter on the Westinghouse Nos. 68 and 101 motors. All commutators are being slotted. With the old brushes in use some commutators had to be turned every three months, but it is confidently expected that the new brushes will lengthen to two years the interval between turnings.

ROLLING STOCK

The Atlanta company operates 222 single-truck cars on Baltimore trucks with motors of the Westinghouse No. 68, Westinghouse No. 101, GE-67 or GE-80 types. These cars weigh about 17,500 lb. complete, including electrical equipment. As the cars seat 28 passengers each, the average weight per passenger is 625 lb. The 60 double trucks are carried on Brill No 27 F.E-1 trucks equipped with four Westinghouse No. 101 or four GE-80 motors. These cars weigh 38,000 lb. complete,

including electrical equipment. The seating capacity is 40, making an average weight of 950 lb. per passenger.

During 1909 and 1910 the company built six double-truck and 12 single-truck cars. It also converted 12 open cars to center-aisle cars with screens. A passage was cut through the inside benches and the platform benches were removed to make vestibuled platforms. The running-board type open car was found dangerous in Atlanta. The company has recently begun to build and operate pay-as-you-enter cars.

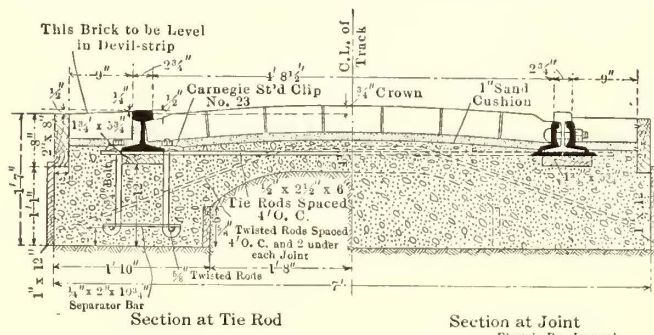
THE CLEVELAND VENTILATOR

The Nichols-Lintern Company, of Cleveland, Ohio, has been conducting tests of its Cleveland ventilator on a number of roads recently and has found that in regular city service the exhaust per ventilator averages about 2500 cu. ft. per hour and for interurban service about 4500 cu. ft. per hour. The ventilator is made entirely of sheet metal and will fit any size of upper deck sash or sash frame. It is weatherproof and draft-proof and very inconspicuous both from the interior and outside of the car. The air from the interior of the car is taken from close to the head lining and the exhaust is close to the upper and lower decks of the car. The weight of the ventilator varies, according to its size, from 3 1/2 lb. to 6 lb. The Nashville Railway & Light Company, Nashville, Tenn., recently made a test of this ventilator extending over about five months and has ordered more than 250 of them.

SUGGESTED TIELESS ROADBED CONSTRUCTION

W. A. Haller, former general manager of the Oklahoma Railway, has devised the construction shown in the accompanying cut as a suggestion for track in which ties are entirely omitted. In this design the rail rests directly on longitudinal creosoted strips embedded in concrete. The base of the rail is secured to the concrete by means of hook bolts which hook over the longitudinal reinforcing rods in the concrete, as shown in the end section. The rails, longitudinal strips, tie rods, etc., are assembled and blocked in position and the concrete is then placed. The tie rods are spaced every 4 ft. and the creosoted wood cushion strips are continuous.

During the past two years Mr. Haller has constructed over 10 miles of steel-tie concrete city track which has so far proved entirely satisfactory. However, it has frequently been asserted that a construction consisting of steel ties attached directly to the rail and bedded on solid concrete is too rigid, too likely to be noisy and even to be injurious to the rolling stock. Therefore, the tieless design incorporating a continuous wood cushion strip has been worked out in order to provide a permanent concrete roadbed with a cushioning medium between the rail and the concrete. The design shown will also permit the replace-



Section of Proposed Tieless Concrete Track Construction

ment of a 100-lb. A. S. C. E. section with either 7-in. T or 7-in. girder rails merely by the substitution of thinner creosoted strips.

INDEX TO UNIT COSTS AND QUANTITIES 100 FT. TIELESS CONCRETE AND PAVED CONSTRUCTION.

Quantities.		Cu. yds. excavation at 50 cents.....	Cost.	
Per 100 ft.	Per Mile.		Per 100 ft.	Per Mile.
32.	1,690.		\$16.00	\$845.00
CONCRETING				
20.27	1,070.	Cu. yds. stone at \$1.55 and 45 cents..	40.54	2,140.00
16.25	540.	Cu. yds. sand at \$1 and 35 cents....	13.83	729.00
22.23	1,174.	Bbls. cement at \$1.60.....	35.57	1,878.00
		Labor	21.80	1,151.00
570.	30,096.	Feet form lumber at \$20.....	11.40	601.80
		Equipment and miscellaneous.....	5.83	308.00
21.8	1,151.	Total cu. yd. concrete.....	\$128.97	\$6,807.80
TRACK.				
2.97	157.14	Tons of rail.....	\$110.00	\$5,814.00
3.33	176.	Continuous joints, at \$2.20 and 80 cents.	10.00	528.00
200.	1,056.	Bolts } r-in.x4 1/2-in. track bolts at \$6	1.08	55.20
.18	9.2	Kegs }		
3.3	176.	10-in. x No. 0000 7/8 bonds at 40 cents and 40 cents.....	2.50	130.80
25.	1,320.	1/2-in.x2 1/2-in.x6-ft. tie rods at \$0.637.	15.92	840.80
100.	5,280.	Hook bolts at 7.7 cents.....	7.70	406.56
50.	2,640.	Separator plates at 4.6 cents.....	2.30	121.44
100.	5,280.	Rail clips at 2 cents.....	2.00	105.60
200.	10,560.	Lin. ft. 1 3/4-in.x5 3/4-in. creosoted timber	4.61	243.40
440.	23,232.	Ft. } 5/8-in. twisted bars at \$2.50...	14.62	772.20
585.2	30,898.	Lb. }		
186.	9,820.	Ft. } 1/2-in. twisted bars at \$2.50....	3.95	208.67
158.1	8,347.	Lb. }		
100.	5,280.	Ft. track laying at 30 cents.....	30.	1,584.00
	5,280.	Ft. total track.....	\$204.68	\$10,810.67
PAVING.				
4,500.	235,000.	Brick at \$13.00.....	\$58.00	\$3,955.00
	60.	Brick per sq. yd.....		
20.5	1,075.	Sq. yd. border at 40 cents.....	8.20	430.00
52.	2,738.	Sq. yd. center at 30 cents.....	16.60	820.00
4.4	235.	Bbl. cement at \$1.60.....	7.00	376.00
4.45	235.	Yd. sand at \$1.40.....	6.23	329.00
		Supervision and miscellaneous.....	5.00	270.00
			\$100.00	\$5,280.00
			\$449.65	\$23,743.47
		Incidentals, 5 per cent.....	22.48	1,187.15
		Engineering and supt. 5 per cent..	22.48	1,187.15
			\$494.61	\$26,117.77

MERGER OF INTERESTS OF PAY-AS-YOU-ENTER CAR CORPORATION AND PAY-WITHIN CAR COMPANY

An important announcement was issued March 1 by the Pay-As-You-Enter Car Corporation, of New York, and the Pay-Within Car Company, of Chicago, as follows:

"We beg to announce that the interests of the Pay-As-You-Enter Car Corporation and the Pay-Within Car Company have been merged, and a central organization exclusively authorized to issue licenses under the numerous patents owned and controlled by the two companies will be created under the title of Prepayment Car Sales Company, with principal offices at 50 Church Street, New York City, and offices in Chicago and Philadelphia.

"We believe that this consolidation will very materially assist the development of modern street car design on this continent.

"Every successful type of prepayment car and door-inclosing devices on such cars will be controlled from this central organization, whose combined resources and experience will be at the service of the electric railway fraternity."

It is understood that the consolidation has been brought about largely by the fact that in endeavoring to improve their prepayment systems each company found it impossible to progress much further without infringing the patents of the other, the strength of which both companies had ascertained. The new company will be backed by the entire resources of the two other companies and by the financial interests allied with them. Duncan McDonald will be president; A. H. Englund, of the Electric Service Supplies Company, of Philadelphia, will be vice-president and general sales agent; Harold Rowntree, of Chicago, the inventor of most of the door devices which are controlled by the company, will be treasurer, and Thomas W. Casey, who has been responsible for the introduction and great success of the pay-as-you-enter principle in the United States, will be in charge of the company as general manager. The Prepayment Car Sales Company will control a large array of patents, exceeding, it is understood, 100 in number, covering the great variety of designs of prepayment car and door-closing devices owned by the two companies. The extensive work done by both companies warrants a brief statement of their histories.

ORIGIN AND PROGRESS OF THE PAY-AS-YOU-ENTER CAR

The pay-as-you-enter car was invented by W. G. Ross, formerly managing director of the Montreal Street Railway Company, and Duncan McDonald, general manager of the same company. It was first put in operation in Montreal in 1905 and at once proved a complete success, so much so that the Montreal Street Railway Company adopted the plan for its entire railway system. In the following year, in the fall of 1906, a car of the pay-as-you-enter type was exhibited at the Columbus convention of the American Street & Interurban Railway Association and proved to be one of the most interesting features at that convention.

After having an expression of opinion from the prominent railway managers in the United States, the inventors decided to exploit the car, with the result that in the month of November, 1907, the Chicago City Railway Company inaugurated the system on its lines with 300 cars, which proved another success. A little later on the International Railway Company, of Buffalo, commenced with 50 cars. In March, 1908, the Metropolitan Street Railway, of New York City, placed 155 cars in operation, and a month or so later the Public Service Railway of New Jersey followed with 150 cars. The experiment of the pay-as-you-enter feature on street cars proved so successful in Montreal, Chicago, Buffalo and on the Public Service Railway under the most severe conditions possible that it was but a short time before many of the other large electric railways throughout the country adopted the system, and to-day there are said to be over 7000 cars in daily operation on 72 railway systems in the United States and Canada.

After being exploited at first as a private syndicate, the Pay-As-You-Enter Car Corporation was incorporated under the laws of New Jersey in 1908 with a capitalization of

\$1,000,000; Duncan McDonald was elected president and Thomas W. Casey general manager. This company still exists as a subsidiary to a new corporation which was incorporated under the laws of the State of Delaware in May, 1910, with the same title but with a capitalization of \$5,000,000, divided into \$1,500,000 7 per cent preferred stock and \$3,500,000 common stock. Of the latter \$1,000,000 is in the treasury unissued. The Delaware corporation was formed under the auspices of Carlisle & Company, bankers, of New York, for the purpose of materially developing and enlarging the field for the pay-as-you-enter system at home and abroad, and its securities were exchanged for the securities of the New Jersey corporation, which was retained as the operating organization. It is understood that arrangements are on foot for the immediate formation of a separate company to deal with the European patents, and a representative of Carlisle & Company is at present in London organizing such a company.

HISTORY OF THE PAY-WITHIN CAR

The pay-within car had its origin in Philadelphia. In considering fare prepayment the Philadelphia Rapid Transit Company deemed it impracticable to build a car with a very long platform because of the narrow streets and numerous right-angle turns which would make a long platform overlap the sidewalk. Moreover, the reconstruction of any considerable portion of its rolling stock to longer platforms meant a large expense. The company, therefore, decided to remove the bulkheads and create a space on the car-floor level where the conductor could stand, and thus give the entire length of platform over to passengers. This made it possible to rebuild the cars to the prepayment plan and have a platform 50 in. long inside.

The design was worked out by the late F. H. Lincoln, then assistant general manager of the Philadelphia Rapid Transit Company, and Harold Rowntree, of the Burdett-Rowntree Manufacturing Company, Chicago, and important patents were granted to both. The first reconstruction involved 50 cars, which were placed in operation on the Twelfth and Sixteenth Street line, in Philadelphia, on Sept. 28, 1908. These cars were equipped with sliding doors and folding step, both pneumatically operated, the mechanism being supplied by the Burdett-Rowntree Manufacturing Company. The Philadelphia Rapid Transit Company instantly recognized the merit of this type of equipment, since the boarding and alighting accidents were reduced to almost nothing and the receipts were very materially increased. The conversion of additional cars followed rapidly until at the present time there are about 750 pay-within cars in operation in Philadelphia.

The Pay-Within Car Company was then organized for the commercial exploitation of the car, and the Electric Service Supplies Company, Philadelphia, which had been largely instrumental in the organization of the Pay-Within Car Company, was appointed the exclusive selling agent of the car. One of the Philadelphia Rapid Transit converted cars was shown at the street railway convention at Atlantic City, October, 1908, and created a great deal of favorable comment.

The Capital Traction Company, of Washington, D. C., was the first company outside of Philadelphia to recognize the merit of this type of car and placed an order shortly after the convention for 15 cars for operation on its Chevy Chase division, which is a combination city and suburban line. These cars were built new by the Cincinnati Car Company and had platforms 6 ft. 6 in. over all, so that it was possible to divide the platform into separate entrance and exit ways.

It soon became apparent that the field for the pay-within car would be restricted if limited to pneumatically operated doors and steps, partly on account of the expense involved in the pneumatic devices themselves and the reconstruction of old cars to provide pockets for the sliding doors, but also because a great many cars of modern design are not equipped with air compressors. The engineers of the Pay-Within Car Company, therefore, had to devise some way of manually operating doors and steps. The early efforts in this direction were quite discouraging because of the friction involved and of the inertia possessed by sliding doors of considerable size, but

finally a system of folding doors and steps with a manual device and ball bearings was evolved in which the doors and steps could be easily operated with a 6-in. handle. As soon as this apparatus was available the pay-within car became a thoroughly practicable commercial proposition, and it has been adopted by a great many roads during the past year.

PRESSED-STEEL GASOLINE TRACK INSPECTION CAR

Fairbanks, Morse & Company, Chicago, Ill., have placed on the market a new Sheffield motor car, for use where only a small one to three-man car is required. The frame of this car is made of one-piece pressed steel, which is stamped to the proper form while in the flat sheet, and then flanged to form the top, sides and bottom flanges. Pressed-steel stiffeners as well as the pressed-steel front foot rest are then riveted into the frame. The several holes in this frame, which are used for attaching other parts of the car, are all drilled in after the frame is bent, so that the frames are interchangeable. If a frame should be damaged beyond repair, a new frame can be obtained, and the other parts of the car assembled to it. Practically all the woodwork upon the car is included in the seats and tool box. A two-cylinder,



Gasoline Inspection Car in Service

two-cycle, air-cooled motor is used to propel the car, which drives directly on the front axle. The company uses the two-cycle engine as it eliminates the use of valves of any kind which are necessary for the operation of a four-cycle motor. To lubricate the entire engine, the lubricating oil is mixed with gasoline, the tank being filled with the mixture. The oil passes with the gasoline through the carburetor into the crank case of the engine, and from there into the cylinders. The gasoline is, of course, vaporized, and the oil goes through as a spray, which reaches and lubricates all parts of the motor. The car weighs about 400 lb., and it can be operated up to a speed of 30 m.p.h.

COASTING RECORDERS FOR MILWAUKEE

The Milwaukee Electric Railway & Light Company has just concluded an exhaustive test of the Railway Improvement Company's coasting time recorders, and has found that, on the trial cars, it was possible with these machines to reduce the average energy required per car mile 18 per cent or more. At the same time the brakeshoe wear was materially cut down. In consequence, the company has placed an order for 300 coasting recorders for immediate delivery. These coasting recorders are similar to those in use on the elevated and subway lines of the Interborough Rapid Transit Company of New York, and on the Broadway cars of the Third Avenue Railroad Company. The Milwaukee Electric Railway & Light Company is the first prominent Northwestern road to inaugurate this system.

RECENT TURBINE DEVELOPMENTS AND EFFICIENCIES

In a paper read before the Engineers' Society of Pennsylvania on Dec. 12, 1910, E. D. Dreyfus, of the Westinghouse Machine Company, presented some interesting data on steam turbines. Limitations in the electrical art have previously confined the rotative speed of turbines within 1800 r.p.m. for sizes above 500 kw. To-day turbines of 2500 kw are very satisfactorily operating at 3600 r.p.m., and 4000-kw turbines of the same rotative speed are soon expected. In high-speed

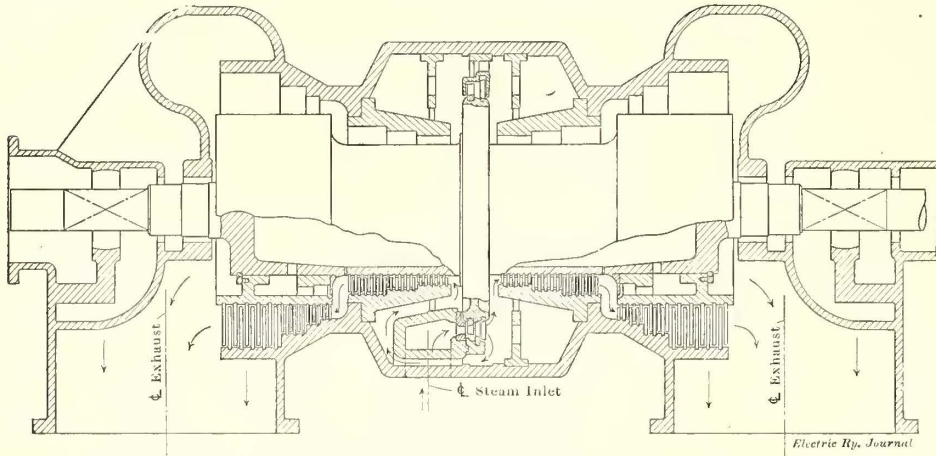
encumbered by external ports. Furthermore, independent supports are provided, permitting the exhaust passage to expand and contract freely without disturbing the alignment.

When large capacities are encountered a different problem arises. The size of the exhaust port becomes disproportionately large as compared with the turbine cylinder, necessitating a casting that is difficult to make. Naturally a division of the large volume of steam at the low pressure end suggested itself to the designer. The distance between bearings is another item that the designer of large machines must contend with in dealing with bending moments and stresses. It would be impracticable to place two reaction machines end to end and divide the flow in opposite directions through the two similar elements. One of the solutions, then, was to substitute for the longest and least efficient section of such a combined machine a short impulse wheel of about equal efficiency. In doing this the unit was made 30 per cent shorter than the single-flow design.

Another advantage secured in this arrangement, for large turbines, is the elimination of two of the dummy pistons of the reaction type turbine—the two low-pressure sections equalize their end thrust and the impulse section requires no counterbalancing, as all of the expansion takes place in the nozzles. For low speeds which obtain in 25-cycle work the intermediate stage is retained as a single-flow element in order to provide the best blade lengths.

For such high speeds as are used in 60-cycle work a straight double-flow design lends itself admirably. These improvements have resulted in the exceptionally symmetrical turbine shown in the sectional drawing. Furthermore, a decrease in length of the machine has been brought about, together with greater economy. In the straight double-flow turbine the subdivision of steam after it issues from the impulse wheels is very simply accomplished by a short belt around the nozzle blocks. The specific volume of steam, after issuing from the impulse wheel, being still relatively small, the subdivision is readily taken care of in this way.

This composite or hybrid design proposes to retain as much of the reaction blading as may be justified from a efficiency standpoint. There is a notable difference in efficiency between the nozzle and bucket elements used in turbines. The



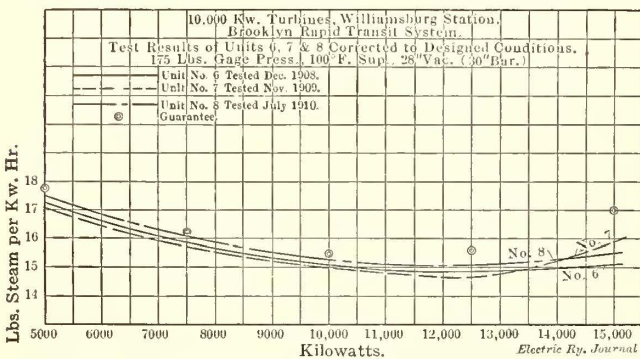
60-Cycle Double-Flow Turbine

work generator rotors of the through shaft type have been largely superseded by designs having the shaft bolted to the ends of the field disk by means of a non-magnetic coupling in two-pole machines and integral with either half of the rotor in four-pole machines, the whole secured by bolts.

The effect of rotative speed is forcibly brought out in the table, which gives the principal dimensions on two 1000-kw turbines, 1800 r.p.m. and 3600 r.p.m. each.

	COMPARATIVE DIMENSIONS.	
	Low Speed, 1800 r.p.m.	High Speed, 3600 r.p.m.
1000-kw Turbine.		
Length between bearings, approximately...	12 ft. 7½ in.	8 ft. 8 in.
Size of bearings, approximately.....	6 in. x 14 in.	4 in. x 9 in.
Weight, including blading, approximately..	7,000 lb.	2,000 lb.
Maximum drum diameter, approximately...	3 ft. 1¼ in.	20 in.
Minimum drum diameter, approximately....	17¼ in.	10¼ in.
Number of rows of blading, approximately..	82	49
Largest blades (nominal height).....	4 in.	4 in.
Shortest blades (nominal height).....	¾ in.	½ in.

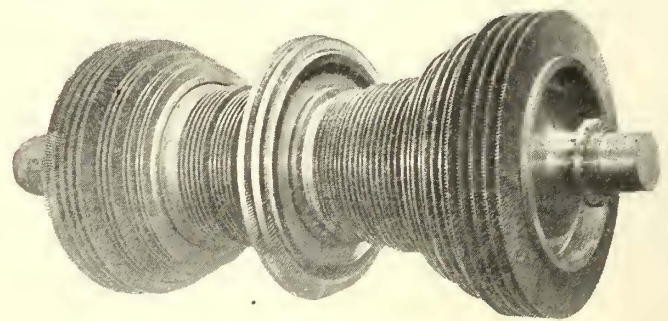
Coincident with the improvement in mechanical construction a betterment in economy of 3 per cent to 5 per cent has re-



Comparison of Guarantee and Test Records of Three Brooklyn Turbines

sulted, both in large and small sizes, due to altered distribution of steam and better blade lengths.

In the early machines the cylinders were made with rib and web reinforcement and with the equalizer passages and turbine supports cast integral. Material of different thickness at certain parts and the varying temperatures occurring in the turbine did not encourage uniformity of cylinder expansion nor facilitate the production of the casting. In the new types the cylinder cover and base are entirely symmetrical and un-



Spindle of Double-Flow Turbine

general results of nozzle and blade experiments indicate that nozzle efficiencies range from 95 per cent to 98 per cent, while single buckets may vary from 70 per cent to 85 per cent. Reaction turbines have a specially constructed blading formation which provides the same results as nozzles, the expansion taking place in both the rotating and stationary elements. In the impulse type the area of the steam passage through the buckets is sensibly constant. Reaction blades establish varying cross-section in precisely the same manner as in nozzle de-

signs. Only when these blades are of relatively short lengths do they become of uneconomical proportion with respect to the leakage annulus, which appears only in the high-pressure stage, and, therefore, the impulse wheel used in this part of the turbine does not detract from the efficiency. Moreover, the use of the impulse section utilizing a high pressure and heat drop removes the wide difference of temperature and pressure with the cylinder.

The turbine, since its introduction within the past decade, has quickly surpassed the economies established by the most efficient reciprocating engines. The most efficient engine has shown itself capable of developing a kw-hour on about 17 lb. of steam with 175 lb. pressure, 80 deg. to 90 deg. superheat and 28-in. vacuum. This engine record has been improved about 20 per cent by the turbine. One of the Westinghouse straight double-flow turbines of 10,000 kw capacity, installed at the City Electric Company, San Francisco, Cal., has developed a kw-hour with 13.88 lb. of steam under the same operating conditions.

The set of curves on page 386 shows the steam consumption results obtained in three tests on successive installations of 10,000-kw turbines in the Williamsburg power station of the Brooklyn Rapid Transit System. In every case the amount of steam required was less than the guarantee, between the limits of 50 per cent load and 50 per cent overload.

SINGLE-TRUCK PAY-AS-YOU-ENTER CARS FOR QUINCY, ILL.

The Illinois Traction System has lately received from the Danville Car Company eight single-truck pay-as-you-enter cars for use in Quincy, Ill. These cars are of a design which has been adopted as standard by this system for single-truck, pay-as-you-enter operation. As shown in the accompanying half-tone and floor plan, the front platform of these cars has a single sliding door for exit only, and the rear platform has two swinging doors and a dividing rail for entrance and exit. The cars are built for double-end operation. The body

yellow pine. The floor in the body of the car and on the platforms is 13/16-in. yellow pine. The platform framing is composed of white oak knees, the side knees being plated inside with 1/2-in. x 9-in. plate, and the center knees with 3/8-in. x 9-in. plate.

As shown in the half-tone, the sides of the car are plated with sheet iron. This steel sheathing is of No. 14 gage, 33 1/2 in.

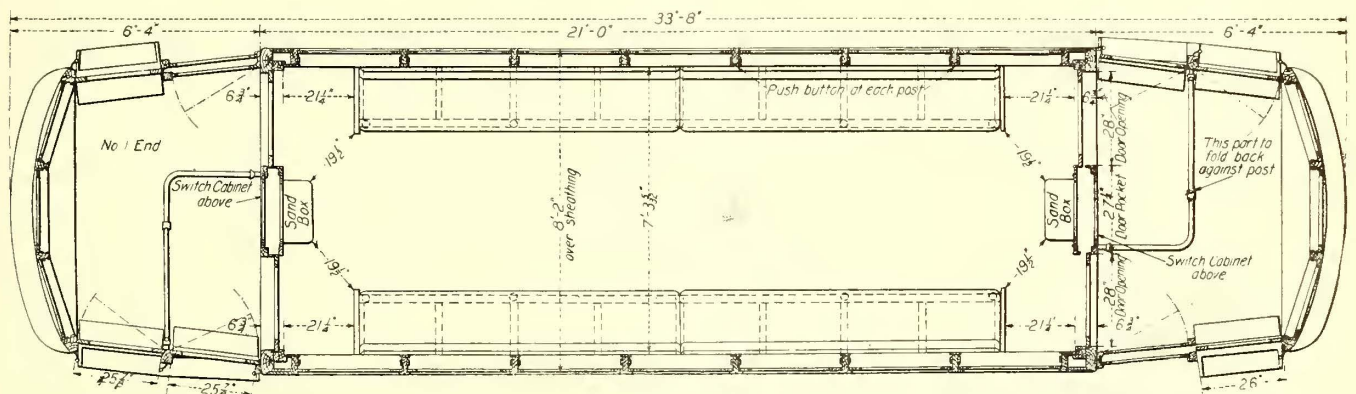


Single-Truck Pay-As-You-Enter Car for Quincy, Ill.

high, and terminates 1/4 in. above the bottom edge of the side sill. The cars were painted in accordance with the Illinois Traction System's standard specifications for steel passenger cars. The switch cabinets on these cars are lined with 3/8-in. transite.

Among the specialties installed on these cars are the standard ball-bearing sheaves of the Illinois Traction System for sliding doors; O. M. Edwards spring rollers for all drop sash; Hunter destination signs; Empire safety treads over the oak steps; Consolidated Car Heating Company's heaters and push-button system; U. S. No. 13 trolley stands, and Earll trolley catchers.

Several bills have been introduced before the New York State Legislature prohibiting the practice of engineering by anyone unless so authorized by a license issued to him by a State board of engineering examiners. Laws to a similar effect have been passed in a few States and others are pending before a number of legislatures. The bill at Albany which is



Plan of Single-Truck Pay-As-You-Enter Car for Illinois Traction System

end-doors are arranged to slide into a center bulkhead. Ample room is provided for rapid passenger movement, as the seating is longitudinal, and, furthermore, there is a free space of 12 1/4 in. opposite each door. Although the car is but 33 ft. 8 in. over all, the platforms are each 6 ft. 4 in. long. The car, which is 8 ft. 2 in. wide over the sheathing, is operated over a track gage of 5 ft.

The side sills, end sills, cross sills and drop-door framing are of yellow pine; the side-sill plates are of 18-in. x 1/4-in. steel. All the cross sills are held in place at the side-sill plate in malleable-iron pockets. The end sills are plated outside with 10-in. x 3/8-in. plate, and inside with 7-in. x 1/2-in. plate, returning on the side sill and securely bolted to the same. The cross sills at the truck supports are reinforced outside with 3 1/2-in. x 3 1/2-in. x 3/8-in. angles, and on the inside with 5-in x 3/8-in. plate.

All side and corner posts are of ash. The top plates are of

being most strongly pressed resembles the law applying to State qualification for the practice of medicine. The American Society of Civil Engineers has passed a resolution stating that it "does not deem it necessary or desirable that civil engineers should be licensed in any State."

A storage-battery plant, said to be the largest single-battery plant of its kind in the world, will be installed by the Consolidated Gas, Electric Light & Power Company, of Baltimore, as soon as a building now being constructed for it is finished. The building will be located adjoining the largest direct-current substation of the company and will cost about \$50,000, while the entire cost of the plant will approximate \$300,000. The storage battery will be of sufficient size to take care of the peak load in the entire business district for nearly half an hour should an accident occur at the time of maximum consumption.

PENNSYLVANIA RAILROAD ORDERS NINE MORE ELECTRIC LOCOMOTIVES.

Nine more electric locomotives, aggregating about 40,000 hp, have been ordered by the Pennsylvania Railroad. The new locomotives will be of the same type as those which are now being operated in the Manhattan Terminal, New York City, and will supplement the 24 already in use. The new locomotives are to be completed by July 1, 1911. The cabs, frames, running gear and mechanical parts will be built by the Penn-

Total wheel base of each half.....	23 ft. 1 in.
Total wheel base of locomotive.....	55 ft. 11 in.
Diameter of drivers.....	72 in.
Contract tractive effort.....	60,000 lb.
Maximum draw-bar pull (recorded on test).....	79,000 lb.
Normal speed with full train.....	60 m.p.h.
550-ton train to be started and accelerated on 2 per cent tunnel grades, maximum contract horse-power.....	4,000
Weight of each interpole motor complete with cranks.....	43,000 lb.
Height of motor frame above cab floor.....	5 ft. 6½ in.
Height of center of shaft above cab floor.....	2 ft. 1½ in.

Since the opening of the Manhattan Terminal on Nov. 27, 1910, the entire through passenger traffic of the Pennsylvania Road in its Newark tunnels has been handled by the electric locomotives of this type with entire satisfaction.

TURN-IN CAR AT DAYTON, OHIO

The People's Railway Company, of Dayton, Ohio, has recently equipped one of its "Pay-Within" cars with the combination turnstile and register, invented by John F. Ohmer, of the Ohmer Fare Register Company. The different features of this invention, which is known as the "Turn-In" repayment system, were described and illustrated in the *ELECTRIC RAILWAY JOURNAL* for Dec. 17, 1910, on page 1209. The Dayton car is equipped with a turnstile on each platform. The turnstiles have aluminum arms carrying a table upon which the conductor can make change or where the passenger can deposit any package in case his fare is not ready in advance. The turnstiles are attached to an indicating recording and printing register, to which auxiliary dials are connected, showing the same denominations of fares as those mounted in the register. The turnstile and the attached register are controlled by the conductor, who releases the turnstile for entrance by pressing a pedal. The passage of the passenger registers the fare. The only delay possible is that caused by passengers who do not happen to have the proper fare available at once. The arms and tables of the turnstiles are collapsible, so that the front or exit platform is entirely unobstructed.

During February this equipment was inspected by a number of prominent railway men and others, who were the guests of George C. Towle, general manager of the People's Railway. Among those who took the trips were: C. L. S. Tingley, vice-president of the American Railway Company, Philadelphia, Pa., which controls the People's Railway; Harrie P. Clegg, president, and Charles B. Clegg, vice-president, of the Dayton & Troy Electric Railway, Dayton; John A. McMahon, president, E. Wuichet, assistant secretary, V. R. Powell, superintendent, and claim agent, and L. M. Wilson, master mechanic, People's Railway; A. Benham, assistant general manager, Ohio Electric Railway Company, Dayton, Ohio; T. E. Howell, general superintendent, City Railway Company, Dayton; R. A. Crume, general manager, Dayton & Troy Electric Railway; Dennis Dwyer, president, Dayton, Covington & Piqua Traction Company; W. L. Smith, general manager, Dayton Street Railway; Henry Gebhart, chief engineer, Oakwood Street Railway Company, Dayton; B. M. Brown, superintendent, Lebanon & Franklin Traction Company, Dayton, and John F. Ohmer.

During the trip these gentlemen had the opportunity of trying the turnstile register combination as often as they liked and of observing how easily passengers even when encumbered by traveling bags or packages could pass rapidly through the turnstile. The strongest feature asserted for this mechanism is that it secures to the railroad the exact fare for every ride, visibly indicated under its proper denomination, recorded as indicated and printed as recorded.

WEIGHT OF SANITARY CAR FLOOR

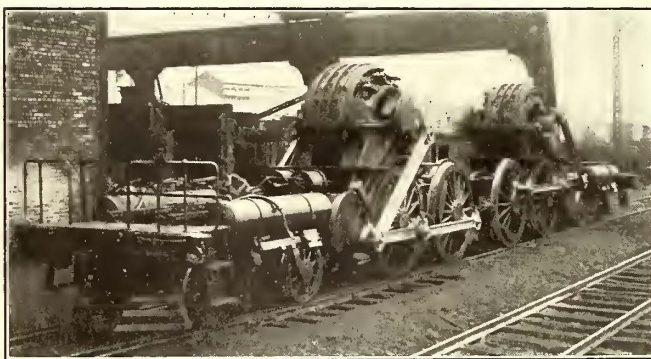
Through an error in printing the article entitled a "Sanitary Car Floor," on page 310 of the *ELECTRIC RAILWAY JOURNAL* for Feb. 18, the weight of the "Monolith" floor described was given as 55 lb. per square foot. The correct weight is 55 lb per square yard. This material has been applied by its manufacturers, the American Monolith Company, Milwaukee, Wis., on many classes of high-grade rolling stock where a light, durable and sanitary floor is required.



Pennsylvania Locomotive Hauling Eight-Car Train

sylvania Railroad at its Juniata shops. The air brakes will be supplied by the Westinghouse Air Brake Company. The electrical equipments will be built and the complete locomotives assembled at the East Pittsburgh works of the Westinghouse Electric & Manufacturing Company.

The Pennsylvania locomotives are by far the most powerful ever built. The locomotive is an articulated machine of double cab design. Each half carries its own motor and complete equipment and the two halves are coupled together at their driving-wheel ends. The frames, driving wheels and trucks of the running gear are similar in general character to those of the "American Type" steam locomotive. The coupled ends are fitted with permanent couplings of twin drawbars and friction draft gears, so arranged that the leading half serves as a leading truck and the other half as a trailer in whichever direction the locomotive may be moving. Each cab is complete with automatic and straight air brake equipment, apparatus for train lighting, electric headlights, pneumatically operated whistle and sanders, as well as its motor, unit switches and master controller. The machines are so arranged that if one motor is cut out the entire machine can be operated from either cab with the remaining motor. The halves are interchangeable.



Motors and Running Gear of Pennsylvania Locomotive

The unit switch field control permits two or more locomotives to be coupled together and all to be operated from either end of any one cab, and affords flexibility of speed regulation. It gives two additional running notches and at the same time economizes power consumption during acceleration.

The following are some of the characteristic features of these direct-current, 600-volt electric locomotives:

Weight of locomotive, complete.....	156 tons.
Weight on drivers.....	200,000 lb.
Weight on each driving axle.....	50,000 lb.
Weight on each bogie truck.....	57,000 lb.
Total length over all, inside knuckles.....	64 ft. 11 in.
Rigid wheel base of each half.....	7 ft. 2 in.

LONDON LETTER

(From Our Regular Correspondent)

At a recent meeting of the London County Council the chairman of the finance committee stated that the financial condition of the tramways did not justify any profits being diverted toward the relief of rates. The time, of course, might come when the Council would decide that sums should be applied in that way, but the chairman doubted whether such sums should be applied, as many held the view that a tramway should not be worked for profit, but that any balance should be devoted to a reduction of fares and in improving the system.

The returns of the Board of Trade which deal with tramways and light railways in the United Kingdom for the year ended 1910 show that there are 2562 miles open; that the capital expenditure amounts to £73,941,659; that the number of passengers carried was 2,743,000,000, and that the net receipts were £4,945,787. The number of passengers carried during the year was equal to about 62 times the estimated population of the United Kingdom. Out of 2562 miles, 2429 miles are operated electrically. The mileage worked by means other than electricity has thus diminished to 133 miles. Of the 300 tramway undertakings, 176 belong to local authorities and 124 to companies. The net receipts of local authorities who work tramway undertakings belonging to them or leased from other local authorities amounted to £3,600,191, and £1,111,888 was applied toward reducing tramway debt and £346,274 in relief of rates. The sum of £761,646 was carried to the reserve and renewal funds.

The capital necessary to construct an electric tramway from Torquay to Paignton has been subscribed and the work will be commenced immediately. The work of converting the surface contact system to the overhead system on the Torquay Tramways has been commenced.

One of the most interesting reports that have been published recently is the third annual London traffic report, by the Board of Trade. This is a most comprehensive document. It deals not only with the traffic in London, but the suggested making of many miles of new streets and roads in and about London. The report considers that on the completion of the present London tramways further tramway extension and the acceleration and multiplication of existing services will be practically impossible, and it is recommended that 100 miles of new roads and 25 miles of old ones be reconstructed to facilitate tramway traffic. The report is considered editorially in this issue.

The City Council of Coventry has been considering a report of the general purposes committee on the question of acquiring the Coventry Electric Tramways, Ltd., and has decided in favor of acquiring the property so that hereafter the tramways will be operated by the municipality. Coventry has had a tramway system for about 30 years. A large extension was made about seven or eight years ago. A considerable amount of money will have to be spent on the existing lines and in extending the service to new districts.

At the half-yearly meeting of the London Electric Railway, which controls the Metropolitan District Railway and various tubes of the Underground Electric Railways, Lord George Hamilton, chairman of the company, stated that it had carried 46,662,000 passengers during the half year. This is a slight decrease, but is explained by the fact that through tickets are issued now, one passenger passing over three of the railways being counted as one passenger whereas formerly he was counted as three. The earnings for the last half year were £332,000, an increase over the six months of the corresponding period of the preceding year. Certain revisions of fares have been made owing to the amalgamation of the tubes, and the working expenses show a diminution of £4529, due mainly to the lower price paid now for current. It is proposed to replace the arc lamps in the stations by incandescent lamps, which have been found to be more effective and cheaper. The passenger traffic showed very serious competition over the shorter distances. The long-distance traffic was very satisfactory, however, and the policy of the company is to link the distributing centers and to facilitate as far as possible exchange between the company's own lines and connecting lines. Accordingly a bill has been promoted in Parliament to ex-

tend the Bakerloo tube from Edgware Road to Paddington, the busy terminus of the Great Western Railway, which railway, during the earlier stages, would contribute annually toward the cost. A bill is also being promoted to provide a satisfactory physical connection between the various tubes and the District Railway at Charing Cross. It is proposed to extend the Hampstead line with a loop, and to arrange a physical connection between the platforms of the Hampstead line, the Bakerloo line and the District Railway. To do this an escalator will be installed. At present the power house at Lots Road can produce more current than is consumed, and the company is endeavoring to secure power to sell current to companies with which it connects. Authority will also be asked to incur expense in connection with omnibus and other road vehicles, as they have been found convenient in increasing the traffic at isolated stations. A bill has also been deposited in Parliament by the District Railway for power to incorporate a joint committee of the railway and the London Electric Railway to purchase the Lots Road generating station of the Underground Electric Railways from which both railroads take current.

The London United Tramways, Ltd., seems to have turned the corner. The receipts and profits declined for some years, but now that the property has been taken over by the Underground Electric Railways and managed by Mr. Stanley the prospects are brighter. The gross receipts for the year amounted to £333,659, and the working and general expenses, maintenance and repairs to £234,211, leaving with the balance brought forward from last account the sum of £100,398. After payment of interest on debenture stock and loans for the year, and providing for income tax, there remains a balance of £30,814. The directors propose to place £30,000 of this to reserve fund for renewals and contingencies and to carry forward £814. The number of passengers carried during the year was more than 60,000,000, an increase of about 3,250,000, and the directors report a substantial increase in the passenger earnings, although the traffic was adversely affected by the extensive repairs to the permanent way. A new system of fares was inaugurated during the year, each penny stage being divided into three sections and passengers being permitted to travel over any three sections for a penny, four sections for three halfpence and five or six sections for 2d. This new system has resulted in additional traffic. More than 3500 rail joints were cast welded during the year and a number of crossing frogs and points were replaced. Nearly all the rolling stock has passed through the repair shops for complete overhauling and many important changes have been made in the power house, workshops and stores. A bill promoted by the company in the last session of Parliament for an extension of time to construct the tramway along Kew Road, Richmond, received the approval of Parliament, but as the work has not yet been carried out the company has promoted another bill for an extension of time for one year.

The municipalization of the Birmingham tramways, which dates from Jan. 1, 1907, is in two directions still incomplete. The City of Birmingham Tramways still holds the lease of the Bristol Road line, while the Handsworth Cable Tramway, as far as the city boundary at Hockley, though like the Bristol Road line owned by the corporation, is subject to an unexpired lease to the Birmingham & Midland Tramways. Both of these lines, however, will come into the hands of the corporation on June 30, 1912, when the leases expire. The Bristol Road line will be remembered as the subject of the first local experiment in electrical traction, the cars being operated by storage batteries. For a time the experiment seemed promising, but eventually the service degenerated until it became very inefficient.

It is anticipated that at the forthcoming half-yearly meeting of the London & Brighton Railway definite information will be given as to the intentions of the directors in reference to the scheme which has been under consideration for some months for the electrification of the main line between London, Brighton and Eastbourne. Experience gained from the working of the elevated railway between London Bridge and Victoria is said to have confirmed the impression that the electrification of the main line to the coast is not only quite practicable, but necessary, to cope with the growing seaside pleasure and residential traffic.

A. C. S.

News of Electric Railways

State Supreme Court of Pennsylvania Upholds Agreement Between Company and City in Philadelphia

The Supreme Court of Pennsylvania on Feb. 27, 1911, handed down a decision sustaining the validity of the contract entered into in 1907 between the City of Philadelphia, the Philadelphia Rapid Transit Company and the Market Street Elevated Railway. The suit was brought by Elmer E. Brode as a taxpayer of Philadelphia and came before the Supreme Court of Pennsylvania on Jan. 3, 1911, for argument on appeal from the decision of Judge Kinsey in Common Pleas Court No. 1, sustaining the validity of the agreement. The argument before the Supreme Court in Philadelphia on Jan. 3, 1911, was summarized in the *ELECTRIC RAILWAY JOURNAL* of Jan. 14, 1911, page 89. In sustaining the decision by Judge Kinsey, the Supreme Court said:

"The act of 1907 is very brief and its provisions are free from all ambiguity. It provides that a municipality may enter into a contract with a street passenger railway or motor power company leasing and operating the franchises and property of such other company within the municipal limits for the purpose of fixing and regulating the franchises, powers, duties and liabilities of such companies, and the rights of the respective contracting parties and by such contract a municipality may, inter alia, agree to accept from the company or companies fixed payments in lieu of the performance of certain duties or of license fees or charges imposed in favor of the municipality by general law or ordinance or by the charters of the respective companies.

"The municipality is further empowered to contract for the appointment of a certain number of persons to act as directors of the company or companies in conjunction with the directors elected by the stockholders thereof and for the ultimate acquisition by it, upon terms mutually satisfactory, of the leaseholds, property and franchises of the contracting company or companies.

"An act of Assembly is to be declared void only when it violates the Constitution clearly, palpably, plainly and in such manner as to leave no doubt or hesitation in the mind of the court passing upon its constitutionality.

"Tested by this rule, how can it be said that the act of 1907 is violative of the section of the Constitution referred to? In its 24 lines there is not to be found a word or clause that can be tortured into the expression of legislative intent that a municipality may become a stockholder in any company, association or corporation or obtain or appropriate money for or loan its credit to any corporation, association, institution or individual.

"The granting of a franchise to a street railway or to a motor power company leasing and operating the franchises and property of the other company necessarily involves a contract or agreement with the municipality granting the franchise for the purpose of fixing and regulating the same and defining the powers, duties and liabilities of the company and the respective rights of each of the contracting parties.

"This is all the first sentence of the act of 1907 provides for. The second empowers the municipality to contract for the payment to it by a street railway or motor power company of fixed sums in lieu of the performance of certain duties or of the payment of license fees or charges imposed in its favor by general law or ordinance or by the charter of the leasing or operating company. This offends against nothing in the Constitution.

"If, then, the Legislature had the clear power to enact these provisions because not forbidden to do so, it follows as a corollary that it had the power to direct that a municipality, in making its contract with a street railway or motor power company, may, for the protection of its rights under the contract, provide that a certain number of persons shall act as directors of the company in conjunction with the directors elected by the stockholders thereof, and the final clause empowering the municipality to contract for the ultimate taking back of the franchises which it granted and for its acquisition of the leaseholds and property necessary to the exercise of the same is not a provision

authorizing it to become a stockholder in a corporation or to appropriate its money for or loan its credit to a corporation."

Reply of Montreal Street Railway to City

The Montreal (Que.) Street Railway, through its president, E. A. Robert, has replied as follows to demands made by the Board of Commissioners of Montreal for the modification of the terms under which the company operates in Montreal:

"Regarding suggestions made verbally to us by you we beg to say as follows:

"1. An increased percentage on the gross earnings of the consolidated lines. We beg to refer you again to our communication of Jan. 11, 1911, wherein it is proposed to you to share the profits of the whole system with the city. We are still of the opinion that this system would be the most advantageous one, and would ask you to adopt it.

"2. Reduce rates for workmen and school children. We beg to point out first that in all cities of similar importance the rates are in most cases higher and in no case lower. Our minimum and average fares are at present the minimum on the continent, and any reduction could not be entertained. We have very carefully considered this question, owing to the fact that the annexations that have taken place and that are likely to take place in the near future will make it necessary to establish some radius from Place d'Armes Square where the present city fares will be maintained, and a basis of fares established for the outside radius, which fares could be reduced to the city fares so soon as justified by the traffic, as outlined in our communication of Jan. 11 and verbally confirmed to you to-day.

"3. Increase the headway from 5 to 3 minutes on all important routes, the question of importance to be decided by the Quebec Public Utilities Commission. This we have always and are still ready to concede as one of the conditions of a new contract.

"4. The company to provide seating accommodation for every passenger. These demands could not be considered by any company on this continent.

"5. The company to remove the snow from curb to curb on all the streets where it runs at its sole expense and under the supervision of the City Surveyor. We believe that a considerable saving in the snow removal expense could be made by carting away the snow in cars. The company would be prepared to undertake this carting at cost, the city to maintain the winter road and the total cost of carting and maintenance to be divided equally between the city and the company.

"6. The company permanently to pave at its sole expense one-third of the streets upon which it runs its lines, the paving to be done where the city decides to permanently pave its streets.

"7. The company to keep at its sole expense in good order the pavement from curb to curb on all streets where it runs its cars. As this involves the permanent paving and maintenance of all the principal streets of the city from curb to curb the company could not entertain this demand.

"8. The company to place in underground conduits within a radius to be decided upon by the Quebec Public Utilities Commission all feeders and return cables. The company will always be willing to be governed by Section 39 of the Statutes of Quebec, 9 Edward VII, Chapter 81.

"9. The company to construct and operate all new lines ordered from time to time by the Quebec Utilities Commission to meet the requirements of the public service. The company has always conceded and still concedes that this demand should be one of the conditions of a new contract.

"10. The company to suggest some methods whereby it will do at its sole expense the street cleaning, street watering and removal of garbage in all streets where it runs its cars. The company cannot suggest any method whereby it will undertake to do what is demanded, at its sole expense."

C. V. Weston Advocates a Traffic Commission

Charles V. Weston, president of the South Side Elevated Railroad, Chicago, Ill., is quoted by the *Chicago Post* as recommending complete public control of surface, elevated and subway lines in Chicago exercised through a commission of three men, one a lawyer, one an engineer and one a business man. Mr. Weston was reported to have said before the Chicago Real Estate Board that Chicago was not ready for "extensive" construction of subways, and to clear up this and other remarks which had been misinterpreted by the daily press he consented to an interview in the *Post*, which follows:

"As the matter appeared I had reversed myself on the subway question. That was not the case. I have thought out a set of principles that must be adopted in Chicago if the transportation situation is to be improved along proper lines, and I never deviate from those principles. Moreover, they are principles that are coming into general acceptance because they are sound business principles."

"Then Mr. Weston enumerated his cardinal points. The principles Mr. Weston vigorously championed are:

"Local transportation should be a monopoly; rival lines should consolidate and single management be established.

"The public should fix the capitalization of the single corporation, making watered securities impossible.

"The public should demand and receive best equipment, best service and the constant maintenance of the property.

"Estimated upon the exact cost of this service, fares should be adjusted on a zone system to provide a fair return on investment.

"Complete public control should be maintained through a commission of three members—an expert engineer, an able corporation lawyer and a high-grade man of affairs.

"At any time the city should have the right to take over the property from the investors by giving back their money.

"When these principles are recognized and adopted the transportation problem will be taken out of politics and placed upon a business basis. The public will have adequate transportation facilities operated as its own representatives shall direct. The investor will have a reasonable return upon his money. What rate should be regarded as reasonable I do not know. That could easily be settled if left to fair-minded business men.

"With the power to take over the property at any time the city, through its commission of three, would be in complete control of the situation. This commission should decide what was needed in the way of equipment, where cars should be operated and how often they should run.

"The South Side Elevated Road, in which \$20,000,000 is invested and which is operated efficiently, has made no profits to speak of in 15 years. It is being run as a charitable institution. But upon the basis I have suggested the investment would be stable and the management would have an incentive to do all in its power to give good service.

"Regarding subways, the transportation companies need more tracks downtown. These additional tracks cannot go on the surface; there is no room for them. I don't care whether the additional tracks are elevated or underground, but since the public seems opposed to more elevated tracks, I have no objection to subways. Subway construction is costly, and it would be criminal to advocate subways where there could be no return on the investment. For that reason a comprehensive system is out of the question now. But in the business center we have got to have more facilities to realize the capacity of the outlying portions of existing lines."

San Francisco's Municipal Railway

The public utilities committee of the San Francisco Board of Supervisors has recommended that an additional \$600,000 of municipal bonds for the reconstruction of the Geary Street, Park & Ocean Railroad as a municipal enterprise should be offered for sale. The action was taken upon notification from the city engineer's office of the Board of Public Works that \$600,000 would be needed so that the work on the municipal project may not be delayed. The proposals for early construction and the amounts to be ex-

pendent are as follows: Special track work, \$60,000; lands for power house and substation, \$140,000; cars, \$300,000; track construction and overhead work, \$300,000; construction of buildings, \$80,000; total, \$880,000. Out of the proceeds of \$500,000 of bonds already sold, \$218,000 has been set aside to cover part of the above estimates, leaving \$600,000 needed for immediate use.

The report of the above action has resulted in the following comment on the Geary street municipal project by the *San Francisco Chronicle*:

"The slowness of the municipal administration in carrying out the plans for the construction of the Geary Street Railroad is causing the people to look for the motive behind the delay. There is a strong suspicion that the plan of the politicians is to delay the actual work of construction until just before the next city election.

"It is true that the next step in the financial plans calls for an issue of \$600,000 bonds, but apparently no steps have been taken to be ready to use this money when it becomes available. It is needed for cars, power house and power equipment, and real estate for the power house, but the Board of Works has not yet reported that the specifications for this part of the work are even 1 per cent complete."

"Some of the rails are reported ready for delivery, but as the ties, tie rods, fish plates and so on have not yet been ordered, it has been decided to store the rails on their arrival in this city for six months, which, by the way, brings us to just about the critical period of August 1, or three months before the electorate of San Francisco will choose another Mayor. Possibly then the municipal line will be a world beater for activity, bar none. Just at present the expectant patrons are wondering if the plans for the cars are not ready because the bonds are not sold, or if it is that the bonds are not sold because the plans for the cars are not ready.

"The exact status seems to be: Rails ready for delivery; \$230,000 available for ties, bolts, tie rods, fish plates and overhead equipment, and no money nor plans for cars, power house or power equipment."

Municipal Ownership Measure in Detroit

Corporation Counsel Hally, of Detroit, completed the draft of a bill to amend the home rule law of Feb. 23, 1911, and sent copies to members of the Michigan League of Municipalities for consideration. This bill provides that amendments may be made to the charter of a city without a general revision of that instrument, as now required by law. The proposed change will allow the city of Detroit, and other cities as well, to submit the question of municipal ownership of the street railway system to a vote of the people and so place the city in a position to name the terms upon which a new grant will be made. The bill follows the action taken by the Michigan League of Municipalities at a recent meeting held in Detroit. Mayor Thompson, of Detroit, Corporation Counsel Hally and officials of many other cities will be present at a general hearing on the question of amending the home rule law before the committees of the Legislature at Lansing on March 1, 1911. Alderman McCarty submitted a resolution to the Common Council on the evening of Feb. 21, 1911, providing that the question of the election of a charter commission should be submitted to the people, so that in the event of failure of the proposed amendment before the Legislature an election of members of the commission may be held as soon as possible.

Toledo Transit Affairs

The City Council of Toledo on Feb. 20, 1911, adopted a resolution demanding payment by the Toledo Railway & Light Company of its share of the pavement cost on Broadway between Colburn Street and St. James Court, amounting to \$9,979.36, with interest since Oct. 30, 1910. Director of Public Service Cowell had reported to the Council that he was unable to collect the amount.

A resolution has been presented to the Council calling upon every newspaper in the city to present proofs of charges made by the *Toledo Blade* that members of that body were not endeavoring to secure 3-cent fare, and were

not supporting Mayor Whitlock. The *Blade* intimated that the Council was awaiting the result of the veto on the Geleerd bill which would provide for municipal ownership.

Cornell Schreiber, city solicitor of Toledo, appeared before the house committee on cities at Columbus on Feb. 20, 1911, to support the Geleerd bill. Among other things he said: "If Toledo had the right to own its street railway system it could compel the street railway to accept a franchise that we think is fair."

Mr. Schreiber insisted that the City Council of Toledo had indorsed the bill. Representative William Riddle suggested that a vote of two-thirds of the electors of a municipality be required for municipal ownership instead of a majority, and both the author of the bill and Mr. Schreiber agreed to an amendment to this effect. William Kirby, Toledo, opposed the bill. He objected to the clause which makes it unnecessary for the city to secure the consent of owners of abutting property when lines are to be extended. He recalled the failure of the attempt of the city to operate a municipal gas plant, and said that the people are still paying interest upon the debt incurred at that time. Attorney George W. Seiber, Akron, representing the Northern Ohio Traction & Light Company, also opposed the bill.

Association Meetings

Massachusetts Street Railway Association—Boston, Mass., March 8.

Central Electric Accounting Conference—Springfield, Ohio, or Youngstown, Ohio, March 11.

Illinois Electric Railway Association—Bloomington, Ill., March 17.

Street Railway Association of the State of New York—Syracuse, N. Y., March 21 and 22.

American Railway Engineering & Maintenance of Way Association—Chicago, March 21-23.

New England Street Railway Club—Boston, Mass., March 23.

Central Electric Railway Association—Columbus, Ohio, March 23.

Southwestern Electrical & Gas Association—Houston, Tex., April 27, 28 and 29.

Iowa Street & Interurban Railway Association—Davenport, Ia., April.

Missouri Electric, Gas, Street Railway & Water Works Association—St. Louis, Mo., April.

Annual Banquet of New England Street Railway Club.—The eleventh annual banquet of the New England Street Railway Club will be held at Hotel Somerset, Boston, Mass., on the evening of March 23, 1911.

Oakland & Antioch Electric Railway.—The Oakland & Antioch Electric Railway has been completed and placed in operation between Bay Point and Concord, Cal., the first eight miles of the route to Oakland through the Contra Costa Hills.

American Electric Railway Manufacturers' Association.—In accordance with action taken at the last meeting of the executive committee of the American Electric Railway Manufacturers' Association, the association has established headquarters in a new office at room 1002, City Investing Building, 165 Broadway, New York, N. Y.

Power Brakes in Ohio.—Attorney General Hogan, of Ohio, has rendered an opinion to the State Railroad Commission to the effect that it has power to enforce the law passed by the last Legislature which requires that all cars of street and interurban railways shall be equipped with power brakes. The law went into effect on Jan. 1, 1911.

Strike on Pottsville Suburban Line.—Employees of the Schuylkill & Dauphin Traction Company, Pottsville, Pa., went on strike recently to enforce the reinstatement of a motorman who had been discharged by the company for insubordination. The places of the men who struck were filled promptly and the service was not seriously affected.

The Public Side of Street Railroading.—The Portland Railway, Light & Power Company, Portland, Ore., is reprinting in installments in the daily press of Portland the paper, "The Public Side of Street Railroading," presented

by Patrick Calhoun, president of the United Railroad of San Francisco, Cal., at the meeting of the American Electric Railway Association at Atlantic City, N. J., Oct. 10-14, 1910.

Power House Ordinary Realty.—The Appellate Division in New York has decided that the Interborough Rapid Transit Company must pay taxes on its power house and substations on an assessment of \$4,970,000 for 1904 and \$5,969,000 for 1905. Asserting the power houses were part of the railway equipment, the company refused to pay this tax. The court says the power houses are taxable as ordinary realty.

Toledo Situation.—Charles A. Thatcher has asked Mayor Whitlock to appoint a committee to consider his suggestion that a company with a capital stock of \$5,000,000 should be formed to bid for the street railway franchise in Toledo. He favors taking over the property of the Toledo Railways & Light Company, however, if the Geleerd bill to allow the city to purchase and operate the system should be passed.

Brooklyn Rapid Transit Entertainment.—The tenth annual concert, drill and dance of the Brooklyn Rapid Transit Employees' Benefit Association was held recently at Prospect Hall, Brooklyn. About 4000 persons were in attendance, more than 2000 of whom are estimated to have been employees of the Brooklyn Rapid Transit Company. A concert was given by the band composed of employees of the company.

Fender and Wheel Guard Tests in St. Louis.—The Board of Public Improvements of St. Louis, Mo., expects to begin a series of tests of car fenders and wheel guards on March 27, 1911. The board intends to invite those interested to submit fenders for the test. The tests will be in charge of Francis J. Cutts. It was expected that the rules to govern the tests and other general information in regard to them would be ready for distribution by March 1, 1911.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

California.—A slight error in the enrolment of Senate bill 244, giving San Francisco the right to use any tracks belonging to the United Railroads and any streets occupied by that corporation, has invalidated the measure after it has passed through both houses and been signed by the Governor. The first two words, "An act," were omitted, and the title of the measure as enrolled reads: "To amend section 499 of the civil code of the State of California relating to the use of the same street or tracks by two lines of street railway." Senator Burnett, of San Francisco, who introduced the bill, says that he will present it again. The law intended to be enacted by the bill provides that any incorporated city, city and county or town may own and operate street railways within or without the municipal limits and may occupy the same street or tracks occupied or used by any street railway within its limits upon payment to such company of an equal portion of the estimated cost of construction. The city is also permitted to construct tracks of a different gage in conjunction with the company's tracks. Senator Finn's bill which gives to San Francisco the right to build a municipal street railway over East Street, from the Presidio to Hunter's Point, has been passed in the Assembly without a dissenting vote and is now ready to be sent to the Governor. The bill was amended before final passage merely to provide against the possibility of San Francisco transferring the grant. Assemblyman Brown has introduced a bill which requires railways not to permit a car or train to depart from a terminal unless the carrying and seating capacity is 10 per cent greater than the number of passengers.

Indiana.—An agreement concerning the block signal system to be required on interurban railways has been reached in the committee of the Senate on railroads. The bill has been amended so as to require the Railroad Commission to yield its point in holding out for compulsory installation of automatic block signals. Other systems will be permissible under the amended bill reported favorably. The Senate has passed the following bills: To compel electric railways to erect suitable stations in cities; to regular stops; to authorize railroads to acquire stock in traction company terminals. The House has passed the

bill to make it unlawful to employ any person to operate a car on an interurban railway unless he has had one year's experience in steam or interurban service as prescribed in the book of rules adopted by the Railroad Commission, and has also passed the bill to confer on the Railroad Commission power to require the attendance of interurban railway operatives at conferences called by the commission.

Ohio.—The Winters public utilities bill was originally referred to the railroad committee, but Judge Winters, the author of the measure, finally had the bill referred to the House code committee, of which he is chairman. Representative Edwards has introduced a bill which provides that where a street railway follows a route less convenient than the most direct line between terminals it may be shifted to other streets by a resolution of the City Council and without the consent of the owners of abutting property. This measure is designed to allow the Cleveland Railway to build its line on Euclid Avenue instead of on Prospect Avenue.

Pennsylvania.—It will be some time before the administration measure providing for the displacement of the State Railroad Commission by a public utilities commission will be ready for introduction as a new bill is being drawn to meet the desires of Governor Tener and at the same time be constitutional. The following measures affecting electric railways are in committee and will hardly be reported out before March 15: To provide for taxation of real estate owned by corporations; to compel cars to be equipped with inclosed platforms; to prohibit trespassing on rights-of-way, railroads and railways; to repeal State police; to provide for examination and licensing of engineers; to provide that where any public service corporation neglects properly to perform any of its corporate functions, etc., suit may be brought to forfeit right to occupy public streets, etc.; to provide for the payment of wages every two weeks; to provide for the safety of employees by requiring periodical inspection of steam boilers, etc.; to provide for the collection of judgments by attachment execution against ways, etc.; to require suburban and interurban railways to equip their passenger cars with toilets; to govern outside advertising and advertising in common carriers; to require electric railways operating suburban or interurban railways to provide suitable waiting rooms at terminal stations and to equip all cars with toilets or water closets; to require proper appliances for the control of trailers by employees of the motor car; to protect the health and safety of employees of interurban, suburban and street railways; to provide an employer's liability act for injuries to employees; to give the right of eminent domain to electric light companies.

Senator Hunter has introduced a bill in the form of an amendment to the State Railroad Commission act to give the commission full power to enforce its orders and rulings. The commission under the new act would have the power to regulate the management of common carriers, fix rates, change routes, designate where transfers shall be given and fix the proportion of fare to be given each carrier where transfers are made between different corporations. Under the amendment no charter could be granted to a corporation desiring to be a common carrier without the approval of the commission; similarly, the purchase and holding of capital stock of one carrier by another or transfer of stock for purposes of collateral security could not be made without the approval of the commission. In case of accident the commission would have to be notified immediately. The bill also provides for branch offices of the commission in Philadelphia and Pittsburgh. Other bills have been introduced to permit municipal corporations to construct street railways and buy all equipment necessary to operate them and then lease to corporations for periods of years to be fixed by councils; to empower viewers to assess damages for grading streets on railroads and street railways; to provide that cities acquiring property shall take title in fee simple; to authorize municipalities to regulate animal and vehicle traffic by ordinance; to amend laws relative to city debt so that funding bonds shall be paid in annual installments, and creating bureaus of public utilities in departments of public safety and a bureau to have authority over street railways, gas, water and electric lines, telephone and telegraph companies and wire and cables; to authorize second-class cities to tax street railways, telegraph, telephone companies, etc., for general revenue purposes.

Financial and Corporate

New York Stock and Money Market

Feb. 28, 1911.

The fact that the Wall Street market is closely held by strong financial interests was demonstrated last week by the manner in which it withstood the blow administered by the Interstate Commerce Commission's adverse decision on railroad rates. There was of course a sharp break in prices and some liquidation, but at no time did the condition approach demoralization and the rush to sell was only momentary. Important financial interests held the market steady. The public took no part in the trading.

The bond market is hardly as strong as a few weeks ago, but money rates are easy. Quotations to-day were: Call, 2@2¼ per cent; 90 days, 3@3¼ per cent.

Other Markets

Tractions have shown a better tone in the Philadelphia market during the past week, although prices have advanced only fractionally. Sales of Rapid Transit have been fairly large, of the other issues rather light.

In the Boston market there has continued to be some movement in Boston Elevated and in the issues of the Massachusetts Electric Companies.

Kansas City Railway & Light and Series 2 of the Chicago Railways were the only traction issues that were offered in the Chicago market last week, and these only in small lots.

In the Baltimore market during the past week there has been some small trading in the shares of the United Railways Company, at about 17¼, and the usual moderate activities in the bonds of the company.

Quotations of traction and manufacturing securities as compared with last week follow:

	Feb. 21.	Feb. 28.
American Light & Traction Company (common).....	a290	a290
American Light & Traction Company (preferred).....	a106	a106
American Railway Company.....	a45	a44
Aurora, Elgin & Chicago Railroad (common).....	44½	a44
Aurora, Elgin & Chicago Railroad (preferred).....	85	a85¾
Boston Elevated Railway.....	a129	a129
Boston Suburban Electric Companies (common).....	a16	a16
Boston Suburban Electric Companies (preferred).....	71½	71
Boston & Worcester Electric Companies (common).....	9	a10
Boston & Worcester Electric Companies (preferred).....	40	40
Brooklyn Rapid Transit.....	78¾	78¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	83½	83¾
Capital Traction Company, Washington.....	129	*129
Chicago City Railway.....	a190	*190
Chicago & Oak Park Elevated Railroad (common).....	*3¼	*3¼
Chicago & Oak Park Elevated Railroad (preferred).....	*7¼	*7¼
Chicago Railways, pteptg., ctf. 1.....	a93	a92½
Chicago Railways, pteptg., ctf. 2.....	a25	a23½
Chicago Railways, pteptg., ctf. 3.....	a10	a8½
Chicago Railways, pteptg., ctf. 4.....	a6	a5
Cleveland Railway.....	91½	a94
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105	a105
Detroit United Railway.....	74	a71
General Electric Company.....	a154½	a154
Georgia Railway & Electric Company (common).....	a125½	a129¼
Georgia Railway & Electric Company (preferred).....	a87½	87
Interborough Metropolitan Company (common).....	19	19
Interborough Metropolitan Company (preferred).....	54	53
Interborough Metropolitan Company (4½s).....	78½	78½
Kansas City Railway & Light Company (common).....	a22	a25
Kansas City Railway & Light Company (preferred).....	*71	a70
Manhattan Railway.....	139¾	140
Massachusetts Electric Company (common).....	17	17
Massachusetts Electric Companies (preferred).....	a88	a88
Metropolitan West Side, Chicago (common).....	a21	a20
Metropolitan West Side, Chicago (preferred).....	a67	67
Metropolitan Street Railway, New York.....	15	*15
Milwaukee Electric Railway & Light (preferred).....	110	110
North American Company.....	71¾	71½
Northwestern Elevated Railroad (common).....	a22	*22
Northwestern Elevated Railroad (preferred).....	a62	*62
Philadelphia Company, Pittsburgh (common).....	53½	a53¼
Philadelphia Company, Pittsburgh (preferred).....	a53½	a43½
Philadelphia Rapid Transit Company.....	a23½	a20½
Philadelphia Traction Company.....	85	85
Public Service Corporation, 5 per cent col. notes.....	a06½	a06½
Public Service Corporation, ctf. 5.....	106	a105½
Seattle Electric Company (common).....	a109½	a112
Seattle Electric Company (preferred).....	101	101½
South Side Elevated Railroad (Chicago).....	a69	*69
Third Avenue Railroad, New York.....	11	11
Toledo Railways & Light Company.....	8	a10
Twin City Rapid Transit, Minneapolis (common).....	110¾	a110
Union Traction Company, Philadelphia.....	a17¾	a18
United Rys. & Electric Company, Baltimore.....	17¾	17¾
United Rys. Inv. Co. (common).....	47¾	47¾
United Rys. Inv. Co. (preferred).....	74¾	74
Washington Ry. & Electric Company (common).....	35	35
Washington Ry. & Electric Company (preferred).....	a88	88
West End Street Railway, Boston (common).....	92	a92½
West End Street Railway, Boston (preferred).....	102½	a102½
Westinghouse Elec. & Mfg. Co.....	a70¾	69¾
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a120	a120

a Asked. *Last Sale.

Annual Report of Metropolitan West Side Elevated Railway

The Metropolitan West Side Elevated Railway has issued its pamphlet report for the year ended Dec. 31, 1910. The earnings, expenses and income account for the years ended Dec. 31, 1910, and Dec. 31, 1909, follow:

	1910	1909
OPERATING EARNINGS.		
Passenger earnings.....	\$2,936,999	\$2,695,230
Other operating earnings.....	132,946	123,200
Gross earnings.....	\$3,069,945	\$2,818,430
OPERATING EXPENSES.		
Maintenance of way and structures.....	\$141,831	\$134,350
Maintenance of car equipment.....	173,927	165,172
Maintenance and operation of power plant.....	379,483	312,706
Conducting transportation.....	660,313	605,095
General expenses.....	96,323	103,348
Loop operation and maintenance.....	197,138	97,495
Total.....	\$1,556,015	\$1,418,076
Income from operation.....	\$1,513,929	\$1,400,354
Other income.....	8,770	11,100
Gross income.....	\$1,522,699	\$1,411,514
Interest first mortgage bonds.....	\$399,960	\$399,960
Interest extension mortgage bonds.....	161,320	161,216
Interest collateral loan.....	15,250	20,252
Interest equipment notes.....	.....	601
Other interest.....	.....	601
Miscellaneous rentals.....	37,048	37,048
Loop rentals.....	286,138	262,626
Taxes, car licenses and special assessments.....	180,252	180,893
Total charges.....	\$1,079,968	\$1,062,596
Surplus available for dividends.....	\$442,731	\$348,917
Dividends declared.....	261,237	.....
Balance carried to surplus.....	\$181,494	\$348,917

The statement of surplus for the fiscal year ended Dec. 31, 1910, follows:

Balance as of Jan. 1, 1910.....	\$1,580,624
Balance of surplus for year ended Dec. 31, 1910, as per income account.....	181,494
Total.....	\$1,762,118
Charged off for depreciation and losses.....	\$50,000
Surplus as of Dec. 31, 1910.....	1,712,118
Total.....	\$1,762,118

In presenting the report Britton I. Budd, president of the company, said in part:

"The increase in operating expenses was principally due to the normal increase in cost of carrying a greater number of passengers than the preceding year, to an increase in wage scale as per new agreement made with employees, to increased price paid for power-house fuel from April 1 to Sept. 1, during which time all mines in Illinois were shut down on account of the coal miners' strike. The total increase in operating expenses amounted to \$137,939.

"The proportion of operating expenses to gross earnings increased approximately $\frac{1}{3}$ of 1 per cent.

"The months of November and December show a very considerable falling off in traffic, which is accounted for principally by the widespread strike of men and women employed in the clothing industry. Notwithstanding this condition, traffic exceeded that of any previous year.

"The most gratifying feature of the increase in traffic is the continued development of travel in the reverse direction to the normal current during the rush hours, occasioned by the building up of many industrial plants on the western outskirts of the city adjacent to the lines of your company. On account of this distribution of the traffic, the greatly increased number of passengers were accommodated without an increase in the number of cars or additional capacity in power plant.

"Mileage operated during the year has been increased from 50.5 to 51.5, exclusive of sidetracks. Eighteen passenger coaches were converted to control cars; otherwise no changes or additions have been made to the equipment, there being 225 motor cars, 161 coaches, 101 control coaches and 17 miscellaneous cars.

"Total mileage increased one mile of main line single, and one-half mile of sidetrack, due to the construction of three tracks on the Douglas Park line from Forty-eighth Avenue to Fifty-second Avenue. This greatly improved conditions at the end of the line, furnishing storage room for 60 cars, and providing through service to the industries and residents in this locality.

"A new coal and material yard was constructed at Forty-

sixth Avenue on the Douglas Park line, with connections to the Belt Railway. This allows the storage of 10,000 tons of power-house coal, and provides for the economical handling of same and for the storage of track timber, rail, etc.

"During the year 13,471 ties were renewed, equivalent to $\frac{1}{2}$ miles of single track, complete, with wooden guard rails. Two hundred and forty tons of new 60-foot, 80-lb. rail were laid in tangent track, equivalent to 2 miles of single track. Nineteen thousand and forty-nine feet of steel structure, equivalent to 12,022 tons, were repainted during the year.

"Three hundred and seventy-four axles of the best heat-treated steel were installed under passenger coaches, replacing small axles. Three hundred rolled steel wheels were placed in service. Eighteen passenger coaches have been equipped with cabs and control apparatus on both ends. A large part of the car equipment has been equipped with ventilating devices, in accordance with the city ordinance.

"Dividends to the amount of 3 per cent on the preferred stock were paid during the fiscal year, payment being made quarterly. One hundred thousand dollars were paid on the collateral loan during the year, reducing same from \$300,000 to \$200,000."

The report contains the following traffic summary:

	Total Passengers.	Daily Average.
1907.....	54,280,888	148,715
1908.....	51,587,667	140,950
1909.....	52,519,609	143,889
1910.....	57,229,886	156,794

Philadelphia Refinancing Approved

The plan advanced by E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., some time ago, for refinancing the Philadelphia Rapid Transit Company, was approved at the meetings of the stockholders of the Philadelphia Rapid Transit Company and the Union Traction Company held on Feb. 28, 1911. Briefly the plan provides for an increase in the indebtedness of the company from \$5,000,000 to \$15,000,000, in accordance with the proposal as given in the ELECTRIC RAILWAY JOURNAL of Feb. 25, 1911, page 349. City Councils must approve the loan, which is to be guaranteed by the Union Traction Company, and the stockholders must deposit their stock with the Fidelity Trust Company, Philadelphia, Pa., before March 15, 1911, under an agreement whereby Mr. Stotesbury can create a voting trust.

The results of an audit of the financial condition of the company from July 1, 1902, to Dec. 31, 1910, made by Vol-lum, Fernley, Vollum & Rorer, Philadelphia, Pa., and addressed to Charles O. Kruger, president of the company, were placed in the hands of the stockholders of the company prior to the meeting on Feb. 28. The condensed balance sheet, as of Dec. 31, 1910, contained in this report, showed total assets of \$102,238,188, and liabilities of \$102,238,188. The report also contained a comparison of the passengers carried and the receipts from passengers for the last six months of the calendar years 1909 and 1910. The gain in passengers carried for the last six months of 1910 over the same period in 1909 was 12,486,898, and the gain in passenger receipts for the last six months of 1910 over the same period of 1909 was \$391,571.

Bonds Issued by the Ohio Traction Company to Finance Improvements

Stockholders of the Ohio Traction Company, Cincinnati, Ohio, voted on Feb. 24, 1911, to authorize the issue of \$2,500,000 5 per cent, 25-year gold bonds. Of the total amount authorized \$1,750,000 bonds have been sold to Drexel & Company, Philadelphia, Pa. The bonds are dated March 1, 1911, and interest is payable on March 1 and Sept. 1. The bonds are redeemable as a whole after five years on any interest date at 103. For purposes of the sinking fund the bonds are callable on March 1, 1912, or any interest date thereafter at 103. The sinking fund is designed to retire the entire issue at maturity.

The bonds are secured by mortgage on the traction building, Cincinnati, and on the stock of the Cincinnati Traction Company and the Cincinnati Car Company. The proceeds

of the bonds sold will be used to retire floating debt and to provide capital for betterments.

Among the improvements planned is the completion of the Pendleton power plant. The company will install an additional 6000-kw Westinghouse turbo-generator in this plant. It will abandon the Hunt Street plant as a generating station and will carry the current from the Pendleton plant at 66,000 volts and transform it at the substations. The completion of this improvement will eliminate the hauling of coal. The company will also abandon the Cumminsville power plant as a generating station and locate substation equipment at that point.

The company has acquired 12 acres of ground near the plant of the Cincinnati Car Company, which is located on Spring Grove Avenue, at Chester Park. Ground which it now occupies, adjoining the plant of the car company, will be used by the latter company. The railway company will build on its new land at Spring Grove and Mitchell Avenues a large car house with a capacity of 300 to 400 cars and new shops.

In connection with the issue of the bonds by the Ohio Traction Company the stockholders and directors of the Cincinnati Car Company have voted to increase the authorized stock, which has been \$100,000 to \$1,500,000. The stock of the Cincinnati Car Company is owned by the Ohio Traction Company.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.

It is reported that on Feb. 21, 1911, plans were discussed for the early reorganization of the Chicago & Milwaukee Electric Railroad and that a provisional agreement was made that all questions causing litigation should be decided by Judge Peter Grosscup without appeal from his decision. Attorney Levy Mayer, said to represent holders of \$4,000,000 of bonds of the Wisconsin Division, urged immediate foreclosure in order to end the litigation which is keeping the road in the bankruptcy court. He insisted that the choice of routes by which the road might enter the city should be settled by the owners of the road after the receivership had been closed. Another conference will be called by the court as soon as other security holders can be heard from in regard to the provisional agreement not to appeal from the decision of Judge Grosscup. It has been stated that so long as the road has no entrance for its cars into the heart of Chicago it will be difficult to operate it profitably and most of the bondholders desire an early reorganization so as to obtain terminal facilities.

On Feb. 23, 1911, W. O. Johnson, a director of the Western Trust & Savings Bank, was appointed operating receiver of the Chicago & Milwaukee Electric Railroad by Judge Peter S. Grosscup of the United States Circuit Court. The three former receivers, D. B. Hanna, George G. Moore and W. Irving Osborne, are to be retained by the court in an advisory capacity. In a statement issued by Judge Grosscup he said:

"The appointment of Mr. Johnson has no significance in determining by what route the Chicago & Milwaukee Electric Railroad shall get into the city. That question will be determined when the reorganization has been advanced, and will be largely, if not entirely, determined by the security holders themselves. But in view of this it was thought best not to select an operating receiver who had any personal interest in either of the proposed routes.

"Mr. Johnson was selected as receiver because of his experience in the Freeport Street Railway and the Strawboard and Boxboard receiverships. Mr. Johnson possesses the exact qualities that are now needed to bring the Chicago & Milwaukee Electric Railroad to a place where it can show what there is in it in the way both of earning power and as a public utility."

Central Park, North & East River Railroad, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has signed a decree of foreclosure under the consolidated mortgage of the Central Park, North & East River Railroad for \$1,200,000. The amount found to be due, which includes interest from June, 1908, is \$1,391,800. Isham Harris has been appointed special master to conduct the sale.

Detroit United Railway, Detroit, Mich.—Forster, Hotaling & Klinke, New York, N. Y., attorneys who claim to repre-

sent \$120,000 of the 4½ per cent bonds of the Detroit United Railway, asked the State Railroad Commission to enjoin the company from paying the dividend declared at a recent meeting of the directors. The commission, however, on Feb. 24, 1911, authorized the issue of \$1,078,000 bonds by the company. On the organization of the present company a mortgage was executed authorizing a bond issue of \$25,000,000. Of this amount \$15,880,000 were placed in escrow to retire underlying bonds, the remainder to be used for construction, betterments and extensions. J. C. Hutchins, president of the company, stated that the New York attorneys were mistaken in their conclusions, and that the issue will not affect former issues in the least. Since 1907 the earnings had all been used for betterments, the directors preferring this course to the issue of bonds. In 1910 earnings amounting to \$1,558,000 were used for betterments. This sum, however, was reduced to \$1,440,000 by the sale of the Woodward Avenue car house and one or two other items. The stockholders were entitled to a return on their investment. The stock amounted to \$12,500,000 and had never been increased. The company had outstanding \$1,500,000 in gold notes and the directors did not feel that dividends should be resumed until these were provided for, so it was proposed to have the stockholders subscribe for \$1,880,000 bonds held in the treasury at 82½ and to resume dividends. If a higher price can be secured for the bonds than 82½ they will be placed upon the market. The company under its mortgage can issue bonds to only 75 per cent of the amount spent for betterments. For this reason only \$1,078,000 could be issued in place of the expenditure of \$1,440,000 last year. The company has ordered cars at a cost of more than \$400,000 and has arranged for other improvements that will entail large expenditures.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—The Fidelity Trust Company, Baltimore, Md., as trustee, is offering for subscription at 99¼ and interest to yield 5¼ per cent, 5 per cent 3-year notes of the Fairmont & Clarksburg Traction Company of the issue of \$1,000,000 sold recently to the National City Bank, New York, N. Y. The notes are dated Feb. 1, 1911, and are due Feb. 1, 1914. They are convertible at the option of the holder into common and preferred stock on the basis of 70 per cent of the common stock at par and 30 per cent of the preferred stock at 85 for each \$1,000 note. The notes are secured by the deposit with the trustee of the entire outstanding capital stock of the Fairmont & Northern Railway, the entire outstanding capital stock of the Clarksburg & Western Railway and 76 per cent of the capital stock and \$466,000 of the \$600,000 of first mortgage 5 per cent bonds of the Fairmont & Mannington Railroad.

Kansas City Railway & Light Company, Kansas City, Mo.—The Metropolitan Street Railway, all of the capital stock of which is owned by the Kansas City Railway & Light Company, has sold to Lee, Higginson & Company, Boston, Mass., \$1,400,000 of consolidated mortgage 5 per cent bonds, dated May 12, 1895, and due May 1, 1913. The total authorized issue is \$7,500,000, of which \$7,243,000 is now outstanding, including the bonds now sold. The remaining \$257,000 is reserved to retire underlying division issues. The \$1,400,000 of bonds now issued are to refund the \$1,350,000 5 per cent first mortgage bonds of the Kansas City Cable Railway, which are due on April 1, 1911, and to reimburse the treasury for the \$50,000 paid in making the annual retirement of that amount of the 5 per cent bonds of the Corigan Consolidated Street Railway. The bonds were offered for sale at 99 and accrued interest to yield 5½ per cent.

Lawton & Fort Sill Electric Railway, Lawton, Okla.—On the application of E. E. Shipley, receiver of the Lawton & Fort Sill Electric Railway, J. T. Johnson, district judge, has authorized the receiver to dispose of the property at public sale at a time and place to be fixed.

Montreal (Que.) Street Railway.—A bill has been introduced in the Legislature at Quebec to authorize the incorporation of the Montreal Tramways Company, with a capital stock of \$20,000,000 in \$100 shares to merge the Montreal Street Railway and its subsidiary companies, namely, the Montreal Terminal Railway, the Montreal, Park & Island Railway and the Public Service Corporation, formerly the Suburban Tramway & Power Company, on terms subject to the consent of the Quebec Public Utilities Corporation.

Northern Ohio Traction & Light Company, Akron, Ohio.—At a meeting of the directors of the Northern Ohio Traction & Light Company, on Feb. 24, 1911, the proposal of W. E. Hutton & Company, New York, N. Y., and Cincinnati, Ohio, to purchase \$1,000,000 of the proposed issue of \$3,000,000 of 6 per cent cumulative preferred stock of the company was accepted. A stockholders' meeting has been called for April 15, 1911, to authorize the financing and approve the sale. The funds will be used to finance the development of its power stations and to improve the company's lines.

Rock Hill Water Supply, Electric Light & Street Railway Company, Rock Hill, S. C.—The city of Rock Hill has arranged to take over and operate the property of the Rock Hill Water Supply, Electric Light & Street Railway Company, which includes 1.5 miles of horse railway.

Sea View Railroad, Wickford, R. I.—D. F. Sherman, president of the Providence & Danielson Railway, Providence, R. I., on behalf of himself and his associates, is said to have secured control of the Sea View Railroad through the purchase of the majority interest in that company held by Andrew Radel, Bridgeport, Conn.

Somerset Water, Light & Traction Company, Somerset, Ky.—The sale of the property of the Somerset Water, Light & Traction Company under foreclosure on Jan. 16, 1911, to J. H. Gibson, Somerset, has been confirmed by the court. As announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 25, 1911, page 351, the United Water, Light & Traction Company has been incorporated as the successor to the Somerset Water, Light & Traction Company.

Toledo Railways & Light Company, Toledo, Ohio.—The annual report of the Toledo Railways & Light Company, Toledo, Ohio, shows that the gross income for 1910 was \$2,985,382 and the operating expenses, including maintenance, renewals and depreciation, \$1,868,600, leaving a net income of \$1,116,782. Deductions from the income were \$111,953.72 for taxes and \$814,427 for interest on bonds, or a total of \$926,380, leaving the net surplus \$190,401. A comparison with the figures of 1909 shows increases as follows: Gross earnings, \$252,204; operating expenses, \$241,262; net income, \$10,942; interest charges, \$36,140; surplus, \$327,553. All the directors except Jay K. Secor were present at the meeting on Feb. 23, 1911. The election of a chairman of the board was postponed indefinitely.

Dividends Declared

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent, common.

Louisville (Ky.) Traction Company, quarterly, 2½ per cent, preferred; quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

EAST ST. LOUIS SUBURBAN COMPANY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Jan.	'11	\$188,724	\$103,010	\$85,714	\$45,236	\$40,478
1 "	'10	188,193	103,039	85,154	45,153	40,011
ILLINOIS TRACTION SYSTEM.						
1m., Dec.	'10	\$618,469	*\$364,326	\$254,143	.....	.....
1 "	'09	503,206	*289,044	214,162	.....	.....
12 "	'10	6,216,104	*3,665,628	2,550,476	.....	.....
12 "	'09	5,363,384	*3,063,491	2,299,892	.....	.....
HOUGHTON COUNTY TRACTION COMPANY.						
1m., Dec.	'10	\$25,032	\$14,187	\$10,845	\$6,560	\$4,285
1 "	'09	26,083	14,234	11,849	7,106	4,743
12 "	'10	311,475	165,593	145,881	77,697	68,184
12 "	'09	319,966	172,551	147,415	73,325	74,090
NORTHERN OHIO TRACTION & LIGHT COMPANY.						
1m., Jan.	'11	\$186,271	\$106,904	\$79,367	\$44,429	\$34,938
1 "	'10	164,994	94,500	70,444	43,292	27,152
PORTLAND RAILWAY, LIGHT & POWER COMPANY						
1m., Jan.	'11	\$511,624	*\$270,613	\$241,011	\$123,509	\$117,502
1 "	'10	431,011	*201,888	229,123	109,152	119,971
UNION RAILWAY GAS & ELECTRIC COMPANY.						
1m., Dec.	'10	\$294,154	*\$166,834	\$127,320	\$59,653	\$67,667
1 "	'09	266,012	*174,397	111,615	57,690	53,925
12 "	'10	2,981,711	*1,729,057	1,252,654	791,154	551,500
12 "	'09	2,820,349	*1,550,889	1,269,460	691,190	578,270
WHATCOM COUNTY RAILWAY & LIGHT COMPANY.						
1m., Dec.	'10	\$39,084	\$17,777	\$21,307	\$10,777	\$10,529
1 "	'09	39,149	21,034	18,114	8,522	9,592
12 "	'10	411,160	233,694	177,466	109,446	68,021
12 "	'09	406,867	228,093	178,775	99,799	78,975

Traffic and Transportation

Strike of Employees of Connecticut Valley Street Railway

Seventeen employees of the Connecticut Valley Street Railway, Greenfield, Mass., resorted to the device of not reporting for duty on Feb. 16, 1911, as a means to force the company to reinstate five employees discharged for cause earlier in the month. The men discharged were told individually the reasons for which they were discharged.

Soon after the discharge of these men the company was waited on by a so-called committee of employees representing only a small portion of the men, who asked the company to reinstate the five men discharged. The plea was politely but firmly refused. Thereafter endeavors were made by the employees who visited the office and by outsiders to arouse public sympathy through mass meetings held in cities and towns through which the company operates. Committees purporting to represent these meetings afterward requested the officers of the company to submit the difficulty to arbitration. To all of these committees the answer was given that there was nothing to arbitrate; that the questions at issue were between the men discharged and the company; that the men had been discharged for cause, and that the evidence upon which their discharge was based was ample.

On the morning of Feb. 16 the places of the 17 employees of the company out of 105 who failed to report for their respective runs without any notice of their intentions were filled at once by men on the extra list, and barring two missed trips cars on all of the divisions have continued to run on schedule time. The company has suffered slightly from the malicious and unlawful destruction of property. The 17 men who did not report for duty on Feb. 16 have been discharged for insubordination and will not again be employed by the company.

Service in Atlanta

P. S. Arkwright, president of the Georgia Railway & Electric Company, Atlanta, Ga., has filed an answer with the Railroad Commission of Georgia in regard to the order of the commission to show cause why the service should not be improved and all-night service installed. Each line was taken up in turn by Mr. Arkwright, and the conditions which govern its operation are referred to in detail. The answer was concluded as follows:

"Respondent shows that it has been for a number of years and is now operating a limited all-night service. It operates one car, making a trip from the Southern Railway shops on Cooper Street along Cooper Street to Whitehall Street, from Whitehall Street to Alabama Street, to Broad Street, to Marietta Street, along Marietta Street to the Inman yards. This service was put on in order particularly to meet the needs of the railway trainmen who were required to report for duty or who left their duty between the hours of midnight and 5 o'clock in the morning. On this line a fare of 10 cents is charged. It is the route where the greatest need for such service exists. The receipts from this service have not been sufficient to pay the cost of furnishing it.

"The regular service on the lines of this company ends at approximately 12 o'clock midnight and begins at approximately 5 o'clock in the morning. On quite a number of the lines of the company an additional car is operated, leaving the center of town after midnight and in some cases as late as 1 a. m., and on a number of lines an early car is operated, leaving the center of town before 5 a. m. and in some cases as early as 4 a. m. These very late and very early extra cars serve practically the entire general territory of the City of Atlanta.

"After the hours when the car service stops practically all places of residence, business and amusement have closed. Of the few persons who are compelled to work after midnight nearly all continue at work until the car service is resumed in the morning. Any all-night service would necessarily have to be at infrequent intervals and for the persons who occasionally have to travel about at night, such as doctors, etc., this character of service would be of practically no use. Respondent says that there is no general need

for any additional all-night service in Atlanta and no general useful purpose to be served thereby.

"Respondent shows that there is no reason why lines should not be double tracked wherever needful to facilitate increased service provided such increase of service is reasonably necessary and upon condition that the right to double track such lines can be secured and that the streets are wide enough to permit double tracks and that the company has the funds with which to do it. There are, however, a number of instances where, although traffic justifies the double track, the street is too narrow to permit it. There are also other cases where the right to construct double tracks cannot be secured. It has been the policy of this respondent to double track its lines just as fast as the travel justifies it. The great bulk of the track construction work which the respondent has done has been in double tracking its lines and other work necessary for the furnishing of increased service."

A Bill to Standardize Pay-As-You-Enter Cars in Toronto

On Feb. 20, 1911, W. K. McNaught introduced a bill in the Ontario Legislature defining standard pay-as-you-enter cars and imposing a fine of \$100 a day for each car operated on what is known as the pay-as-you-enter system unless it conformed to the bill's provisions. The bill applies only to Toronto, as it is limited to cities of 100,000 population or more. According to the bill the car must have a rear platform at least 72 in. deep, with a folding step not less than 54 in. long. The rear platform must be inclosed and properly heated and provided with a door or doors having an aggregate width of at least 54 in., so arranged as to permit of the entrance and the exit of passengers at one and the same time. If there is a partition between the rear platform and the body of the car, such partition must have doors or openings so as to permit of the entrance and exit of passengers at one and the same time. The front platform must be inclosed and properly heated. It shall be provided with an exit door at least 30 in. wide and a folding step of the same width. If there is a partition between this and the body of the car it must be provided with an exit door or opening not less than 30 in. wide.

In the meantime the chairman of the Ontario Railway Board has rescinded the approval of the bylaw of the company allowing it to use prepayment cars. The solicitor of the company has said that it would appeal from the decision.

Lower Car Steps

E. C. Buckland, vice-president of the Connecticut Company, New Haven, Conn., recited as follows the conditions which govern the question of the height of electric car steps in a letter which he addressed recently to Mrs. John T. Sterling, Bridgeport, Conn., vice-president general of the National Daughters of the American Revolution:

"It is the desire of the management to make the steps satisfactory to patrons if it is possible to do so, but we find ourselves confronted with some conditions not of our making, but brought about by the development of the traffic. Among them are the following:

"During the last 10 years the public have demanded a larger, more easy-riding car than the small single truck cars which previously were the standard horse car; in fact, this demand has become so insistent that the single-truck cars are now an embarrassment to the company. Whenever they are used people complain on account of their size and their uncomfortable riding qualities. The large double-truck car, then, must be regarded as the present standard, with the tendency to increase still further the size and weight. With those large cars must, of course, come larger motors, which are geared directly on the axles. These motors must have sufficient space between the floor of the car and the ground to clear the surface of the pavement. Therefore, with the larger cars the floors have to be raised higher and consequently the passengers must climb a higher step in order to get into the car.

"I think you will see that we cannot lower the height of the floors. The question then becomes, can we not use two steps by which to get into the car? I suppose that no mat-

ter of car equipment has received more careful attention or more extensive experiment than the providing of two steps where one is now used. The experiments have been along two lines. One is to construct an additional step extending further out from the side of the car. That, in cities where the streets are broad and there is plenty of room between the curb and the track, answers admirably, but where the streets are narrow and wagons drawn up alongside the curb barely clear the cars, it is impossible to build steps which will project still further than do the present steps.

"The other plan is to cut a notch into the floor, and so let the second step be flush with the car. This avoids the trouble of providing a clearance, but it makes a pitfall for passengers who are getting off the car and is not recommended as good operation.

"This question of car steps is one which is receiving our very careful attention. We will apply a remedy as soon as we can find a practicable one, and our omission to do so at the present time has been due to our inability to find a solution, rather than to our indifference to the conditions.

"There should also be borne in mind the large expense attendant upon the alteration of all of the cars operated by the Connecticut Company, and the doubtful value of any such alteration when it shall have been completed."

Collision in Cleveland.—Twelve persons were injured on Feb. 14, 1911, in a collision between the Chicago and New York express of the Nickel Plate Railroad and a car of the Cleveland Railway at the crossing at Kinsman Road and East Sixty-fourth Street.

Whistle at Crossings.—The Public Service Commission of Maryland has ordered the Washington, Baltimore & Annapolis Electric Railway and the Maryland Electric Railways to instruct their motormen to whistle when approaching public and private crossings in the country.

Service Between Welland and Port Colborne.—On Feb. 18, 1911, the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., inaugurated a passenger and freight service between Welland and Port Colborne. The opening of the line was delayed until the company received permission to cross an intersecting steam railroad.

Service in Albany.—The Public Service Commission of the Second District of New York has set March 9, 1911, for a further hearing on the subject of service on the Pine Hills and West Albany lines of the United Traction Company, Albany, N. Y., to which reference has been made previously in the *ELECTRIC RAILWAY JOURNAL*. The company has been directed by the commission to present evidence at the hearing on March 9, 1911, concerning the financial relations of the company with other companies.

Complaint Against Buffalo & Lake Erie Traction Company.—The Trustees of Silver Creek have complained to the Public Service Commission of the Second District of New York against the Buffalo & Lake Erie Traction Company, alleging that under a schedule adopted Dec. 1, 1910, the service is irregular and at less frequent intervals than theretofore and that under the franchise granted the company it is required to operate cars daily each way at intervals of not more than 60 minutes, from 6 a. m. to 11 p. m., and that this service is of great importance to the business interests of the village.

Reduction in Fare by the New York & Long Island Traction Company.—The New York & Long Island Traction Company has notified the Public Service Commission of the Second District of New York that beginning March 1, 1911, it will reduce from 15 cents to 10 cents the fare charged on its line between Fulton Street, Brooklyn, and the Jericho Turnpike, Queens Borough, and Front and Main Streets in Hempstead. The lower rate was that fixed in the company's franchise and complaint of the higher rate being charged had been made by the West Hempstead, Hempstead Gardens & Lake View Association.

Ordinance to Limit Car Capacity in Pittsburgh.—Judges Marshall Brown, James R. Macfarlane and Thomas J. Ford, of the Allegheny County Court, have granted an injunction to prevent the City of Pittsburgh from enforcing the ordinance which it passed recently to limit the number of passengers to be carried on a car. The injunction was asked

by the company after the City Solicitor had notified the company that the city intended to enter 100 suits for violation of the overcrowding ordinance to recover the \$100 fine for each violation prescribed by the ordinance. The company declared the ordinance "unconstitutional, unreasonable, illegal and void." In granting the plea of the company the court said that no such law has ever been successfully enforced in this country, and that all attempts that had been made to enforce such regulation have failed.

Park Business at Allentown.—R. P. Stevens, president of the Lehigh Valley Transit Company, Allentown, Pa., refers as follows in the recent pamphlet report of the company for the year ended Nov. 30, 1910, to the amusement business of the company: "Your company controls an amusement and recreation park midway between Allentown and Bethlehem and the development of this enterprise has been the cause of a part of the increased passenger receipts. The park caters to an estimated population of 100,000 people with a 5-cent fare zone, and also benefits by many picnic parties from points between High Bridge, N. J.; Mauch Chunk, Portland and Philadelphia. The establishment of a good comic opera company in the park the past season proved a great success, and the present policy of providing high-grade entertainments and amusements and of affording frequent service assures continued success in this department."

New Schedule in Trenton.—Beginning Feb. 20, 1911, the Trenton & Mercer County Traction Company, Trenton, N. J., adopted a schedule that provides a one-hour headway to Princeton, a 15-minute headway to Lawrenceville, a 40-minute headway to Trenton Junction and a 30-minute headway to Yardville, with the same service as at present to Hamilton Square, Pennington and Hopewell. On West State Street, South Clinton and Hamilton Avenues there are six cars an hour, instead of seven, with nine cars in the morning and evening rush hours. Prospect Street cars continue on the old schedule of seven cars per hour through the day, with an increase to 10 during rush hours. On the Center and South Broad Street lines six cars are in service in the non-rush hours, with an increase of nine in the morning and evening, and on North Broad Street there are eight cars through the day, as against six formerly, with an increase to 11 in the rush hours.

Results with Prepayment Cars and Gates in Memphis.—T. H. Tutwiler, president of the Memphis (Tenn.) Street Railway, issued a statement recently in regard to the prepayment cars in use on the lines of that city and to the car gates in which he said in part: "The gates and the prepayment plan of collecting fares were inaugurated here after a careful study of systems elsewhere and, since their inauguration, they have accomplished the results hoped for. Chief among these is the prevention of accidents. In December, 1909, the falls from our cars amounted to 134, while in December, 1910, with the gates in service, they amounted to only 19, 17 of which were from the East End open trailers, which did not have the safety gates. So it may be said that as against 134 falls in December, 1909, the falls in 1910 on gate cars were reduced to two. The figures for January have not yet been tabulated. An annual comparison would show the prevention of more than 1000 accidents per year, many of which would be serious and some fatal. It would seem that the prevention of accidents should be of paramount consideration in the operation of street cars, and if the gates accomplish this result certainly the public is served. The prepayment plan of collecting fares enables the conductor to remain on the platform, which is certainly the station he should occupy looking to the safe operation of the car, in which position he is at all times in a position to see when passengers are safely on or off the car. It may be said that some of our cars which now have the gates are not such as we would design in case of new cars, and all future cars will have more commodious platforms to facilitate the present gate and prepayment plan system. Considering the results accomplished, there can be no doubt that the present method is a step in the right direction and that it is annually preventing hundreds of accidents and saving several lives, which is of paramount importance in the operation of every first-class street railway service."

Personal Mention.

Mr. G. R. G. Conway has been appointed chief engineer of the British Columbia Electric Railway, Vancouver, B. C.

Mr. William A. Koch, vice-president of the Owensboro (Ky.) City Railroad, has been elected president of the company to succeed Mr. John G. Delker.

Mr. W. O. Johnson, a director of the Western Trust & Savings Bank, Chicago, Ill., has been appointed operating receiver of the Chicago & Milwaukee Electric Railroad, Chicago, Ill.

Mr. Harry Flynn, who has been connected with the Georgia Railway & Electric Company, Atlanta, Ga., for some time, has been appointed auditor of the company, a newly created position.

Mr. Frank Mitchell, assistant cashier of the Georgia Railway & Electric Company, Atlanta, Ga., has been appointed cashier of the company to succeed Mr. I. S. Mitchell, who has been elected treasurer of the company.

Mr. J. W. McCrosky, manager of the operating department of J. G. White & Company, Limited, London, Eng., left London on Feb. 15, 1910, to go to Venezuela and Brazil on a business trip in connection with properties in those countries which are managed by J. G. White & Company, Limited.

Mr. W. R. Putnam has been appointed electrical engineer of the Dakota Power Company, Rapid City, S. D., in charge of the construction of the hydroelectric plants of the company on the Rapid River. Mr. Putnam was formerly superintendent of the Menominee & Marinette Light & Traction Company, Marinette, Wis.

Mr. I. S. Mitchell, Jr., has been elected treasurer of the Georgia Railway & Electric Company, Atlanta, Ga., to succeed Mr. G. W. Brine, resigned, who continues as vice-president and secretary of the company. Mr. Mitchell's entire business career has been with the Georgia Railway & Electric Company, mainly in the capacity of cashier.

Mr. W. F. Towne, formerly general freight agent of the Pacific Electric Railway, Los Angeles, Cal., has been appointed general freight agent of the Pacific Electric Railway, Los Angeles-Pacific Company, and the Los Angeles & Redondo Railway in charge of the freight terminal business of the companies in Los Angeles. Mr. Towne has been connected with the Pacific Electric Railway four years, and before that was foreign freight agent of the Southern Pacific Company, with headquarters at San Francisco.

Mr. M. E. McCaskey, vice-president of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has resigned, effective March 1, 1911. Mr. McCaskey's connection with the company commenced at the time of the consolidation in 1906 when he was promoted from the vice-presidency of the Pennsylvania & Mahoning Valley Railway to the vice-presidency of the consolidated companies which formed the Mahoning & Shenango Railway & Light Company. No appointment of a vice-president was made by the company upon receipt of Mr. McCaskey's resignation.

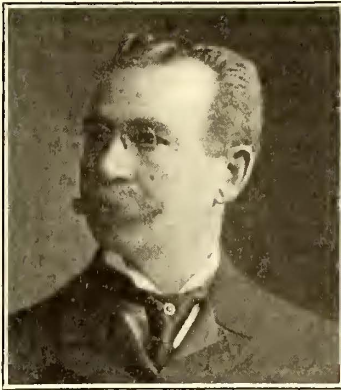
Mr. George E. Moffat, formerly general superintendent and consulting engineer of the British Columbia Electric Railway Company, Limited, of Vancouver, B. C., was appointed general manager and operating manager of the Richmond & Henrico Railway, Richmond, Va., on Feb. 1, 1911. This line is about 10 miles long and connects Church Hill, Richmond, with the business section of the city by a viaduct half a mile long, 96 ft. high and 42 ft. wide. The company is preparing to build some long extensions. Mr. Moffat has had a long experience in electric railway operation in this country and abroad and a biography of him was published in the *ELECTRIC RAILWAY JOURNAL* for Sept. 24, 1910, just subsequent to his resignation from the British Columbia Electric Railway.

Mr. F. W. Taylor has been appointed general purchasing agent of the Pacific Electric Railway, Los Angeles, Cal., with jurisdiction over the stores for the Pacific Electric Railway, Los Angeles-Pacific Company, Los Angeles & Redondo Railway, San Bernardino Valley Traction Company, Redland Central Railway, Riverside & Arlington Railway, Peninsula Railway, Fresno Traction Company, Stockton Electric Railroad and the Visalia Electric Rail-

road, all controlled by the Southern Pacific Company. Mr. Taylor has been connected with the Harriman interests for the last 22 years as supply agent and storekeeper; also as general storekeeper of the Oregon Short Line at Pocatello, Idaho, and for the last eight years he has also been general storekeeper of the lines of the Southern Pacific Company east of Sparks, Nev.

Mr. John I. Beggs, president of the Milwaukee Electric Railway & Light Company, of Milwaukee, Wis., announced his retirement from the presidency of that company last week. Mr. Beggs will re-

move about April 1 to St. Louis, where, as stated in the *ELECTRIC RAILWAY JOURNAL* for Feb. 18, he will take charge of the St. Louis Car Company, of which he has just been elected president and general manager. No successor to his position at Milwaukee has yet been appointed. Mr. Beggs has been identified with the management of public service corporations for many years, and is recognized as one of the leading and most forceful men in the electric railway and electric lighting industries.



John I. Beggs

He is no stranger to manufacturing and selling enterprises, for twenty years ago he was Western manager for the old Edison General Electric Company. Since then he has been connected with electric lighting or electric railway companies in Cincinnati, St. Louis and Milwaukee. He took full charge of the predecessor of the present Milwaukee Electric Railway & Light Company in 1897. The property had then just emerged from bankruptcy, but Mr. Beggs has built it up until it is now recognized as one of the most prominent and successful of the combined central-station and electric railway companies of the country. Mr. Beggs was president of the American Electric Railway Association in 1906-07, and is a man of varied and extensive interests, as well as of remarkable versatility and of unshrinking courage. President James Campbell, of the North American Company, of New York, which is interested in the Milwaukee Electric Railway & Light Company, says that Mr. Beggs retires from the management of the Milwaukee company against the wishes of every one interested. He paid this tribute to the retiring president: "Mr. Beggs is an ideal executive of a great company. He is a wonderful executive; he has vision; he not only can tell others how to do things, he can do them himself. I never have known a man who combined so many qualities of leadership. He is an engineer, an administrator, an accountant and a financier. The Milwaukee Electric Railway & Light Company is a monument to his ability as a manager and his devotion to duty as a man." The Milwaukee papers unite in paying editorial tribute to Mr. Beggs' resourcefulness and ability as a man and as a railway manager and to the loss which Milwaukee will experience by the change. Even the *Daily News*, which in the past has been antagonistic to the company, said, in part: "In the resignation of John I. Beggs from the head of the Milwaukee street railway and lighting system, this city will lost probably the most dominant character of her history. Constructive, forceful, magnetic, of remarkable physical and mental energy, a driver and at the same time a leader, Mr. John I. Beggs is a man among men and one whom Milwaukee will miss, nor soon forget. In many ways Milwaukee is better for having Mr. Beggs as the head of its great public service corporation. His constructive force, his business imagination, as he called it, his tenacity and his great administrative ability have given Milwaukee a system that equals the best in construction quality and an operative service generally speaking of a highly satisfactory character."

Mr. Beggs became connected with the electrical industry in its early days, being manager of an electric lighting plant in Harrisburg, Pa., in 1884. After that he became connected with the Edison company, as stated. While retiring from the management of the Milwaukee property, Mr.

Beggs will retain his financial interest in the company and remain as one of the directors. He will also keep his interests in the Milwaukee financial and other institutions which he has acquired during his long residence in that city. Although expecting to make St. Louis his home, Mr. Beggs is also evidently planning to spend considerable time in Wisconsin, because he has just purchased a handsome country residence on an island located in Lac La Belle in the immediate vicinity of Oconomowoc, Wis.

Mr. E. W. Olds, superintendent of rolling stock Milwaukee Electric Railway & Light Company, has tendered his resignation, to take effect April 1, and will move to California, where he will live in the future. It is understood that Mr. Olds was anxious to retire from active service a year or more ago, but has remained in Milwaukee at the earnest wish of the company with which he has been connected, pending the completion of an order for 100 new pay-as-you-enter cars which are being built for that company by the St. Louis Car Company. These cars are now being delivered. Mr. Olds entered the service of the Milwaukee Electric Railway & Light Company in 1896. He was one of the organizers of the American Electric Railway Engineering Association and has always been prominent in the councils of that body. He served as president of the association in 1903-4.

Mr. W. H. Glenn, general manager of the street railway department of the Georgia Railway & Electric Company, Atlanta, Ga., has in addition been elected vice-president of the company. Mr. Glenn became connected with the engineering department of one of the constituent companies of the Georgia Railway & Electric Company after he was graduated from the Georgia School of Technology. Subsequently he served for several years in the shops. He next served as purchasing agent of the company. Later he was appointed superintendent of track and roadway, and in that capacity he had charge of most of the reconstruction work which followed the formation of the Georgia Railway & Electric Company and worked out many of the problems incident to the changes in the physical property which followed the consolidation. Mr. Glenn was appointed general manager of the railway department of the company in January, 1908.

Mr. A. E. Peters, who was elected secretary of the Detroit (Mich.) United Railway on Feb. 7, 1911, as announced in the *ELECTRIC RAILWAY JOURNAL* of Feb. 18, 1911, began his business career with the Michigan Central Railroad at Detroit, which he served for 10 years in the local freight, general freight and auditor's office. He resigned from the Michigan Central Railroad to accept a position with Winston & Meagher, Chicago, Ill., corporation lawyers, who at that time acted as counsel for the Michigan Central Railroad. Mr. Peters returned to Detroit in 1892. He was connected with the Detroit Gas Company for a year and entered the service of the Detroit Citizens' Street Railway in 1893 as stenographer and clerk. He was elected secretary of that company on March 28, 1895, and upon the organization of the Detroit United Railway on Dec. 31, 1900, he was elected assistant secretary of that company. He was also purchasing agent of the Detroit Citizens' Street Railway and the Detroit United Railway for about seven years.

OBITUARY

Frank S. Layng, a director of the Railway Steel Spring Company, New York, N. Y., and formerly a vice-president of the company, is dead. Mr. Layng was also president of the Illinois Zinc Company, Peru, Ill.

Joseph Wetzler, who was joint editor with Mr. T. C. Martin of the *Electrical World* in the later eighties and later of the *Electrical Engineer*, of New York, died in London on Feb. 22. He had been a resident of England for the past 12 years. He was 47 years of age.

R. H. Carpenter, formerly auditor and traffic manager of the Western Ohio Railway Company, Lima, Ohio, died at a sanitarium at Dayton, Ohio, on Feb. 23, 1911, after an illness of more than a year. Mr. Carpenter was a son of Mr. F. D. Carpenter, general manager of the company.

Robert Stewart, a division superintendent for the Chicago (Ill.) City Railway, is dead. Mr. Stewart was born in County Down, Ireland, in 1851, and came to the United States when 20 years old. He entered the service of the Chicago City Railway in 1873 as the driver of a horse car and became chief supervisor of the system in 1893.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Belleville & Western Railway, Belleville, Ill.**—Application for a charter has been made in Illinois by this company to build an electric railway in Belleville. Capital stock, \$2,500. Incorporators: V. J. Adams, Coulterville; John D. Vogt, T. W. Hofsemmer, Peter J. Gundlach and B. A. Gundlach, Belleville.

***St. Louis, Peoria & Northwestern Railway, Peoria, Ill.**—Incorporated in Illinois to build an electric railway from a point in or near Peoria through the counties of Peoria, Tazewell, Mason, Menard, Sangamon and Macoupin to a connection with the Macoupin County Railway, at a point about 2½ miles south of Girard. Capital stock, \$25,000. Directors: Marvin Hughitt, Chauncey Keep, Byron L. Smith and Baret Conway, Chicago; John V. Farwell, Lake Forest; William A. Gardner, Evanston, and John D. Caldwell, Oak Park.

***Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.**—Application for a charter has been made in Indiana by this company to take over the Fort Wayne & Wabash Valley Traction Company's property. Capital stock, \$8,000,000, half of which is common and half preferred stock. Officers: Henry J. Bowerfind, president; James Haberley, vice-president; Arthur H. Mohr, secretary, and Henry E. Vordemark, treasurer, all of Fort Wayne.

***United Water, Light & Traction Company, Somerset, Ky.**—Incorporated in Kentucky to take over the Somerset Water, Light & Traction Company. Capital stock, \$100,000. Incorporators: William Waddle, C. F. Smith, B. L. Waddle, A. A. Tuttle and M. O. Curd, all of Louisville.

Niagara Falls, Welland & Lake Erie Railway, Niagara Falls, Ont.—The Canadian Parliament has granted a charter to this company to build an electric railway to connect Niagara Falls, Welland and Port Colborne, with branches to Port Dover on Lake Erie, and to Fort Erie on the Niagara River opposite Buffalo. It is expected to begin construction in the spring. C. J. McLaughlin, Toronto, Ont., is interested. [E. R. J., Oct. 1, '10.]

***Woodlawn & Southern Street Railway, Woodlawn, Pa.**—Application for a charter will be made by this company in Pennsylvania to build a 7½-mile electric railway to connect Woodlawn, Aliquippa, Hopewell and South Heights. Incorporators: Alexander B. Sheppard, John L. Moore, Ralph E. Reymer, John W. Adams and Walter L. Copeland.

***Memphis & Rugby Railway, Memphis, Tenn.**—Application for a charter has been made by this company in Tennessee to build an electric railway between Chelsea Avenue, Memphis, and the new suburb, Rugby. Capital stock, \$50,000. Incorporators: E. H. Coapman, vice-president and general manager of the Southern Railway, Washington, D. C.; Charles T. Doerr, purchasing agent Birmingham Street Railway; Henry Wetter, Luke Seawell, Charlotte, N. C.; James H. Malone and W. J. Francis.

Dallas (Tex.) Street Railway.—Incorporated in Texas to build an electric railway in Dallas to connect at Garrett Avenue and Ross Avenue with the Dallas Consolidated Electric Street Railway and extend eastward 900 ft. over Ross Avenue to Henderson Avenue and north to the city limits. Capital stock, \$20,000. Incorporators George W. Works, W. Leslie Williams and A. C. Moser. [E. R. J., Sept. 3, '11.]

FRANCHISES

Burbank, Cal.—F. A. Halburg, representing the Pacific Electric Railway, has received a franchise from the Board of Supervisors to build its railway on Fourth Street in Burbank. This is part of the plan to build a 5-mile extension of its Glendale line to Burbank.

Los Angeles, Cal.—The Los Angeles Railway will ask the City Council for a franchise to operate a line on Fifty-third Street in Los Angeles.

Martinez, Cal.—The Oakland & Antioch Railway, Oak-

land, has asked the supervisors for a franchise along Ygnacio Valley Road to a point known as Castle Rock Gate.

East St. Louis, Ill.—The Southern Traction Company, East St. Louis, has received a franchise from the House of Delegates to use the the upper roadway of the Municipal Bridge for a double-track railway and to operate its railway over certain streets in the downtown section of St. Louis.

Paris, Ill.—The Illinois Traction System, Champaign, has received a 50-year franchise from the Board of Aldermen to build an extension from Charleston to Paris. The Illinois Central Pacific Railway will build north from Paris to Chrisman and the Illinois Traction System is to build south from Danville to Chrisman. By use of the Illinois Traction System there will be through service from St. Louis to Buffalo.

***Veedersburg, Ind.**—Joseph Wamsley has asked the City Council for a franchise to build an electric railway over certain streets in Veedersburg.

Iola, Kan.—D. H. Siggins, J. J. Jones and associates have asked the City Council for a franchise to build an electric railway in Iola. This proposed railway will connect Chanute, Humboldt and Iola. A franchise has been received in Chanute. [E. R. J., Feb. 25, '11.]

Frederick, Md.—The Frederick Railroad has received a franchise from the Board of Aldermen to extend its railway in the southern section of Frederick.

***St. Louis, Mo.**—The St. Louis, Arcadia & Jefferson Railway has asked the City Council for a franchise to build a 2-mile electric railway in St. Louis to Carondelet Park and to connect Arloe, Gratiot and Lindenwood.

Trenton, N. J.—The Morris County Traction Company, Morristown, has received approval of the State Board of Public Utility Commissioners authorizing it to double-track its railway upon certain streets in Madison.

Amsterdam, N. Y.—The Fonda, Johnstown & Gloversville Railroad, Gloversville, has received a franchise from the City Council for an extension of its line in Amsterdam. The Public Service Commission, Second District, has approved of this franchise and authorizes this company to issue for construction purposes the balance of its 50-year first general consolidated refunding bonds for \$83,000, making a total with the amount previously authorized of \$463,000, all of which are to be sold at a price to be approved by the commission.

Buffalo, N. Y.—The International Traction Company has asked the Public Service Commission, Second District, for a certificate of convenience and a necessity for the construction of an extension on the Abbott road in Buffalo between Cazenovia Street and the city line of Buffalo, a distance of 1½ miles. This extension will connect with the Buffalo Southern Railway, and connect Buffalo with Hamburg, Orchard and that vicinity.

Lima, Ohio.—The Ohio Traction Company has received a 99-year franchise from the County Commissioners to extend its railway to the locomotive works, steel foundry and Gramm motor works in Lima and for the portion of the route lying outside of the city.

Youngstown, Ohio.—The Lake Erie & Youngstown Railway has received a franchise from the City Council to build its railway on Covington Street, Federal Street and West Front Street to Market Street in Youngstown. This projected railway will extend from Conneaut to Youngstown via Ashtabula, Trumbull and Mahoning counties. John H. Ruhlman, Youngstown, promoter. [E. R. J., Feb. 4, '11.]

Oregon City, Ore.—The Mount Hood Railway & Power Company, Portland, has asked the City Council for a franchise to build its railway through Oregon City.

***Burgettstown, Pa.**—W. G. Cramer, representing a company which proposes to build an electric railway to connect Burgettstown and McDonald, has asked the Borough Council for a franchise in Burgettstown.

Quakertown, Pa.—The Lehigh Valley Traction Company, Allentown, has received a franchise from the City Council to build its new short line in the vicinity of Quakertown, by which twenty minutes is to be saved in the trip from Philadelphia to Allentown. Plans for this work are about complete.

Chattanooga, Tenn.—The Chattanooga Railway & Light Company has asked the General Council for three franchises to build extensions in Chattanooga. One franchise provides for the principal streets of the west side of Chattanooga, another known as the Duncan ordinance provides for franchises over all the principal streets and another known as the James ordinance provides for lines over streets, most of which are at present without street railway facilities.

***Delavan, Wis.**—The Lake Geneva & Lake Delavan Electric Company has received a franchise from the City Council to build an electric railway in Delavan.

TRACK AND ROADWAY

Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, Ia.—This company has asked for bids on 5 miles of continuous circuit automatic signal blocking. The bids are returnable Feb. 25 at the office of H. U. Wallace & Company, Marquette Building, Chicago.

Central Illinois Public Service Company, Mattoon, Ill.—A 30-mile extension between Charleston and Paris will be built by this company during the present year.

Woodstock & Sycamore Traction Company, Sycamore, Ill.—Plans are being made by this company to build an extension to Marengo.

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—During 1911 this company will build about 21 miles of new line from Geneva, Ind., to Celina, Ohio, via New London, Ind., and Sheels Corner and Dearborn, Ohio.

Capital Circuit Traction Company, Indianapolis, Ind.—It is said that this company which is now surveying between Lebanon and Danville will use gasoline motor engines instead of electricity. It is expected eventually to extend the line to connect Danville, Martinsville, Franklin, Shelbyville, Greenfield, Noblesville and Lebanon. [E. R. J., Feb. 25, '11.]

***Ladoga, Ind.**—H. Kessler, Ladoga, and associates, are considering plans for the construction of a 10-mile electric railway between Ladoga and Jamestown.

Owensboro (Ky.) City Railway.—This company will extend its railway about a mile in Owensboro during the year.

***Winnipeg, Man.**—Messrs. Macdonald, Sullivan, Haggart and Tarr are said to be making plans and will soon apply for a charter to build an electric railway in Manitoba.

Washington, Frederick & Gettysburg Railway, Frederick, Md.—An application has been filed by this company with the Maryland Public Service Commission for the right to build an electric railway from Brentwood, Md., via Prince George's, Montgomery, Howard, Frederick and Carroll counties to the Pennsylvania line and then to Gettysburg. The company also asks the approval of the commission to issue \$100,000 of stock and, in addition, \$35,000 of bonds and \$6,000 of preferred stock at 6 per cent for each mile constructed.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—This company will build about 3½ miles of track during 1911 from the city limits to the cement plant.

St. Louis-Kansas City Electric Railway, St. Louis, Mo.—This company has awarded the contract to the L. C. Smith Construction Company to build 28 miles of the proposed railway between Kansas City and St. Louis. Work will begin in the spring. D. C. Nevin, Kansas City, president. [E. R. J., Dec. 17, '10.]

North Carolina Public Service Company, Greensboro, N. C.—During 1911 this company expects to construct about 15 miles of track from Greensboro to High Point.

Pine Brook Electric Railway, Caldwell, N. J.—Construction will soon be begun by this company on its proposed 12-mile railway which will extend from the present terminus of the Public Service Railway's line in Caldwell, to Denville, where it will connect with the Morristown Traction Company's line, via West Caldwell, Pine Brook, Parsippany and Denville. S. William Kerris, Pine Brook, is interested. [E. R. J., Jan. 21, '11.]

Morris County Traction Company, Morristown, N. J.—About 12 miles of track will be built by this company during 1911. It will extend from Morristown eastwardly through Convent, Madison, Chatham and Summit, which will com-

plete connections with Elizabeth and the Public Service Railway, Newark.

Elmira Water, Light & Railway Company, Elmira, N. Y.—This company will build about a mile of new track in Elmira during the present year.

Jamestown (N. Y.) Street Railway.—This company has ordered steel rails for double-tracking its railway on Main Street and the building of the new line on Willard Street. Construction will be begun early in the Spring.

Lancaster-Buckeye Lake Traction Company, Lancaster, Ohio.—This company is making preliminary arrangements for building its proposed 20-mile electric railway to connect Lancaster and Buckeye Lake. John H. Littrell, Lancaster, is interested. [E. R. J., Feb. 18, '11.]

Columbus, Marion, Upper Sandusky & Toledo Traction Company, Marion, Ohio.—This company will begin the construction of its line from Upper Sandusky to Toledo in the near future. The people of Sycamore have been asked to take \$15,000 in mortgage bonds of this company. It will connect Marion, Tiffin, Upper Sandusky, Fostoria, Columbus and Toledo. Frank M. Ohl, Toledo, promoter. [E. R. J., Jan. 28, '11.]

Toledo, Port Clinton & Lakeside Railway, Toledo, Ohio.—Plans have been completed for the extension of the line owned by this company from its terminus at Marblehead to the sandbar on the south side of the peninsula, where a dock and waiting station will be built for the accommodation of boats between Marblehead, Cedar Point and Sandusky. The change will necessitate a bay ferry route.

Shawnee (Okla.) Electric Railways.—This company will build 40 miles of track to connect Oklahoma, McLoud, Harrah, Choctaw City, Spencer Muskogee and Spencer during 1911.

Sand Springs Interurban Railway, Tulsa, Okla.—Contracts will soon be awarded by this company for building its proposed 6-mile electric railway to connect Tulsa and Sand Springs. W. H. Henderson, First National Bank Building, Tulsa, chief engineer. [E. R. J., Feb. 18, '10.]

People's Railway, Berlin, Ont.—This company is applying for a Dominion charter on the ground that several of its proposed terminals are located at ports on international waters, such as Owen Sound, Collingwood, on the Georgian Bay; Port Dover and Port Stanley, on Lake Erie; Hamilton, at the head of Lake Ontario, and Goodrich, on Lake Huron. The company also seeks power to increase its capital to \$5,000,000 and to develop water powers for its own undertaking.

Grand Valley Railway, Brantford, Ont.—About 10 miles of track will be built during 1911 in Brantford by this company.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—The Port Colborne division of this company has been opened for traffic with a two-hour service until midnight. The railway is now in operation from Port Dalhousie to Welland.

Toronto & York Radial Railway, Toronto, Ont.—This company is considering plans for building a 14-mile extension to connect Richmond Hill and Stouffville.

Lane County Asset Company, Eugene, Ore.—The contract has been awarded by this company to the Roberts Engineering Company, Kansas City, Mo., for the construction of the 130-mile railway to connect Eugene, Florence and Coos Bay. It is said that the company has secured financial backing. John Baird, Eugene, secretary. [E. R. J., May 14, '10.]

Oregon Electric Railway, Portland, Ore.—It is said that this company will soon build an extension from Eugene to Salem.

Hummelstown & Campbellstown Street Railway, Hershey, Pa.—About 12 miles of track will be built by this company from Hershey, to Lebanon during the present year.

Johnstown (Pa.) Traction Company.—About 11 miles of new track will be built by this company between Mineral Point and Ebensburg during the present year.

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—It is said that this company will double-track about a mile of its railway extending from Drogie Station, and will later double-track the entire section between Pittsburgh and Evans City.

Lake View Traction Company, Memphis, Tenn.—This company will extend its line from Lake View, Tenn., to Walls, Miss. The work will begin within 60 days. The directors of the company plan gradual extensions to connect with the principal towns of Northern Mississippi.

Cleburne (Tex.) Street Railway.—This company advises that it has completed and placed in operation its 7-mile electric railway in Cleburne. It expects to soon build a 3-mile extension to the park. Daniel Hewitt, Cleburne, president. [E. R. J., Jan. 14, '11.]

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—This company will place contracts for overhead material, 45-lb. rails and two-O round trolley wire, to be used in the construction of a mile extension. There will also be installed a switch about 100 ft. in length. V. S. Heinly, Corpus Christi, secretary.

San Antonio (Tex.) Traction Company.—This company will spend about \$250,000 in improvements on its railway during the year. It will extend and double-track some of its lines and enlarge its power plant. W. B. Tuttle, San Antonio, general manager.

Nooksack Valley Traction Company, Bellingham, Wash.—This company is having surveys made on the Guide-Meridian Road for its railway to Lynden. This proposed 20-mile electric railway will extend through the Nooksack Valley and connect Bellingham, Sumas, Ferndale, Lynden and Blaine. Samuel Alsop, Bellingham, is interested. [E. R. J., Dec. 17, '10.]

***Chamokane Contracting Company, Springdale, Wash.**—This company is being organized to build an electric railway between Springdale to a point on the Spokane River, where the Washington Water Power Company will erect a power plant.

Gogebic & Iron Counties Railway & Light Company, Ashland, Wis.—This company is making preliminary arrangements for building its interurban railway to connect Ironwood and Bessemer. The company has ordered 16,500 cross-ties and 2500 30-ft. cedar poles to be delivered before April 1. The company has opened an office in the Bank of Ironwood Building. F. D. Sullivan, Ashland, is in charge of the affairs of the company. [E. R. J., Dec. 24, '10.]

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.—This company expects to build during the year one mile of single track for local lines and 4 miles of interurban railway between Eau Claire and Altoona.

SHOPS AND BUILDINGS

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has moved its offices to the third floor of the Fiske Building in Fresno. This new office will be permanent until the company's new building is erected in I Street.

Southern Pacific Railroad, Los Angeles, Cal.—Preliminary work has been started by this company on its new car house at Fourteenth Street and Franklin Street extending through to Webster Street in Los Angeles. It will be a four-story stone and steel structure. Awnings composed of a network of metals and supported by steel columns will serve as a protection to passengers. The cost is estimated to be about \$100,000. The company, it is said, will build a car house on Alhambra Avenue, in Los Angeles. The structure will be 160 x 200 ft. The cost is estimated to be about \$100,000.

Shore Line Electric Railway, New Haven, Conn.—This company has purchased a tract of land 500 ft. square on Middletown Avenue in New Haven for a terminal building which will soon be constructed. This is near the junction with the lines of the Connecticut Company at State Street and Ferry Street.

Mason City & Clear Lake Railway, Mason City, Ia.—A fire in this company's car house at Mason City recently destroyed five motor cars. The loss is estimated to be about \$10,000.

Aurora, Elgin & Chicago Railway, Chicago, Ill.—This company is considering plans for building a three-story and basement building to be used for its railway offices in Wheaton.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—The Board of Public Works has con-

firmed the action of the City Council to vacate Cherry Street between Eighth Street and Ninth Street, thus granting the Terre Haute, Indianapolis & Eastern Traction Company a site on which to build a new terminal station.

Springfield (Mo.) Traction Company.—This company will build a new car house on Boonville Street, in Springfield. The structure will cost about \$50,000 and will necessitate the total razing of the building now occupied by this company. W. A. Bixby, general manager.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—Work will be begun at once by this company on a new terminal at Coney Island. The structure will be two stories high, of steel framework and brick construction. The improvements will include a restaurant 50 ft. x 200 ft. on the second floor and back of that a car shed 150 ft. x 150 ft. On the rear will be an automobile garage 170 ft. x 200 ft., facing Fifth Street. A feature of the building will be the utilization of the entire roof space for amusement enterprises.

Ohio Traction Company, Cincinnati, Ohio.—The stockholders of this company at a recent meeting ratified the action of the directors in authorizing a bond issue of \$2,500,000, the proceeds of which will be used for the construction of new houses at Winton Place and other improvements.

Portland Railway, Light & Power Company, Portland, Ore.—Plans are being formulated by this company for building a new car house on a tract of land bounded by Holgate, Milwaukee and Rhone Streets, and the Southern Pacific shops on the East Side in Portland. The cost is estimated to be about \$300,000.

Wheeling (W. Va.) Traction Company.—A frame structure to be used as a waiting room is being built by this company at First Street in Benwood.

POWER HOUSES AND SUBSTATIONS

Public Service Corporation, Newark, N. J.—This company has ordered station and substation apparatus from the General Electric Company as follows: For the City Dock station, a switchboard and regulators; for the Coal Street station, a switchboard; for the Paterson station, transformers and switchboard; for the Passaic substation, transformers, regulators and switchboard; for the Marion station, a switchboard; for the Metuchen station, a switchboard; for the Garfield Avenue substation, oil switches and switchboard apparatus; for the Hudson River substations, constant current transformers, high voltage lightning arrester equipment; for the Trenton station, induction regulators and switchboard apparatus; for the Rutherford substation, a constant current transformer and switchboard; for the Englewood substation, constant current transformers and switchboard; for the New Brunswick substation, high voltage lightning arrester equipment and switchboard apparatus; for the Rahway station, high voltage lightning arrester equipment and switchboard apparatus; for the Lincoln substation, switchboard apparatus; for the Plainfield station, switchboard apparatus; for the Montclair substation, switchboard apparatus, and for the Plank Road substation, feeder regulator and switchboard apparatus.

Third Avenue Railroad, New York, N. Y.—This company has issued specifications for one 1500-kw rotary converter and three 550-kw transformers.

Dayton & Troy Electric Railway, Dayton, Ohio.—It is reported that this company will reconstruct its power plant at Tippecanoe City and build a new substation near Dayton and another near Piqua, in the near future. R. A. Crume, Tippecanoe City, purchasing agent.

Toledo & Western Railroad, Toledo, Ohio.—This company is preparing to spend about \$75,000 in improving the property and making additions to the power facilities this year. The company is controlled by the Toledo Railways & Light Company.

Dominion Power & Traction Company, Hamilton, Ont.—This company will add to its plant during 1911 the following: At its power house in Hamilton a 6400 kw a.c., 2400-volt generator and 7100-hp turbine; at its Hamilton substation an 8000-kw capacity Westinghouse rotary, and at its Brantford substation a 3000-kw capacity Westinghouse rotary. W. C. Hawkins, Hamilton, general manager.

Manufactures & Supplies

ROLLING STOCK

Public Service Railway, Newark, N. J., is building 15 passenger cars in its own shops.

Du Bois Electric & Traction Company, Du Bois, Pa., is in the market for one freight and express car.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex., is in the market for one 32-ft. motor car.

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah, has ordered 10 56-ft. interurban trailer cars from the Niles Car & Manufacturing Company.

Eastern Pennsylvania Railway, Pottsville, Pa., has ordered through the J. G. White Company from the General Electric Company three complete G.E.-90 four-motor equipments.

Oakland (Cal.) Traction Company has ordered 60 passenger cars, with Brill single-motor forged frame trucks and GE-210 motors and air-brake equipment, from the St. Louis Car Company.

Interstate Traction Company, Duluth, Minn., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, as being in the market for two double-truck motor passenger cars, has ordered these cars from the Danville Car Company.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont., has placed an order with the Canadian Car & Foundry Company for six "Simplex" self-clearing cars equipped with M.B.C. draft rigging and Westinghouse air brakes.

Wilkes-Barre (Pa.) Railway, noted in the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1911, as being in the market for 20 additional passenger cars, has ordered these cars from The J. G. Brill Company. The cars are to be 48 ft. long and will be mounted on Brill 27-E-1½ trucks.

Quebec Railway, Light, Heat & Power Company, Quebec, Que., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, as being in the market for 10 single-truck car bodies, has ordered these car bodies from The J. G. Brill Company. This company also reports that it is in the market for 75 coal cars.

Washington Water Power Company, Spokane, Wash., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 14, 1911, as having ordered 25 pay-as-you-enter cars from The J. G. Brill Company, has specified the following details for these cars:

Type of car,	Fare boxes	Brill
single-end pay-as-you-enter	Gears and pinions..	G. E. Co.
Seating capacity.....	Gongs	Dedenda
Bolster centers, length..	Hand brakes.....	vertical
Length of body.....	Heating system	Cons.
Over vestibule.....	Headlights	A. & W.
Width over sills..	Journal boxes	Symington
Over posts at belt...8 ft. 6 in.	Push button signal....	Brill
Body	Sanders.	O. B.
Interior trim	Sash fixtures	Edwards
Underframe	Seats	Brill
Air brakes...Gen. Elec. Co.	Seating material	cane
Bumpers....	Side bearings	Brill
Car trimmings	Springs	Brill
Center bearings ..	Step treads	Mason
Couplers	Trolley base....	U. S., No. 13
Curtain fixtures ...	Trucks	Brill 27E-1
Curtain material...Pantasote	Ventilators	Brill
Destination signs	Wheels...Midvale	rolled steel

TRADE NOTES

Rail Joint Company, New York, N. Y., has moved its Chicago office to Room 215, Railway Exchange Building.

Allis-Chalmers Company, Milwaukee, Wis., has appointed F. C. Bryan general traffic manager of the Milwaukee office.

F. W. Miller Heating Company, Chicago, Ill., has moved its Chicago office from the Railway Exchange Building to the McCormick Building.

John R. Cole Company, Los Angeles, Cal., agent for W. N. Matthews & Brother, has moved its offices to 551 South Los Angeles Street.

Buckeye Jack Manufacturing Company, Alliance, Ohio,

on account of its large increase in business, has increased its capital stock from \$30,000 to \$50,000.

Frank J. Walsh has accepted a position with the Chicago Pneumatic Tool Company. Mr. Walsh has been general foreman of the Chesapeake & Ohio Railroad.

John S. Leake has recently accepted a position with the Pneumatic Jack Company. Mr. Leake was formerly connected with the Manual Training School, Louisville, Ky.

National Car Coupler Company, Attica, Ind., has opened offices in the McCormick Building, Chicago, Ill. W. A. Ruth, sales manager of the company, will be in charge of this office.

McKeen Motor Car Company, Omaha, Neb., has received an order from the Oregon Short Line for four 70-ft. motor cars and an order from the Oregon Railroad & Navigation Company for one 70-ft. car.

Railway Steel-Spring Company, Chicago, Ill., has elected H. K. Devereux, George B. Motheral and Charles Scott, Jr., directors of the company to succeed Julius E. French, Philo N. French and George G. McMurtry.

H. A. Strauss, vice-president and chief engineer of the Falkenau Electrical Construction Company, Chicago, Ill., has been appointed consulting engineer of the Merchants' Light & Power Company, Ogden, Utah.

Valentine-Clark Company, Chicago, Ill., announces that on March 15, 1911, the general offices of the company will be moved from 1001 McCormick Building, Chicago, to 932 Security Bank Building, Minneapolis, Minn.

George A. Johnson, Los Angeles, Cal., has moved his office to 551 South Los Angeles Street, where he will continue to act as sub-agent for Wagner alternating-current motors, generators, transformers and instruments.

Ackley Brake Company, New York, N. Y., has appointed Ing. S. Bellotti & Company, Milan, Italy, agents for the Ackley adjustable brake in Italy. Bellotti & Company are well known throughout Europe as a leading supply house for tramway material.

Hicks Locomotive & Car Works, Chicago, Ill., the property of which was offered for sale under foreclosure on Feb. 21, 1911, was bid in at the receivers' sale by Col. William Barbour, president of the Linen Thread Company, New York, N. Y., for \$470,000.

Alberger Condenser Company, New York, N. Y., has elected George Q. Palmer president of the Alberger Condenser Company and the Alberger Pump Company. Mr. Palmer is succeeded as vice-president of the Alberger Condenser Company by D. H. Chester and in the Alberger Pump Company by W. S. Doran.

Louis A. Shepard, who recently resigned the position with the Titan Steel Casting Company which he had held for several years, has established himself in the timber business with an office at room 517, 30 Church Street, New York. Mr. Shepard will handle a full line of ties, cross arms, poles, piling and timber for railway purposes.

J. F. Hodgkins Company, Gardiner, Me., announce that the business of J. F. Newell & Company was incorporated Feb. 8, 1911, under the name of the above company. The new company will continue the manufacture of trolley wheels, bearings for electric railway motors, journal brasses, "Sampson" lifting jacks and iron and brass castings.

Barney & Smith Car Company, Dayton, Ohio, has declared a dividend of 2 per cent on the \$2,500,000 of 8 per cent cumulative preferred stock, payable March 15, 1911, to holders of record on Feb. 28, 1911. This is the first distribution on the issue since June, 1908. No payment has been made on the common stock of the company since December, 1907.

Garwood Electric Company, Garwood, N. J., has appointed Henry Widmer, 731 Union Street, New Orleans, La., as agent for the sale of its product in Louisiana, southern half of Mississippi, City of Mobile, Ala., and all territory within a radius of 50 miles of that city. Milton S. Nettleton, 29 College Street, New Haven, Conn., has also been appointed as its agent for New Haven and surrounding territory.

Henry Floy, New York, N. Y., consulting engineer, has purchased from the estate of the late William H. Bryan, of St. Louis, the complete collection of data on depreciation ac-

cumulated by Mr. Bryan during his lifetime. The collection includes duplicates of all cards collected by the American Water Works Association committee on depreciation, in addition to similar data on electric light, railway, water power plants, telephone systems, etc.

Mead-Morrison Manufacturing Company, Cambridge, Mass., has closed contracts with the Boston Elevated Railway for installing a complete new coal-unloading and storage plant for its new power house at South Boston, including unloading cars of the latest design, cable road and re-handling and pick-up bridge, and with the Edison Electric Illuminating Company, of Boston, for equipping its plant at South Boston with coal-handling machinery.

Western Electric Company, New York, N. Y., reports that its earnings during January, 1911, were slightly in excess of those of a year ago. The *Wall Street Journal* considers this a remarkable showing in view of the fact that other electrical manufacturing companies report a decrease for the same period. The Western Electric Company's gross business for the twelve months ended last November totaled \$61,000,000, and for the thirteen months ended December, 1910, approximately \$68,000,000.

Lackawanna Steel Company, New York, N. Y., has issued its annual report for the year ended Dec. 31, 1910, which shows gross sales and earnings of \$31,302,760, as compared with \$25,296,661 in 1909. This is \$1,708,650 below the earnings in 1907, the best previous year of the company. Manufacturing cost and operating expenses increased by \$4,385,451 over those of the previous year to \$24,972,289, leaving an income from operation of \$6,330,470, which compares with \$4,709,823 in the previous year, and \$6,623,397 in 1907.

J. W. Paxson Company, Philadelphia, Pa., reports an unusual amount of interest expressed in the steel wire frog and switch brooms which it manufactures for cleaning snow and ice from the frogs and curves of street railway tracks. In consequence the company has received a number of orders in quantity as well as trial orders. The design of the broom is original with the J. W. Paxson Company, and it is useful for cleaning the grooves of rails in both summer and winter. When desired the brooms are furnished with chisel-shaped points.

Charles C. Moore & Company, San Francisco, Cal., engineers, report that the Southern California Edison Company is installing the Moore fuel-oil regulating system in its power station. This is the system used by the Pacific Light & Power Company at its Redondo plant near Los Angeles, where 18 604-hp Babcock & Wilcox boilers are operated with fuel oil with three burners per boiler. The power from that station is used largely for railway work, but in spite of a very fluctuating load a practically uniform steam pressure has been maintained.

General Electric Company, Schenectady, N. Y., has just completed its new warehouse, Greenwich Street and Morton Street, New York City. There are nine floors in the new building aggregating 9000 sq. ft. of floor space, which more than doubles the size of the present warehouse of the company and provides ample space for storing electrical appliances. Two elevators will be used to handle the freight and express and another elevator will be used for the transportation of passengers. The new warehouse with its increased floor space and improved shipping facilities will enable the company to carry a much larger stock to meet the current demands.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., received at its New York office on Feb. 25, 1911, the following cablegram from R. D. McCarter, managing director of the Russian Westinghouse Company, which explains the report which appeared in the daily press the day previous in which the statement was made that the books of the company had been seized by the local authorities at St. Petersburg, where the company is under contract to electrify the city railways: "Our position satisfactory. All companies having large contracts with municipalities have had books and papers taken for investigation by a special committee appointed by the government."

Paul Stewart Company, Cincinnati, Ohio, has been chartered with a capital stock of \$50,000 for the purpose of dealing with electric lighting, traction and manufacturing

corporations throughout America in buying and selling power equipment and machinery, such as engines, generators, motors, etc. The company has purchased a site in Redbank, Ohio, on the Pennsylvania Lines West, and has already erected one steel and concrete building, 100 ft. x 54 ft., to be used as a shop and warehouse, equipped with traveling cranes and other appliances. The office of the company will be located in the First National Bank Building, Cincinnati, Ohio. Paul Stewart, formerly with the John A. Stewart Electrical Company, is president.

Union Switch & Signal Company, Swissvale, Pa., has issued a report for the year 1910 showing a net profit of \$1,250,000. It is said that the net earnings for January largely exceeded those of the corresponding month last year. New orders are being received in greater quantities than was anticipated at the present time, as it is generally the rule that the winter months are very dull. The present outlook, based upon January business, indicates that the company's gross and net earnings in 1911 will be largely in excess of those in 1910, which was the best year's business the company ever had. The improvements in the processes of manufacture will permit of the production of double the output of 1910, and the factory cost is being constantly decreased.

ADVERTISING LITERATURE

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued a folder illustrating and describing the magneto telephone.

Electric Service Supplies Company, Philadelphia, Pa., has recently issued a catalog illustrating and describing Garton-Daniels lightning arresters.

Ohmer Fare Register Company, Dayton, Ohio, has issued two folders pointing out the advantages of registering and recording the face value of all tickets collected.

McQuay-Norris Manufacturing Company, St. Louis, Mo., has issued a folder on "Leak Proof" piston head packing rings. The folder contains several testimonials from users of the rings.

General Railway Signal Company, Rochester, N. Y., describes its universal switch box, Model 5, Form A, in Bulletin No. 121, issued under date of Feb. 19, 1911. This box can be used for shunting or breaking track circuits, for opening line circuits or for selecting circuits.

Joseph Dixon Crucible Company, Jersey City, N. J., has published "Graphite" for March, 1911. It contains articles on "A Monopoly in Zinc Dust," "Increased Use of Dixon's Flake Graphite," "Machine Molding vs. Hand Molding," "Lubricants Used When Machining Various Materials," and "Lubricating Piston Packing."

Green Engineering Company, Chicago, Ill., has issued Catalog No. 8, emphasizing the salient features of the company's pneumatic ash-handling systems. These are adaptable to almost any arrangement of building structures, and may be installed irrespective of the angles of direction or the difference of elevation between points of accumulation and final disposal of ashes.

Canton Culvert Company, Canton, Ohio, has issued a small booklet entitled "No-Co-Ro Metal." This booklet contains articles on "Causes of Corrosion," "Rust Resisting Metal," "Rust and Corrosion Defined," "How Corrosion Is Obviated," and also gives tables showing comparative chemical analyses and twelve-hour corrosion tests of different samples of iron and steel.

Schutte & Koerting Company, Philadelphia, Pa., has issued catalog sheets illustrating and describing the following subjects: "Special Types of Schutte Free Exhaust and Back-Pressure Valves," "Vacuum Breaker Valves," "Automatic Engine Lubricator," "Blast Governors for Corliss Engines," "Air-Jet Chimney Ventilators" and "Koerting Grease Extractor and Feed Water Filter."

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued booklets Nos. 804-X and 805-X, together with folder No. 4181, on standard insulating material products, which have recently been placed on the market by this company. This includes both treated and untreated fabrics and papers, a complete line of friction tapes and rubber splicing compounds, together with various types of insulating glues, cements and gums.