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Seasonable Fire Precautions

The Fourth of July this year falls on Sunday, so that there will be two consecutive holidays following the usual half-day on Saturday of this week. This means a large amount of excursion traffic. In providing the equipment and men to care for this service, railroad managers should not omit to remember the extra fire hazard which is always present on the Fourth of July. Exploding firecrackers are apt to be thrown and rockets and bombs to fall in most unexpected places, and it is well to be prepared to

extinguish incipient fires. A little care in looking over the condition of the hose and in seeing that it can be unreeled quickly, an examination of the water and sand pails and of the fire extinguishers to ascertain whether they are filled and ready for service, and the stationing of a few men at strategic points to look out for fire, may prevent serious damage to car houses and their equipment. At this time such precautions are especially desirable, because the height of the summer season is just beginning, and the destruction of any considerable number of cars will mean a far greater loss than could be covered by the insurance.

The Convention in Denver

Interest in the coming convention at Denver continues to grow. The trip to the Far West offers so many opportunities for pleasurable sightseeing and acquirement of information from the electric roads in that territory relating to their many unique methods of construction and operation that railway officers in the East should not fail to take advantage of them. The promise of new and unusual things to be seen, which is contained in the article by Mr. Beeler, printed elsewhere in this issue, is indeed inviting. Those who go to Denver may expect a royal reception, and those who stay away because the distance seems great will make the mistake of a lifetime. The convention program of all of the associations, judged by preliminary announcements of the various committees, will be better this year than ever before. With a large attendance promised from the Western States, manufacturers will have an excellent chance to interest new customers in a new field.

Discontinuing Obsolete Reports

In a paper describing the operating organization of the Harriman lines, read last month before the New York Railroad Club, Julius Kruttschnitt, director of maintenance and operation, described the purposes of a few of the many reports which are sent to his office, there to be condensed, combined and finally forwarded to Mr. Harriman and the boards of directors for their information in deciding on the policies to be followed in the management of the vast network of railroad lines bearing the name of the Harriman system. Mr. Kruttschnitt emphasized the importance of having fresh, simple and accurate reports and statistics. He also pointed out the necessity of lightening the labor of those charged with the collection of statistics and the preparation of reports by promptly discontinuing any report when it has served its useful purpose. His test was, Does the report make money or does it save money for the company? If it does neither it is discontinued, to be revived at some future time if necessary, or permanently laid on the shelf. A large part of the work of the office force of every department head consists in the collection

and preparation of operating statistics and reports. Every change of administration introduces new requirements in this direction, and it frequently happens that much labor is added and none cut off. A certain amount of statistical information is essential for the intelligent conduct of any business, but, like many other things, it can be overdone. We would suggest that every department head of an electric railway system apply Mr. Kruttschnitt's test to this detail of the work of the organization under him.

The Third Avenue Reorganization

A clear statement of the arduous conditions which investors in street railway properties have had to face during the past 15 years is given in the petition of the receiver of the Third Avenue Railroad Company to the Public Service Commission, outlining the company's plan of reorganization. The petition says:

Twice within a generation the progress of science has necessitated the entire reconstruction of the Third Avenue Railroad—first by installation of the cable system, and, second, by electrification, and that process may possibly be repeated. Property of this class is also specially sensitive to the exercise of taxing powers, and it may at any time be imperiled by State regulation, and, in addition, we have to face the popular delusion that while in all other departments of life the purchasing power of a nickel has during the last generation nearly been cut in two, and the price of everything proportionately raised, the people still have transportation at prices which prevailed in 1870.

The condition here outlined could have been truthfully shown to be even worse than that stated, because while the length of ride given for a single fare has vastly increased since 1870, the average fare paid is very much less than that received by the companies 40 years ago. It is true that the changes from horse to cable and from cable to electricity were justified at the time by sound economic reasons. If horses had been retained on the north and south lines, as they have been on many of the crosstown lines in New York, conditions would be much worse than they are now. The plan of reorganization outlined for the Third Avenue Railroad Company recognizes this obsolescence as a legitimate charge. The assessment of \$25 per share on the capital stock, to paid in in cash, is to be charged to capital account as a liability through the issue of new stock to shareholders. The \$4,000,000 of additional cash capital to be raised in this manner will be used largely in making immediate improvements and paying for those already carried out under the receivership.

During the past few years the increased cost of providing the added service given and the reduced purchasing power of the average fare have more than offset the benefits gained by the changes in motive power. Most legislators and many social economists have ignored this fact. The increase in the gross business of the street railway companies has made more impression than the conditions under which it was being secured, and the railway companies have seemed fit subjects for added taxation, until now there is little incentive left for the investment of new capital. Any diminution of the progressive development of city transportation systems with the reasonable demands of the public and the increase of population would be unfortunate, but it is certain that but little further investment can be expected in city railway enterprises while present conditions continue.

The Accounting Association and Conference

President Wallis and the executive committee of the American Street & Interurban Railway Accountants' Association have given official expression to their desire to promote the work of the Central Electric Accounting Conference for the extensive interurban interests in the Central States. There can be no doubt that the smaller conference will supplement in an advantageous manner the efforts of the national association.

By reason of its wider scope, the national association is obliged to extend its activities generally for the benefit of all of the electric railway properties of the country; it cannot well subordinate the properties of one class to the interests of another group of lines, nor can it fail, if it is to continue to be successful, to act so far as possible for all the roads. At the same time it should be recognized that the managements of the Western interurban properties feel that their accounting problems, leaving out of consideration the questions of executive interpretation of the accounts or matters of operation, differ in various respects from those of the urban roads. Outside of the cities and towns, some of the large interurban companies of the Central West, by reason partly of their extensive mileage and comprehensive plans for the future, have many of the physical and operating characteristics of the older steam lines. Local conditions will determine largely the measure of the relative increase in their freight and passenger traffic, but if the interurban passenger business is regarded as in its infancy, the interurban freight business may fairly be considered as having just passed through the dangers attendant upon birth.

Whatever points of difference in practice, if any, develop in the future, it is clearly to the advantage of all the electric railways to unite harmoniously on all matters of national importance. The Central Electric Accounting Conference, as an organization covering a limited territory, has been able to meet frequently for the purpose of discussion by its members of various subjects relating to the work of the auditor, and if its influence will be extended by the proposed direct affiliation with the Central Electric Railway Association the amalgamation will be in the interest of the properties affected.

Specializing in the Control of Traffic

As an electric railway system grows, the importance of watching the movement of traffic in close detail increases by leaps and bounds. On a small road it is, of course, desirable to keep in close touch with the travel, but the schedule is generally less flexible where only a few cars are run, and the opportunity to save money through the reduction of platform labor and other expenses of the car mileage is very limited. On the small system it is not difficult for the superintendent to follow the traffic requirements, in addition to numerous other duties associated with the office, but as the number of cars on the lines increases a point is reached where some one skilled subordinate official needs to spend most of his time in the personal control of the service. In some cities this is done by the appointment of an assistant superintendent; in others a special office is established in the heart of the congested district, where a close watch can be kept on the regularity

of the service and untoward conditions are overcome by telephonic instructions to the division headquarters.

A recent development in Boston in connection with the specialized study of traffic conditions suggests what may be done with little additional cost to improve the service conditions on a large system. A few weeks ago an office filled by a so-called "Superintendent of the Day" was established for the purpose of concentrating at a single central point the authoritative handling of the entire elevated, subway, tunnel and surface system of the Boston Elevated Railway Company, upon which are operated nearly 52,000,000 revenue car-miles per year. The general operation of the car service in Boston is under the immediate jurisdiction of a superintendent of transportation, and the car schedules are prepared by a branch of his department; but, aside from the hour-to-hour handling of the service through the different divisions of the system, many questions of administration and discipline, service economy and public relations fall within the jurisdiction of the head of the transportation department. The establishment of the office of superintendent of the day immediately relieved the head of the department of many minute details which, while they are of the greatest combined importance, interfere with the broadest administration of other matters if handled by a general operating officer.

In the Boston arrangement each division superintendent fills the office of superintendent of the day approximately once in 11 days, the work being taken up in rotation. In this way the detailed operation of the system is placed in charge each 24 hours of an experienced official, who remains on duty from the morning of one day to the morning of the next. During this time he is in constant and immediate touch by telephone with every part of the company's property and service, and keeps special watch of the weather conditions, traffic movements, condition of the rail, occurrence of all delays of over three minutes caused by defective cars. He also has charge of the operation of sand cars in winter weather, relief of traffic congestion, promptness of special car movements and previous arrangement of pilotage through foreign divisions, accidents, fires and other emergencies. The occurrences reported are kept on a log sheet, and in general the duties of this official correspond somewhat to those of the superintendent of power distribution in the same company, or to the post of officer of the day in the army. The work is entirely distinct from that of a train dispatcher, since it very largely consists of remedying conditions which are out of the ordinary, and does not concern itself particularly with normal or routine matters which would be handled in natural course by division superintendents.

A primary advantage of this arrangement is the location at a fixed point of an official to whom any division head or inspector can report anything unusual, but who is not obliged to give any time to consider the question of car or train movements which are on schedule. The existence of such an officer enables the widest variety of help to be given in times of emergency and tends to stimulate the efficiency of the service as a whole. The filling of the position in rotation tends to increase the efficiency of the incumbents through the broader knowledge of the system and closer mutual acquaintance which they gain, and, as

well, relieves the company from the cost and annoyance of manipulation by men of less practical experience. Although it is almost impossible to express the value of such organization in terms of money, there is no doubt that the taking up of many loose ends, which is continually being done, tends to save the company money which would otherwise be lost, and, in addition, produces a better service for the same expenditure.

Rapid Transit Conditions in Berlin

Those who have had to confront obstacles in the development of rapid transit lines in this country will read with interest the account of how similar projects are conducted and controlled in Germany. Mr. Kemmann, the author of the article in this issue on the Berlin rapid transit situation, has long been associated with the transportation development in that city, and his article indicates that in many respects the conditions in Berlin resemble those which are found in practically every American city. As here, there is a tremendous demand on the part of residents in the suburban districts for the most expensive form of high-speed transportation, and little regard for the cost of providing it. Every section of the city wants the maximum which can be furnished in the way of speed, comfort and frequency of trains, but is unwilling to contribute more to secure improved transit facilities than a minimum in the way of fares. The existing rapid transit company in Berlin is earning but little more than the legal rate of interest, but is expected to build extensions which would be enormously expensive and would be of problematical financial merit.

In some respects the situation in Berlin is worse than that in this country. The metropolitan district of that city is composed of an aggregation of communities which are politically separate from each other. The craze for municipal consolidation, which is so common in American cities, perhaps because of the American pride in bigness, does not seem to have had its counterpart in Germany. Consequently, there is no central political authority in Berlin to which broad and comprehensive schemes of rapid transit development can be referred. On the other hand, progress in the direction of subsidizing extensions of rapid transit lines has gone further in Germany than here.

It is true, that occasionally in this country, more often, however, in the past than recently, short sections of track have been built as extensions to some surface railways by people interested in the real estate which would be served, and these extensions have then been leased at a nominal charge to the local railway company. But elevated or subway extensions to such roads vary greatly from those which can be included in this category. The first suggestion that a district in New York which would be benefited by a rapid transit extension should be assessed for part or all of the cost of its construction was made by the City Club, and the principle has since received the partial indorsement of the New York Chamber of Commerce, although the legal status of the plan yet remains to be determined. The plan of subsidizing extensions of this kind has been carried much further in Berlin. One such line has been built. Others are being favorably considered, and some of them will probably be constructed, if the antagonistic

onistic interests of the various sections of the city can be reconciled.

We are somewhat skeptical of the practicability of the zone system for American rapid transit lines, as suggested by Mr. Kemmann, unless it is very much simpler than that used abroad. We believe, for instance, that a satisfactory system of double or triple fares might be worked out with 5 cents as a basis, but see no advantage under most conditions in any subdividing of the nickel. American custom is so used to the nickel fare and the currency in this country is so well adapted to that rate of fare as a minimum that the conditions differ greatly from those in Germany, where a fare with many gradations is undoubtedly the most desirable to use.

Another interesting point made in the article is that all transfers issued in Germany, even by the surface lines, are in no sense "free transfers," as that term is understood in this country. They simply form part of a system of through fares for which a charge is made according to the distance traveled. In other words, the company sells a through ticket at a price based on the length of ride, and where one car will not carry the passenger to his destination it gives him the privilege of transferring to another.

Mr. Linn's Paper

The paper by Mr. Linn read before the meeting of the Street Railway Association of the State of New York, this week, under the broad title, "Electric Railway Accounting," is presented as a study based on usage of "a practical application of the uniform system of accounts for street railroad corporations prescribed by the Public Service Commission of the Second District." As the information and discussion by the author concerning features of the classification are based on actual experience with the three schedules during the first six months of 1909, the point of view possible is different from that of companies which introduce the accounts only as required by the orders of the commission. These orders directed the installation of the capital accounts as of Jan. 1, 1909, and of the income and expense accounts and traffic statistics as of July 1, 1909. The advantage of a preliminary experience for six months of the accounts other than those which pertain to capital is obvious.

In the discussion of the capital accounts, reference is made to the requirement of the New York Commission that discount on securities issued shall not be charged to property account, and to the provision of the Wisconsin classification permitting discount on bonds and the expenses incurred in connection with their issue to be capitalized. This, in fact, is in accordance with the law of Wisconsin, which recognizes discount on bonds as part of the cost of raising the capital.

While the opposition mentioned concerning the determination of the probable liability on account of casualties has some justification in the necessary inaccuracy of the result, it is plain that accrued liability of some extent is inevitable in the average property. It is good accounting practice to make some provision for this liability from the current revenues, and while it may develop that the allowance is inadequate or excessive, the outcome will be a

nearer approach to the exact requirements than if no effort had been made to estimate this expense.

On the subject of depreciation it is maintained by the author that inspection of the dividends paid by electric railways, if such corporations have not charged the proper amounts to depreciation in the past, indicates not that profits have been distributed too generously, but that rates of fare have been too low. Recent events have demonstrated that rates of fare have been too low in many instances; where the density of population, and therefore the traffic, is light, low fares will not stimulate travel materially, and the fare may have to be high if a desired service is to be maintained and a reasonable profit assured.

Mr. Linn apparently assumes that the corporations will receive fair and impartial treatment from the State commission on these questions of public relations, and discusses the tendency toward avoidance, under commission regulation, of hasty legislation.

The paper merits the attention of all who are interested in the accounting and financial problems of electric railways.

Assigning Motors to Car Houses

The proper distribution of equipment in relation to traffic is always a problem on a large system. Closely associated with it is the assignment of railway motors to different car houses. When a number of new cars are purchased fully equipped for service, the traffic conditions generally dictate where the motors shall be placed, or, rather, where the cars in complete condition shall be assigned. The initial selection of motors, when properly made, takes into consideration the character of routes, grades, car weights required, stops per mile, and other points which need not be repeated here. These conditions are to some degree permanent on any given division of a large system for any fixed set of routes; but as traffic requirements change, the runs have to be altered, and it often happens that a motor which is the best for the purpose on a given division having one set of runs becomes either seriously overloaded or else has more or less excess capacity with another set of runs.

Large systems frequently use upward of a dozen different types of railway motors in all stages of condition, varying from the outfit just in from the factory to the old-time forms of equipments with one foot in the scrap heap. The plan of confining motors of one or two types to independent service, or keeping down the variety of motors housed at any given car station, therefore, has much to commend it. Where it is possible to use but one or two types of motors at a single car house, the number of spare parts, and notably armatures, that have to be kept on hand is greatly reduced, and the crew of the house tends to become expert in the handling of minor repairs and adjustments of this small number of varieties. At the central storehouse a smaller number of spare units will meet the situation, where the motors are well centralized in service. The supply of spare armatures and brushes, field coils, and other parts proceeds in such cases from the central stores department, resulting in a closer check on the number of replacements required than in cases where armatures and other fittings are transferred indiscriminately from one car house to another. There is less chance of a shortage of important

parts where the car houses are dependent upon the central store department rather than each other. This does not mean that it is inadvisable for adjacent car houses to cooperate with each other in the interchange of equipment but when such things are done, a full and complete record should be transmitted to the officer responsible for the rolling stock's detailed service.

Closer study of the behavior of motors in actual service is desirable, with particular reference to the ability of given equipments to meet the traffic requirements without excessive temperature rise and with the minimum number of breakdowns or partial failures in service. There is also much more opportunity to analyze motors and their performance through the installation of test recording wattmeters than is generally appreciated. In the search for economy which has been so prominent among progressive companies in the past two or three years the failures of equipment have received well-deserved attention from operating men, but less consideration appears to have been given to the relative value of motors for specific divisional service, after that service has departed somewhat from the requirements in force when the apparatus was purchased. Practical investigations with the thermometer and the recording wattmeter are inexpensive; capacity costs money if it is not utilized; and the fitness of given motors for specific service is well worth ascertaining. Obviously, with all the severe conditions which surround railway motor operation in the city street, one cannot expect to fit the motor to the changing schedule with perfect accuracy, but at least one can find out whether it is more desirable to retain a given type on a given division, to substitute another type or to increase the number of varieties in a given car house. With the simple and effective means of analysis now at hand there is no reason why motor distribution should not receive scientific study in a wider field than has previously been cultivated.

A Correspondence Course in Electric Railway Engineering

Attention has been directed from time to time in these columns to the work of the committee on education of the American Street & Interurban Railway Association. When this committee was appointed last year there was no distinct idea in the minds of its members as to its exact functions. The first duty was to determine the lines of work which were feasible and which would be of greatest service to the member companies of the association. As the individual members of the association had previously shown great interest in a study of methods for recruiting the executive and engineering forces of their companies, this subject was considered first. The time between the appointment of the committee and the date of the convention of 1908 was so short that it was only possible to obtain incomplete information from a few companies which were known to have successfully inaugurated definite plans for educational work. No recommendations were made in the 1908 report, as the data were not complete enough to enable the committee to draw conclusions.

During the past year the committee has been accumulating a large amount of information, which probably will result in the formulation of several important recommendations to be presented to the association. The graduate ap-

prentice plan has had a gratifying development and the member companies are regarding with increasing favor the systematic recruiting and training of technical graduates in electric railway work. It will be a number of years before the results of the application of this plan will be evident, but one confidently expected result is an increase in the number of technically trained men occupying positions of executive responsibility.

In addition to the work on the apprentice scheme, the committee has devoted attention to the problem of helping the large body of young men who can never hope to secure a college training. These young men must educate themselves while holding their present positions. Many of them only need encouragement and guiding in this commendable educational process. It is the intention of the committee on education to formulate a plan to supply the incentive to study and to suggest lines of profitable application to student employees. The committee believed the establishment of a correspondence course under the auspices of the association would bring about the desired end, but had some doubt as to whether such a plan would meet with the approval of the member companies. Since the replies have been received to a circular letter sent out on April 10, asking the member companies their opinion as to the value and need of such a correspondence course, all doubts have been removed. With practical unanimity the plan has been endorsed. One company writes:

We feel that anything which can be done to increase the knowledge of employees must not only benefit them, but also the company, in making it possible for the company to secure a higher standard of efficiency of the work of the men. If there is any organized movement of this character it will raise the standard of efficiency of street railway employees in general.

Replies from other companies have been equally encouraging, and it now remains to ascertain the practicability of such a plan by putting it into effect.

It is understood that the committee will recommend that a correspondence course be established by the association, with the stipulation, however, that a financial plan be devised by which no additional burden shall be placed upon the treasury of the association. It is probable that it would be necessary to appoint an assistant secretary, who would have charge of the educational work and devote his entire time to it. No doubt such a plan would cost a considerable sum of money annually to maintain, but if those in favor of the scheme can demonstrate that it will produce the desired results the money will be forthcoming.

There is no agency which can do this work more efficiently than the association as at present organized. The general secretary is in a position to give to the suggested new department his advice and general oversight. If a man with the proper qualifications can be secured to manage the details there is no question as to the ultimate success of the plan. He must be a practical railway man, who is in hearty sympathy with the desire of young men for advancement and education. He will need tact and patience, and will find it necessary to frequently visit his pupils and their employers in order to maintain a close personal interest in them. He must be one who has worked in the shops and car barns as a boy, and who can think and feel as boys do.

FREIGHT HANDLING ON THE METROPOLITAN DIVISION OF THE TORONTO & YORK RADIAL RAILWAY

The Toronto & York Radial Railway owns the interurban lines which radiate from Toronto north, east and west. These roads are operated as separate divisions under the names Metropolitan, Scarboro and Mimico, but are controlled from the main office at Toronto. The passenger

market is No. 00 trolley, with 500,000 cir. mil feeders and No. 0000 in proportion to the load, arranged on the ladder system of feeding from different power plants. The new line from Newmarket to Jackson's Point is No. 0000 trolley, with feeder construction similar to the old line. Feeder taps are made every 1000 ft. The pole line carries telephone wires in connection with the Stromberg-Carlson system of dispatching. The high-tension line, which is also carried on the trolley poles, is a three-phase, 60-cycle, 16,000-volt system. One power house is at Bond Lake, 18 miles from Toronto, and contains one 300-kw, GE d.c. generator and two Westinghouse 150-kw, combination a.c. and d.c. generators, with the necessary step-up transformers. The substation is located at Newmarket, 27 miles from Toronto, and contains two 150-kw Westinghouse rotaries with necessary transformers. The additional power for the new extension is obtained from a steam plant at Keswick, where two 150-kw GE generators are installed. The company is finding this power equipment inadequate for its growing needs, and in the near future will convert its steam plants into rotary substations, using Niagara power, which will be supplied from Toronto.



Fig. 1.—Metropolitan Division, Toronto & York Radial Railway—Later Type of Motor Express Car with Side Windows

service of all three lines is substantially alike, but the Metropolitan division also does a heavy freight and delivery business, the development of which has been so remarkable that it offers the opportunity for a special article on the several features which have contributed to it. The importance of this division's freight business may be gaged by the fact that in 1907 its gross earnings were \$33,896, or over 23 per cent of the total gross earnings of the Metropolitan line.

PHYSICAL CHARACTERISTICS OF THE METROPOLITAN DIVISION

The Metropolitan division is an odd combination of the early and present types of electric interurban railway. It consists in all of 52 miles of single track, of which the first 25 miles out of North Toronto follow the highway to Newmarket over almost all the ups and downs of a rolling country, while the remaining section of later construction is built on graded right-of-way to Jackson's Point, on Lake Simcoe. The older portion of the line was taken over in 1904 by the present owners, who have since made many betterments in track, line and rolling stock. In general, the track, which is of 4-ft. 8½-in. gage, is of 60-lb. rails laid on cedar or tamarack ties spaced 2 ft. centers in gravel or cinder ballast. The respective mechanical and electrical connections are four or six-hole angle joints with electric brazed bonds. The turnouts on the highway section average about ¾ mile, to accommodate the hourly schedule, but on the Jackson's Point section they are about 2½ miles apart.

The overhead line is of the bracket type, with 30-ft. to 35-ft. cedar poles spaced 100 ft. The old line to New-

market is No. 00 trolley, with 500,000 cir. mil feeders and No. 0000 in proportion to the load, arranged on the ladder system of feeding from different power plants. The new line from Newmarket to Jackson's Point is No. 0000 trolley, with feeder construction similar to the old line. Feeder taps are made every 1000 ft. The pole line carries telephone wires in connection with the Stromberg-Carlson system of dispatching. The high-tension line, which is also carried on the trolley poles, is a three-phase, 60-cycle, 16,000-volt system. One power house is at Bond Lake, 18 miles from Toronto, and contains one 300-kw, GE d.c. generator and two Westinghouse 150-kw, combination a.c. and d.c. generators, with the necessary step-up transformers. The substation is located at Newmarket, 27 miles from Toronto, and contains two 150-kw Westinghouse rotaries with necessary transformers. The additional power for the new extension is obtained from a steam plant at Keswick, where two 150-kw GE generators are installed. The company is finding this power equipment inadequate for its growing needs, and in the near future will convert its steam plants into rotary substations, using Niagara power, which will be supplied from Toronto.

PASSENGER BUSINESS

The company operates 18 passenger cars in winter and 20 in summer on this division, with specials on Saturdays, Mondays and holidays. Illustrations are presented of the combination passenger and baggage cars. The baggage compartment is used for carrying small freight, such as dogs, baby carriages and bicycles, for the flat rate of 25 cents any distance. During the winter the company operates passenger cars to Newmarket every hour

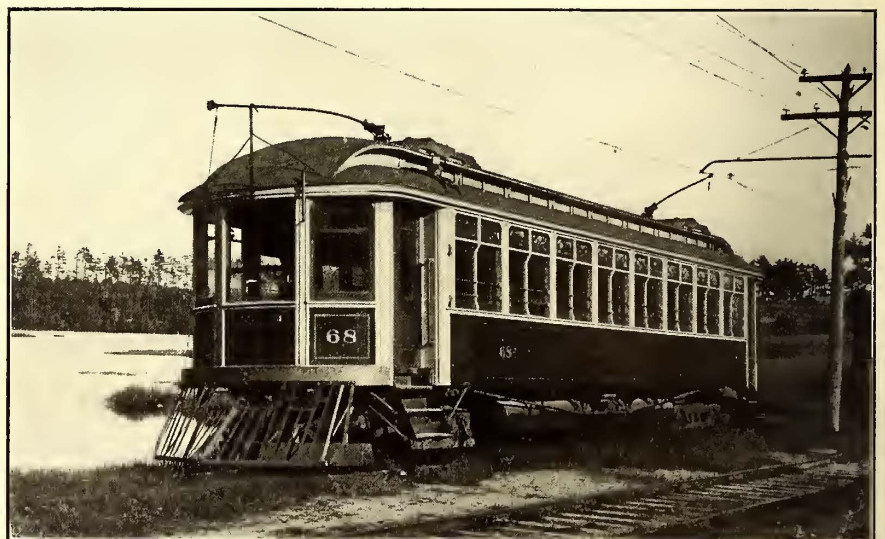


Fig. 2.—Metropolitan Division, Toronto & York Radial Railway—Standard Passenger Car

in the busy parts of the day, but the service to Jackson's Point and Sutton is less frequent. In the summer, however, there is a great deal of pleasure travel to the company's park at Bond Lake, and also to Morton Park and Jackson's Point, which are popular fishing, boating and bathing resorts on Lake Simcoe.

Bond Lake Park contains 200 acres, and, with its lake, forms an ideal place for excursionists who want the quiet

of a natural grove. The boats and merry-go-round are operated by the company, and the refreshment stands, etc., by a single concessionaire. Special attention has been given to developing traffic for this park from Sunday school organizations and other large societies. The regular rate to individuals is 65 cents, but when picnic organizations guarantee 200 or more attendants the rate is only 30 cents for a total ride of 36 miles.

THE FIELD FOR FREIGHT BUSINESS

The territory through which the Metropolitan division operates is principally a well-developed farming country, growing produce, which formerly reached Toronto and other towns through long wagon hauls. The company's freight solicitor in beginning his campaign made a house-to-house canvass, familiarized himself with the details of the farm shipments and pointed out to the farmers the great saving in time that would result in having their produce go by electric railway. The railway has located sidings at points other than stations, where sufficient traffic has been guaranteed to cover the cost of installation and at other points where annual switch or siding rental is paid.

All express or freight is handled, using the standard Canadian steam railroad classification. The rates of the company compare favorably with steam road tariffs, of which it receives the regular pro rata on interchange shipments just like a steam railroad. Special schedules are arranged to take shipments at the time most convenient to the farmers and merchants. In four of the towns served it is customary to have weekly markets—in Sutton on Monday, in Newmarket on Saturdays, in Aurora on Thursdays, and in Schomberg on Wednesdays. At first the farmers had the habit of riding to market on the passenger cars, bringing with them a few baskets of eggs or small quantities of vegetables. This practice was not very profitable to the railway company, and by arranging to have freight cars take the shipments to market just before or immediately after the passenger cars this was eventually turned into a paying proposition.

By keeping track of fairs and horse markets, the com-



Fig. 3.—Metropolitan Division, Toronto & York Radial Railway—Freight House at North Toronto

pany secures a considerable number of live stock shipments, as it sends letters and rate cards to solicit this business from the merchants and farmers before they have decided how they will ship the animals. A spirited campaign has been conducted among the farmers to induce them to take up the grain elevator question. There are now two grain elevators at Schomberg Junction, and it is expected that at least three more will be erected by the farmers between

Newmarket and Sutton. Hay shipments have been secured in a rather unusual way. The company raises its own hay for its delivery horses, and owns a baling press. This press is rented to other farmers, who then ship the baled hay via the electric railway.

Besides the agricultural and live stock shipments, attention has been given to other kinds of freight business. Newmarket, for instance, is the Canadian manufacturing headquarters of the Office Specialty Manufacturing Com-

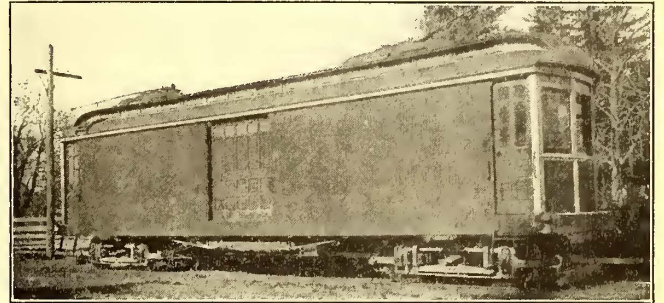


Fig. 4.—Metropolitan Division, Toronto & York Radial Railway—Early Type of Motor Express Car Without Side Windows

pany, or American firm of Yawman & Erbe, office furniture. The electric railway now handles the goods of this factory, from the rough lumber to the finished product. Of course, this class of traffic calls for interchange with steam roads. At North Toronto connection is made with the Canadian Pacific Railroad, at Richmond Hill with the Canadian Northern Ontario Railway, and at Schomberg Junction with the Schomberg & Aurora Railway. The latter is a 15-mile road owned by the electric interests, and it gives a connection with the Grand Trunk Railway.

FREIGHT ROLLING STOCK

Aside from foreign cars, all of the freight traffic is carried by 18 freight cars and four motor express cars. These motor express cars have separate vestibuled cabs for the

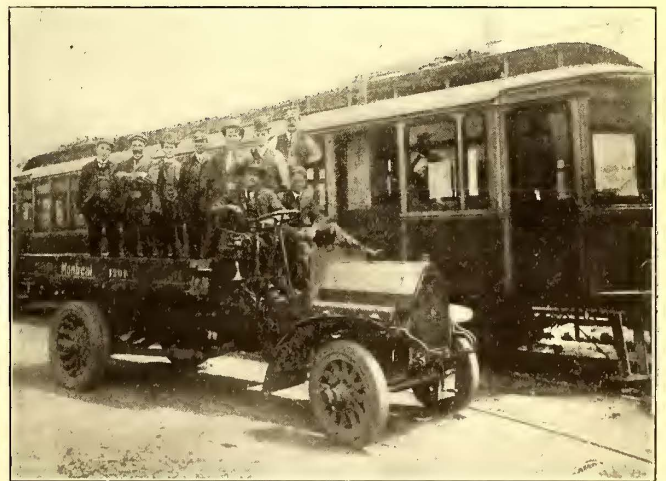


Fig. 5.—Metropolitan Division, Toronto & York Radial Railway Gasoline Motor Truck for City Freight Handling

motorman, but the bodies have grilled or wired windows in addition to the center and end side doors. Quite an interesting feature of the express cars is the neat appearance of the ends, which tends to make them look more like the passenger cars. For convenience in handling milk cans, all of these motor cars are furnished with chain-hung shelves, which are folded against the sides at other times. All classes of rolling stock are stored either in a

sheet-iron shed at Newmarket or brick houses at Bond Lake and Deer Park.

Careful check of the whereabouts of the freight cars is kept by the dispatcher, who controls their movements by telephone. As it is important that this control should be as direct as possible to prevent interference with the passenger schedule, some of the heavy freight is moved at night to avoid such difficulties.

Freight stations are maintained at North Toronto, Newmarket and other important places on the line. The building illustrated is one of the brick freight stations at North Toronto. The freight agents also act as canvassers and are paid fixed salaries.

WAGON DELIVERY SERVICE

The Toronto & York Radial Railway maintains a wagon call and delivery service, because it has no trackage through the city of Toronto, and thus far has not been permitted to operate freight cars therein. The terminal of the Metropolitan division is at the Canadian Pacific Railway crossing and Yonge Street, about 2 miles from the business center of Toronto. To make the collections and deliveries the company now requires three two-horse wagons, two one-horse wagons, besides one three-ton and one five-ton gasoline motor truck. It may be said in passing that the company had to conduct a private educational campaign to make the chauffeurs of these motor trucks understand that their duties are precisely the same as those of the teamsters as regards freight handling. This point should be borne in mind by other railways which are considering the use of motor trucks in cities where automobiles and taxicabs may outnumber the chauffeurs.

The charge for the regular wagon service was formerly 1½ cents per 100 lbs., with a minimum of 15 cents. This charge has now been increased to 2 cents per 100 lb., with a minimum of 20 cents. As a matter of fact this company practically has been giving an express service at freight rates, and has come to the conclusion that those who want the quickest possible service ought to pay more than 2 cents per 100 lb. To this end an express wagon will be

when they expect to ship or receive goods, what complaints they have as to delays, etc.

A dispatcher controls the movements of the teamsters and chauffeurs, as he receives all telephone messages from merchants and wagon men en route. He must record the names of the consignors, the quantity of material to be shipped, when the shipment is to be ready for the wagon

TORONTO AND YORK RADIAL RAILWAY CO. Form 10										
Dr. _____					Cr. _____					
Particulars of Sundry Freight Charges, outstanding at _____ Station, month ending _____ 19__										
DATE	Way Bill	STATION	PAYEE	Amount	Folio	Cash	Recharge	Added Voucher	Transfer	See Memo

Fig. 7.—Metropolitan Division, Toronto & York Radial Railway—Particulars of Outstanding Freight Charges

and to whom the call was assigned. The wagon men also keep a form, on which they record the time they arrived and left certain places, and how much material was handled. When their assignments are completed, the teamsters

Toronto and York Radial Railway							
SPECIAL DEBITS							
Amounts collected or credited, for which no debit exists in month of _____ 19__							
Agents must take specially to debit all collections, and debits enumerated below.							
1. Over collections and over remittances.	5. Switching						
2. Shed Storage.	6. Drafts for Interchange.						
3. Car Storage or Demurrage.	7. Foreign Roads Prepaid, Rec'd not paid out						
4. Cartage (daily total)	8. Advance charges way-billed, not paid out.						
Overcharges and undercharges must be promptly adjusted by correction in current month.							
Each distinctive heading to be entered on a separate sheet.							
DATE	W/B NUMBER	CAR NUMBER	INITIAL	STATION	NAME	AMOUNT	REMARKS

Fig. 8.—Metropolitan Division, Toronto & York Radial Railway—Special Debits

must call up the dispatcher for further orders. These forms, therefore, act as a check on the time of the truckmen, and also show whether shippers are holding up the wagons unnecessarily.

TORONTO AND YORK RADIAL RAILWAY

Mr. _____ Agent at _____ Station, in account with Toronto & York Radial Ry. for month ending _____ 190__.

	TOTAL	FOR AUDIT USE		TOTAL	FOR AUDIT USE	SUMMARY OF CASH REMITTANCES	
						DATE	AMOUNT
Outstanding from last Month.....			Remittances.....				
			Advance Charges.....				
			Other Roads Prepaid, Received.....				
Inward to Collect.....			Overcharge Vouchers.....				
Outward Prepaid.....			Audit Vouchers.....				
Other Roads Prepaid.....			{ Sundry Outstandings.....				
Special Debits.....			{ Ledger.....				
			{ Cash on hand.....				
Cash from Treasurer.....							
Drafts for Interchange.....							
TOTAL.....			TOTAL.....			TOTAL.....	
			I hereby certify the above statement to be correct.				
			Agent,				

Fig. 6.—Metropolitan Division, Toronto & York Radial Railway—Balance Sheet from Station Agent

added to the service to handle all such business at express rates.

The principal wholesale houses in Toronto are supplied with rate cards and shipping cards, showing all agent and non-agent stations on this railway's line. In addition, the company's representative has a system of calling on both receivers and shippers to learn what goods are moving,

FREIGHT ACCOUNTING

Knowing how easy it is to make freight accounting complex, the company has endeavored to get along with the least number of forms consistent with accurate accounting. In the first place, ledger accounts with shippers are not kept at the stations, but only with a few large customers in Toronto, others receiving the standard form of expense

bills. These expense bills are made out in duplicate, one serving as a receipt for payment. The few special forms, not reproduced, relate mainly to those required by the custom regulations between the United States and Canada and to live stock shipments which are in the form of non-liability contracts. A special milk record form is used for the shipments to the City Dairy Company, the principal milk dealer in Toronto. This form simply gives a list naming all dairymen and the number of cans forwarded by them to the dairy company. This list is checked by the dairy agent at North Toronto and is the basis for the ledger account between the railway and dairy. Other milk shippers use the regular shipping form. The rate for transporting an 8-gal. can 20 or 30 miles is 15 cents per can, which includes the return of the empty.

Conductors are furnished with pick-up waybills, which are used for shipments received at way points and are made out in triplicate, for the shipper, office and next station agent. The latter transfers the data from the pick-up waybill on to a regularly numbered waybill, which he makes out in triplicate, one copy to go with the shipment, a second to the head office and the third to his file. If goods for shipment are delivered directly to the station agent the latter gives the shipper a regular bill of lading which specifies the number and kind of packages, marks, estimated weight or quantity and charges, whether prepaid or not.

An explanation of the debit and credit items shown on the reproduced balance sheet, Fig. 6, will give a fairly accurate idea of the accounting activity of the ordinary freight agent, and will show how all money handled by him is checked up at headquarters. "Outstanding from last month" refers to particulars of sundry freight debit charges outstanding or not cleared at the reporting station at the end of the previous month; these particulars are listed on the form shown in Fig. 7. "Inward to collect," "Outward prepaid" and "Other roads prepaid" all relate to the ordinary debits owed by the station agents for charges on ship-

that is, there is no through billing, although through rates are in effect. "Remittances," the first credit item, covers all money turned over during the month and detailed at the right of the balance sheet. "Advance charges" and "Other roads prepaid, received" are for advances paid out for business with other lines. "Overcharge vouchers" are for overcharge remittances made by the agent; in such cases the agent secures a duplicate receipt from the customer and sends one receipt to the auditor with the proper iden-

AGENT'S CREDIT VOUCHER					
<i>To Auditor:—</i>					
<i>Please allow this station credit for the following amounts.</i>					
<i>Credit will be taken on _____ to _____ Balance Sheet.</i>					
WAY-BILL		STATION	NAME	AMOUNT	STATE FULLY WHY CREDIT IS REQUIRED
DATE	NUMBER				

Fig. 9—Metropolitan Division, Toronto & York Radial Railway—Agent's Credit Voucher

tification data as to the expense bill involved. The "audit vouchers" item is accompanied by the agent's credit voucher.

Fig. 9 explains why credit is required on the waybills listed. This credit voucher, Fig. 9, must have attached thereto for checking a copy of agent's correction. "Sundry outstandings" is explained by Fig. 7, already described, which lists both debits and credits in suspension. "Ledger" covers the interchange balance that is due the station agent for the last week of the month, and "Cash on hand" is reported only if the agent has been supplied with money by the treasurer. The station agents are supplied with a cash record and the usual books for listing details of outgoing and incoming freight, monthly abstracts of which are forwarded to the auditor.

Fig. 10 shows the form used for the correction of errors

TORONTO AND YORK RADIAL RAILWAY COMPANY										
CORRECTION NO.		STATION 190								
ISSUED AT		STATION, CORRECTING WAY-BILL NO.								
TO AGENT AT		DATE 19 CAR NO.								
FROM		TO								
PRO. NO.	CONSIGNOR	CONSIGNEE	NO. OF PIECES	DESCRIPTION OF ARTICLE	WEIGHT	RATE	NET FREIGHT	ADVANCED CHARGES	PREPAID	TO COLLECT
		Original Way-Bill Totals								
CORRECTED TO READ:										

Fig. 10—Metropolitan Division, Toronto & York Radial Railway—Form for Correcting Errors in Waybilling

ments to or from other local points. "Special debits" cover amounts collected or credited for which no debit exists in the reporting month; these special debits are shown in Fig. 8, together with the waybill and shipping data. "Cash from treasurer" is self-explanatory. "Drafts for interchange" are based on drafts issued by the agents at the junctions; a statement of this interchange traffic is sent to the auditor four times a month. It should be understood that agents bill only as far as the junction point;

in waybilling. This is made out in triplicate by the sending agent, who retains one copy and forwards two copies to the agent who received the original waybill. The latter certifies the correction and forwards one of his copies to the auditor. Errors in shipments to other roads are taken up by correspondence between the agents concerned.

MANAGEMENT

The Toronto & York Radial Railway Company was formed in 1904, with William Mackenzie as president. Mr.

Mackenzie is the well-known Canadian financier, who is associated with D. D. Mann under the popular title of the Mackenzie-Mann Syndicate. These two gentlemen probably have done more for the construction of steam and electric railroads in Canada than any other two men. The general manager of the Toronto & York Radial Railway Company is W. H. Moore, and the assistant manager Charles L. Wilson. Owing to the attention given to the development of the traffic department, the office of traffic manager was created a few years ago and has been held ever since by F. S. Livingston. Mr. Livingston gives particular attention to the development of the freight and express business. The operating and maintenance departments are each subdivided under separate officials who have had considerable experience in electric railway work. The rolling stock of the Metropolitan division was built in the car shops of the Toronto Railway Company, which is also controlled by the Mackenzie-Mann interests.

ELECTRIC RAILWAY CONDITIONS IN AUSTRIA

BY AN AUSTRIAN ENGINEER

Great interest is being taken in Austria in the electrical equipment of steam railroads. This is especially the case in the Alpine province of Tyrol, which, like Switzerland, is rapidly becoming a land of electric railways. The first single-phase railway in the world, the Stubaitalbahn, was built in the Tyrol, and the absence of coal and the large amount of water-power have given added impetus to the construction of electric roads. Recent statistics indicate that there are about 5,500,000 hp available in the water-powers of Austria, or 187 hp for each 1000 inhabitants. This amount is surpassed only in Switzerland, where there are 454 hp for each 1000 inhabitants. The figures showing the percentage of utilized to available power are in Switzerland, 25 per cent; Germany, 20 per cent; France, 18 per cent; Italy, 14 per cent, and Austria, only 9 per cent. A commission appointed by the Government is now systematically studying the subject of utilizing all of the available water-power for electric traction. As the majority of the railroads are owned by the State, there is a tendency to keep the water-power reserved for governmental use until after the report of the commission shall determine how much will be required by the government railways. While the general electrical industry is being seriously handicapped in the meantime, this plan will insure efficient utilization of the water-powers and a uniform voltage.

The first step in the conversion of steam railways to electric traction will probably take place in the Tyrol, where several large water-power stations are to be built with capacities for furnishing 2000 hp to 12,000 hp. The longest existing electric line in the Tyrol is that between Trient and Malè, 38 miles in length. This line will be opened on July 1, and is operated by direct current at 800 volts.

A more interesting line for the railway engineer is the Maria Zell road, now nearing completion in lower Austria. This is the longest single-phase railway on the Continent (57 miles). It is a single-phase line, with 6000 volts on the trolley wire. Water-power is used. The overhead line is equipped with a catenary similar to that of the Hamburg-Blankenese Railway, with strain adjustments every mile or mile and a half. For the present service 14 locomotives, each equipped with two single-phase, 250-hp motors will be used. Owing to the narrow gage, the motors are located above the trucks, and are connected to the wheels with connecting rods.

IMPROVEMENTS IN CONDUIT RAILWAY CONSTRUCTION IN LONDON

As is well known, the greater part of the tramways in the County of London are owned and operated by the London County Council. The Council commenced the work of electrifying the tramways under its control in the year 1902. Since that date several undertakings in the county have been acquired by the Council and only about 10 miles of tramways belonging to other interests are now in operation in the London County Council area. The following table indicates the progress which has been made with the work of electrification. In some years it will be observed that while the amount of electrified line has increased the length of horse line has also increased. This apparent anomaly is accounted for by the acquisition in those years of horse lines by the Council:

ELECTRIFICATION OF COUNCIL'S TRAMWAYS.

Date.	Electric traction in operation. Street miles.	Horse traction, including lines being equipped. Street miles.	Total. Street miles.
March 31, 1904.....	19¼	69¾	88¾
1905	26¾	68¾	95½
1906	30¾	73½	104
1907	58¾	57½	116¾
1908	68¾	51¾	120¾
1909	84¾	45½	129½

Generally speaking, the electrification of the horse tramways mentioned above has been and is being carried out under the general powers conferred on the London County Tramways by the Electrical Power Act of 1900, but in some instances special authority to reconstruct the lines has been obtained. All new tramways, however, are authorized by act of Parliament.

For operating its electric lines the Council has 1150 cars. This number will be considerably increased within the next few months.

With the exception of about 10 route miles which are equipped with overhead wires, all of the electric lines are worked on the conduit system. This is the only tramway in Great Britain where this system of traction is used, except in Bournemouth, where a short section of conduit system has been installed in the center of the town. Some of the improvements introduced in London since the original construction were described on page 172 of the STREET RAILWAY JOURNAL for Feb. 1, 1908, and it is proposed in the accompanying article to describe a few other features of particular interest.

CONDUIT CLEANING

Two methods of cleaning the conduits are at present in use. One is the dry method, the other is the wet method. The former has not proved entirely satisfactory, as it is impossible to remove all the mud by this means. Hand scrapers are used of a shape approximating as nearly as possible the cross-section of the conduit and the mud and dirt is pushed forward by hand until it reaches the catch pits which are placed about every 40 yd. along the track. The catch pits are in communication with the sewers and the difficulty experienced with dry cleaning is more in getting the dirt into the sewer than removing it from the conduit, as the pipes continually choke up with dry refuse which cannot very well be got out except by the use of water. In wet cleaning a hose fed from the public mains is used for washing out the conduit into the catch pits and so into the sewers. With this method the hand scrapers can get over the work much more easily.

Experiments are now being carried out with a mechanical conduit cleaner. This apparatus consists of a small steel

carriage running in the slot on two wheels with a center flange. Supported by this carriage is a frame carrying two scraper blades capable of being turned through an angle of 90 deg. by means of a handle and crank arms, the blades being moved first into line so that the frame and blades can be dropped through the slot. When in position the blades are turned round at right angles to the conduit. The machine is attached to the rear of a car by a towing rod, swivelled to the rear end of the truck. It has been found that this device will clean the conduit efficiently at a speed of about 10 m.p.h. to 12 m.p.h.

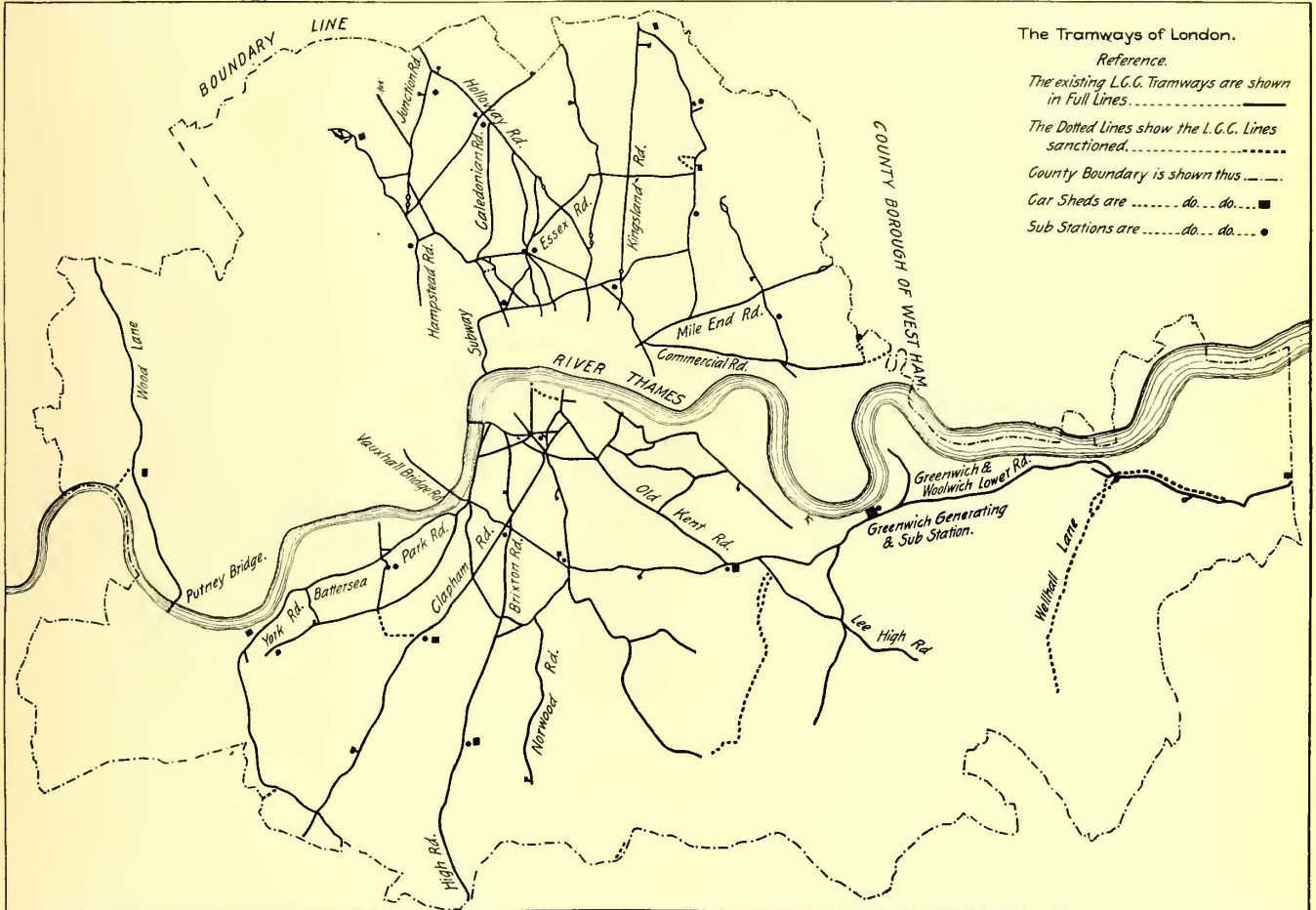
The catch pits are provided with sumps and these are emptied at frequent intervals into cars which carry away the deposit.

One of the greatest troubles with the conduit system is

and negative conductor bars. Men are then sent out with special tools for feeling behind and below the conductor bars so as to find the foreign substances which must have got into the conduit, assuming, of course, that the fault is not in the plough of any car. Usually the fault can be quickly found, but sometimes when pieces of wire, etc., get into the conduit it takes a considerable time to locate them. The insulator box covers are also lifted to help in the inspection.

DISTRIBUTION OF ELECTRICAL ENERGY

There are no very special features in the distribution of electrical energy except that motor-generators are used entirely in the substations with the full line pressure of 6600 volts directly on the stators instead of using rotaries and transformers.



Map of County of London, Showing Tramway Lines in Operation and Extensions Sanctioned

experienced after a long spell of dry weather if a heavy rainstorm follows. Trouble also occasionally happens in low-lying districts due to flooding.

DETECTING AND LOCALIZING FAULTS

The first indication of a fault on the conductor bars is shown in the substation by the opening of the circuit-breaker. Before the breaker is closed the positive conductor in the section in question is connected to a testing resistance of about 5 ohms. If the fault is caused by a dead short-circuit between the bars or a dead earth on the positive conductor a current of 100 amp would pass through the resistance. It should be stated that the negative is connected to earth in the substation. The testing switch is then reversed so as to bring the positive side on to the negative. Then if the fault is merely a positive earth the switch can be closed in the reverse position. If there is still a short-circuit, then the fault is between the positive

Separate positive and negative low-pressure conductors are used for every half mile of track and are separately controlled by switch panels in the substation. The panels contain the reversing switches and testing appliances.

Special feeder pillars are fixed on the footpaths where the low-pressure feeders connect to the track. These connections are so arranged that either the up or down tracks or both may be fed. Switches are provided for cutting out either section at will. The pillars also contain telephones which are in direct communication with the substations feeding that section.

GENERATING MACHINERY

The main features of the generating plant at the Greenwich power station may be summarized as follows:

(a) Vertical-horizontal engines of 14,000 kw are used in the first portion and turbines of 20,000 kw will be used in the second portion.

(b) Each generator has its own independent exciter either coupled direct or driven by ropes.

(c) Centrifugal pumps for the condensing water are installed in a separate pump house. They are electrically driven and the water is passed through special strainers which are self-cleaning.

(d) The coal is unloaded at a pier on the bank of the Thames by apparatus which is a part of the power-station equipment and gravity bucket conveyors carry it into the bunkers over the boilers. The same conveyors bring the ashes from the basement under the boilers to a large hopper under the pier, from which it is delivered to barges to be taken away.

(e) Each pair of boilers has its own fuel economizer on the floor above and the electrically driven feed pumps are in the basement below the boilers.

(f) Chain grate stokers are fixed to each boiler and the whole of the auxiliary gear is electrically driven throughout the station.

TRACK-WORK MATERIALS

The track rails are of the British standard section No. 4, weighing 105 lb. per yard. The rails at curves sharper than 66 ft. radius are 111 lb. per yard. The length of track rails adopted is 45 ft. for about 90 per cent of the whole. The remaining 10 per cent are of shorter lengths in multiples of 7 ft. 6 in., which is the distance apart of the tie bars which are fixed at every alternate yoke.

A heavy and constant source of maintenance and renewal expense is caused by the rapid wearing away of the guard rails on curves from 45 ft. to 400 ft. radius, especially where the car interval is from one-half minute to three minutes. In many instances it has been found necessary for this reason to renew rails within one to two years after being laid. To reduce this expenditure renewable guards, bolted to the rail after the original flange has been cut off, have been used. These guards are of manganese steel and may if required be reversed when one end is worn. This doubles their life and permits the full life of the rail being obtained.

RAIL JOINTS

All rail joints are supported by a sole or base plate formed by a piece of track rail 2 ft. long with its bottom flange bolted to the bottom flange of the rails.

The tread surfaces of the rails at the joints are handled perfectly smooth until the running surfaces at the adjacent rail ends are in the same plane. This method of ensuring equal wear on the joint has proved of great service in minimizing the number of defective joints. It has also been found that if the whole length of a track is ground on the rail tread before the line is opened for traffic the appearance of corrugations is very considerably delayed, and even if they do appear they are not of so serious a character as on rail surfaces not so treated.

The method of attaching the track rails and the slot rails to the yokes was described in the *STREET RAILWAY JOURNAL* for Feb. 1, 1908.

SLOT WIDTH

Originally, the slot was $\frac{3}{4}$ in. in width, but it was found by experience that this allowed too little margin for any irregularity in the movement of the slot tongues or other slight diminution of the slot width. A slot 1 in. wide has been adopted on routes more recently constructed, and it has not been found detrimental or dangerous to any kind of street traffic.

Part of the tracks are paved with wood, and the expansion of this paving has frequently diminished the slot width by $\frac{3}{8}$ in. to $\frac{1}{2}$ in. It is found that creosoted deal wood paving has the least effect upon the slot. The tracks are generally, however, paved with Aberdeen granite, with a toothed course of harder Guernsey granite to take the

excessive wear alongside the running rails. Opposite places of worship, hospitals, etc., where a less noisy paving is necessary, the tracks are paved with creosoted wood.

ROAD BOXES

Access to the insulators is provided at every 15 lin. ft., and to the drainage pits every 120 ft. At special work there is ample access through road boxes to all switch mechanism, connecting cables and conductors.

The road box or hand hole covers are a source of considerable trouble and expense, owing to the rapid wear of the paving in the covers and the rocking action of the covers set up by wear on the bearing edges. These openings are also responsible to a certain extent for the accumulation of mud and dirt in the conduits. To obviate these drawbacks, cast-iron cover plates with the paving carried over them have been substituted for the covers over the insulator chambers, so far with very excellent results. It has not, however, been found advisable to use these cover plates at special work, cross-overs, etc., where constant and rapid access to the conduit and its equipment is frequently necessary.

SPECIAL WORK

The layout and design for all parts of junctions, cross-overs, etc., have as far as possible been standardized, with a view to reducing the delay and expense of renewals. The standard junctions have switches curved on one side to 100 ft. radius. This radius is continued about 10 ft. past the heel of the tongues, and then merged into a 70-ft. radius for the remainder of the curve. The companion track switches have each a movable tongue, thus insuring security and positive action. The mechanism operating the slot tongue is connected with the same shaft as that which operates the tongue of the track switches.

DRAIN RAILS

All running rails and grooves are drained at water holding depressions by drilling a slot in the bottom of the rail groove and connecting this slot by earthenware pipes to the conduit.

CLEANING AND RENEWALS OF SWITCHES

As the slot and track switches are operated simultaneously, it is necessary to make sure of the perfect action of the movable parts and that the mechanism should be certain and rigid in its action. Automatic switches have been tried, but have not been found so satisfactory as manual manipulation in obtaining certainty of movement exactly at the time required and maintaining the changes in the required position until the cars pass. At busy junctions the connecting rod of the switch mechanism is carried in a pipe conduit to the footway, so that the switchman may operate the switches without fear of personal danger.

Generally speaking, repairs and renewals to rails and special work are undertaken during the night and repairs to paving, road boxes, etc., during the daytime.

All-night car service is run on several important routes and during the week the only total cessation of car traffic is from about 2 a. m. to 7 a. m. on Sunday morning.

There are seven depots distributed over the tramway area for the storage and handling of material for the track. Two of these depots are situated alongside the River Thames and two on the Regent's Canal, thus giving convenient and easy handling of materials conveyed by water.

All cars of the Liverpool (Eng.) Tramways are disinfected twice daily during the summer with a solution of chloride of mercury sprayed on the seats and floor. This dries out quickly and leaves no odor.

ACTION NECESSARY TO ASSURE A REASONABLE RETURN ON THE INVESTMENT

BY G. KEMMANN, REGIERUNGSRAT A. D.*

I have read with great interest the series of articles by Charles V. Weston on the subject of the proper return on the investment in city railway enterprises.** The topic treated by Mr. Weston is a very important one and I take pleasure in complying with the suggestion of the editors of the *ELECTRIC RAILWAY JOURNAL* to discuss the subject from a German standpoint in its columns.

Up to the beginning of the present century the only rapid transit service in Berlin was that supplied by the steam lines which form a part of the large railroad system of the State. Although the design and management of the system are excellent, an unfortunate policy was adopted by the Government in the matter of fares. When the well-known "Stadtbahn" was put in operation in 1882 the idea was prevalent in Governmental circles that a Greater Berlin could be developed by inaugurating a plan of low fares similar to that in London and that thereby the construction of homes in the suburbs of the city would be encouraged. Hence the introduction of a system of extremely cheap commutation tickets, workmen's tickets, school tickets, etc., as well as cheap single tickets.

Low as are the single fares charged in the Stadtbahn the commutation fares are simply ruinous. A private company which should undertake to operate under them would soon become bankrupt and the Government has to earn the interest on the capital which it has invested in the Berlin Stadtbahn from the profits on long-distance riders elsewhere. This situation is clearly described in a statement made by the Minister of Public Works recently to a committee of Chamber of Deputies when he said: "Many of the holders of commutation tickets pay only 2½ to 3 pf. for a 10-pf. (2½ cents) ride. This is below cost price and leads to the abnormal condition that outside tax-payers have to make good the deficiency from this cheap transportation to the extent of 5 pf. (1¼ cents) per ride."

While gratitude can be expected from persons individually a mass of people has no such sentiment whatever toward the benefits bestowed upon them. The granting of such abnormally low fares instead of being thankfully acknowledged has always been accompanied by complaints and criticisms on the part of the public in regard to every detail of the operation of the lines. Nor has the object for which the plan was established been attained, viz.: Low rents in the suburbs. Emigration to them has been stimulated, it is true, but the rents have increased everywhere. Nor have the conditions in London been duplicated, because the leaseholding system of property prevailing in that city is quite different from the freehold property in Berlin with its accompanying exaggerated speculation in land values. The tenant is always expected to pay in the form of rent all profits which may come to the speculator from an otherwise sterile soil. In recognition of these facts the Government has changed its policy so far as further rapid transit is concerned and has declined to develop any additional rapid transit lines in Berlin except to build necessary extensions to its existing system.

Under these conditions private capital was invited to

enter the transportation field about the time that the electrical equipment of light suburban railways became feasible, or even before that time, when the light railway law (Kleinbahngesetz) was enacted by the Prussian House in 1892. This bill had been passed to encourage the investment of private capital in the construction of light railways which would develop a suburban and interurban business and act as feeders to the main lines. All light railways in Prussia, therefore, are incorporated under the law which applies as well to rapid transit lines in cities. One of the features of this law is the provision contained in the famous paragraph No. 7, which gives a right of appeal to the national authorities in case any city declines to grant a franchise or right of way to a light railway company or refuses to do so except under very unfavorable conditions. All who have had experience in building under the light railway act know its weak points, but realize that these defects are largely counterbalanced by the right of appeal just described.

The franchise requirements in Prussia are by no means light. The street railway companies are obliged to pave and maintain the pavement for a certain width of the streets over which their tracks run; sometimes the entire width of the street. At other times they are required to illuminate the streets. They are compelled to turn over to the municipalities 8 per cent of their gross receipts as well as one-half of the net receipts exceeding 8 per cent, or even 6 per cent in many cases. Hence it would seem that an average of 8 per cent was considered by many municipalities as the return compatible with public interest to be allowed to the street railway company. Such, for instance, is the case in Berlin where the local street railway company has paid a dividend of 8 per cent for years and has been obliged to pay into the city treasury one-half of the surplus earnings over 8 per cent. The opinion of the Government on this subject can also be assumed from statements made by some of its leading officials to the effect that 8 per cent is a fair return on street railway investments from the public point of view.

In spite of these conditions it is a notable fact that the managers of railway companies in constructing new lines have very rarely taken advantage of the right of appeal contained in the seventh clause of the Light Railway Act. The reason for this is obvious upon a little consideration. The companies prefer to undergo what they consider unjust taxation rather than to get on adverse terms with a community which never lacks the power of showing its displeasure.

The Light Railway Act, as already stated, applies to rapid transit railways in cities, although in both construction and operation they could properly be grouped under the general railway law of 1838. They have, therefore, the privilege of condemning a right of way in the streets; but while this right has been described as being more theoretical than practical with the street railways, this is still more the case with underground and elevated lines. The act applies only to the surface of the streets and does not specify what shall be done if there has to be any interference with the subsoil with its complicated system of sewer, gas and water mains and other subterranean pipes. When the law was passed no consideration seems to have been given to this point, although many rapid transit railways—even one using electricity—were then in operation in London and plans for such lines had been made public in Berlin. Besides condemning the surface, then, it seems to be necessary under the law to condemn the subsoil, for

* Mr. Kemmann is a government councillor, now retired, and has made a study of rapid transit conditions at home and abroad. He has been actively identified with the development of the underground and elevated railroads of Berlin and is now connected with these enterprises, both financially and in an engineering capacity. He has visited this country on several occasions.—[EDITORS.]

** See *ELECTRIC RAILWAY JOURNAL* for Dec. 26, 1908, and Jan. 2, 1909.

which recourse to the general law of condemnation (*Enteignungsgesetz*) is necessary. But in this law still less consideration is given to the needs of rapid transit lines, and it is doubtful whether the courts would hold that this law authorizes a company to change the location of the city sewers, as any such change might have far-reaching effects. From this it will be seen that many legal questions must be settled before the right of way for an underground railway can be condemned. The trouble is still further aggravated by the fact that the question of the use of the surface of the street comes under the jurisdiction of the municipalities, whereas the control of the subsoil is eventually lodged in the courts.

I have dwelt at some length upon these details in order to show that a rapid transit company cannot accomplish very much if it has not an amicable understanding with the municipalities. Friendship on the part of the National Government is largely platonic, even in this country where the Government is often believed to run everything. In fact, the situation may be made worse if the National Government attempts to make suggestions regarding the course of events. This has been shown recently on several occasions where the cities, which are jealous of their power of self-government, have opposed what they considered an attempt of the National Government to interfere with municipal affairs. Another factor detrimental to a better rapid transit policy is the fact that irresponsible promoters often request franchises for new lines regardless of the economical results which would follow their construction and operation. Last, but not least, among the obstacles to rapid transit improvements is the ever-present disposition of the public to find fault and obstruct every attempt made to secure cheap and quick transit facilities.

With so many adverse parties, namely, cities, public, outside promoters and the law, none of which pays much consideration to the economical side of the question, how can a rapid transit enterprise turn out successfully? Every step forward means that almost insurmountable obstacles must be overcome. There is yet another, to which reference has not been made. Berlin is not a homogeneous body politically as, for instance, is New York. The so-called Greater Berlin is an aggregate of some twenty entirely distinct municipalities, each of which promulgates its own policy. When one considers the different opinions which exist among these organizations and their lack of intelligence in questions relating to rapid transit, it is somewhat surprising that there are still some people who will engage in a rapid transit project.

II

Many engineers are inclined to believe engineering difficulties are the worst obstacles to be faced in rapid transit construction. Few pay full attention to the economic side of the question, although it goes without saying that this is the fundamental consideration. It is a well-known fact that very few rapid transit railways in the large cities of the entire world are in a prosperous condition. The majority are struggling very hard to get a "reasonable return on the investment," as Mr. Weston puts it. Those who expect to find gold mines in the field of rapid transit may be invited to study the reports of the English Royal Commission and Sir Herbert Jekyll's new report to the Board of Trade on London traffic. They would do well also to read carefully Mr. Weston's articles and look through the reports on New York rapid transit which have been submitted by Mr. Arnold, by the New York Chamber of Commerce, etc.

Mr. Weston propounded the question: "What is to be considered a fair return on the capital expended by a company in rapid transit railroads?" The chance of a 4 per cent return will certainly not incite many people to invest money in rapid transit schemes, though few of the existing lines earn much more than a 4 per cent dividend. The Berlin Elevated & Underground Railway is among the favorites. It pays 5 per cent on its common stock. This railway extends over the lines of heaviest travel in the entire city, and therefore will probably be able to maintain this percentage. The Paris subway system is also doing well, for reasons easily understood by those who know the conditions. The Parisians have declined absolutely to extend their lines into the suburbs and the system consequently enjoys a very profitable traffic. Another reason is the unfortunate condition of the surface railway lines in Paris, due to the early expiration of franchises. In consequence the subway supplies, as it were, the place of both rapid transit and surface transportation. With the exception of these two examples there is but one electric rapid transit line which pays more than 4 per cent on its capital, i.e., that in New York City. It is a peculiar fact that in Berlin a 5 per cent dividend is considered very satisfactory for a rapid transit line, even by those who are willing to allow a street railway company to earn 8 or more per cent. It is difficult to understand, however, why a larger return should be permitted on the investment in a cheaply constructed surface line than on a heavily capitalized underground railway, which is 10 to 20 times as expensive per mile, and, moreover, carries with it a greater chance of financial risk.

The principal factors affecting the return yielded by a rapid transit railway are the gross earnings on the one side and the expenses of every nature on the other. With a given class of service the expenses are not liable to considerable variations within prescribed limits except that there is a tendency in all countries toward an increase in wages and cost of materials. To this condition there must be added in Germany a large outlay for benevolent purposes, such as pensions, contributions to funds for sick and disabled employees, etc. The other factor of the return, i.e., income account, varies according to the traffic and rates of fares. The shareholder who at a general meeting of the Berlin Elevated & Underground Railway advocated lower fares in order to get a better return, proved very shortsighted. Traffic necessarily increases as fares are lowered and vice versa, but experience has shown that there is a certain system of fares in every city coincident with the needs of the traveling community that will give a maximum of receipts.

To secure this maximum the tariff must first of all be fair. It is only a matter of justice that a passenger who is carried 10 miles should pay more than one who is carried only 5 miles. I do not consider therefore that a uniform fare such as exists in the United States is in accord with the postulate of equal treatment of the public. I recognize its simplicity to be a great advantage, but simplicity can be attained in other ways. The uniform fare on the Central London Underground Railway was abandoned some years ago. The Bakerloo tube gave it up very soon and now all the London tubes and railways have a scale of fares increasing with the distance. A uniform fare for each of the two classes has been introduced by the Paris Metropolitan, but the reason for this is easily explained by the circumstances already mentioned, that none of the Paris lines oversteps the so-called "Ceinture." In other words, rapid transit stops at the very doors to the outskirts, avoiding

touch with the suburbs which are served by tramways and suburban steam lines. I agree entirely with what Mr. Weston states with regard to the uniform fare, and I do not hesitate to recommend its entire abolition. The American fare of 5 cents is below what it should be for distances beyond a certain limit, and could be less for short distances.

It may not be out of place here to refer to the system of zone fares introduced by the Berlin Elevated & Underground Railway Company. The management of this company followed the State railways in introducing two classes of fares, second and third, in city rapid transit, each class having separate compartments for smokers and non-smokers. This, seemingly, is too many classes for city transit, but it was difficult to see how to do without this two-class system, to which Berlin had grown familiar through decades. From 15 to 20 per cent of the passengers ride in the second class in spite of the $1\frac{1}{4}$ cents higher fare. The third-class fare on the Elevated & Underground Railway is $2\frac{1}{2}$ cents for four stations, $2\frac{3}{4}$ cents up to seven stations, 5 cents up to 10 stations and so on. For every three stations an additional $1\frac{1}{4}$ cents is charged, the average distance between stations being about half a mile. This works out to an average per passenger of 3.3 cents with a line $10\frac{1}{2}$ miles in length and with 23 stations. The average ride is $2\frac{1}{2}$ miles, so that the average fare per passenger is 1.36 cents per mile, a figure which is fair and well adapted to Berlin conditions.

Single tickets only are sold. There are no season, commutation or through tickets, nor passenger tickets of any other kind, except so-called early-hour tickets and a certain rebate granted to children. Single tickets used before 8 o'clock in the morning—"early tickets"—cost $1\frac{1}{4}$ cents less than the ordinary ones, the minimum, however, being $2\frac{1}{2}$ cents. Children less than six years of age, under charge, are carried free. If there be added to this the statement that dogs are carried for $2\frac{1}{2}$ cents up to the tenth station and $3\frac{3}{4}$ cents beyond, the entire tariff in force on the Elevated & Underground Railway has been stated. The absolute absence of "transfers" entitling a passenger to change from one means of transportation to another without paying an additional or higher fare is noticeable, as, indeed, it is on the German surface lines. The system of "interchange tickets" that has been adopted on surface lines in many cities (Dusseldorf, Frankfurt, and others) is quite different from the American transfer. The principle underlying the interchange ticket is nothing more than a tariff varying according to distance, but spread over two, or even more, sections in a broken journey. Tickets of this class are "through tickets." Whether the passenger has to change or not after paying his fare depends solely on the direction he wishes to travel and on the service provided. According to the principle of least resistance, the companies try to reduce the number of transferring passengers by providing through routes in the channels of densest traffic. In Berlin the only surface line issuing such through tickets or transfers on its own system is the Charlottenburg Tramways Company, which is controlled by the Grosse Berliner Strassenbahn. The Grosse Berliner Company itself has been compelled by the city of Berlin to adopt a uniform fare of $2\frac{1}{2}$ cents, regardless of the distance, which I consider absolutely wrong and unjust even for a tramway. A passenger may ride on a surface car in Berlin 10 miles for $2\frac{1}{2}$ cents. The evil is mitigated to a certain degree only by the fact that on the surface lines shorter rides generally prevail. But

the company has declined at all times to issue transfers, and passengers have to pay another $2\frac{1}{2}$ cents fare whenever they change to another car.

Berlin traffic conditions are such that on the Elevated, too, a considerable short-haul traffic prevails, for which the low or short-distance fares are partly responsible. Nevertheless, the surface lines are not greatly affected by the short-haul traffic of the elevated, because the tramways consist of a network of outspreading arteries, whereas the elevated and underground only form a few trunk lines. The effect is still further lessened by the fact that the elevated has a station, say, only every $\frac{1}{2}$ mile, whereas one can board a surface car wherever he likes.

The average distance traveled on the Berlin rapid transit lines does not grow in the same ratio as the railways into the outskirts of the city. This is accounted for by the falling off of traffic in the outer zones, whereas the inner zones become more congested—just the reverse of the state of things in New York, where the long-haul traffic increases as the lines are extended further into the suburban area. Habits of life, land policy, fares and other circumstances account for this variation.

Whatever differences, however, may exist in rapid transit here and abroad, the economical value of suburban lines, considered as self-supporting concerns, is not such as to yield a reasonable return on the capital invested. The uniform fare in the United States, the decreasing density of traffic on the confines of Berlin and London—the Paris system can be ignored in this connection—result in conditions under which the return on the capital invested in long-distance lines is entirely inadequate. Hence the policy of the Berlin Elevated & Underground Railway, inaugurated years ago, either to leave the construction of the suburban sections of the rapid transit system to the city authorities or to large real estate owners wishing to develop their properties, or else to build such lines only on the condition that they be supported by subsidies large enough to cover every deficit of operation, including charges to depreciation, reserve, sinking funds, etc., and say, 4 per cent interest on the capital.

The first step in this direction was the conception of the Neu-Westend line, a spur to connect with one of the main arteries of the present rapid transit system and extending west to an entirely new field recently opened up for building purposes. About 2 miles of this line, which when finished will be 3 miles in length, was opened for traffic on March 29, 1908. The subsidy to defray the deficit train operation was provided jointly by the Neu-Westend Land Company, the city of Charlottenburg and the Government—the latter owning the large area of the Grunewald, which abuts upon the Neu-Westend property. This solution of the problem has proved successful, and the effect of one year's operation of the line has confirmed the preliminary estimates of the receipts. It is expected that the new line will be self-supporting in about 20 years.

Other spurs are now under consideration in a south-westerly direction, but the method of financing them is somewhat different. Large land companies have combined with the local outlying municipalities to build these extensions, but the Elevated Company will operate them. The cities and landowners, among whom is the Government, with a large area suitable for dwellings, will own the lines and will meet all the expenses, including cost of operation. So far as the public is concerned, the operation will be no different than if the line was owned directly by the Ele-

vated Company. This policy was inaugurated first by the city of Wilmersdorf, which worked in harmony with the Royal Commission in charge of the Government estate mentioned, called Dahlen Colony, but the negotiations have not been brought to a final conclusion, on account of opposition on the part of the city of Charlottenburg, which lies next to Wilmersdorf.

Unfortunately, a short section of the Wilmersdorf line has to be built across Charlottenburg territory. This fact was adopted as a pretext by Charlottenburg to defeat the scheme in favor of one of its own. The line desired by Charlottenburg, if built, would largely parallel the Neu-Westend line, the Stadtbahn and the existing rapid transit system, and would serve little new territory. I mention this simply to show that Germans are no better than Americans as regards destructive competition. The Government is seeking means to settle this conflict in a disinterested and fair way, but through lack of power may fail in its efforts to reconcile the interests of the cities.

The authorities of other suburban municipalities, as well as those of Berlin itself, are now engaged in projecting railways of their own, entirely regardless of any harmonious project of rapid transit development or of the facilities offered by the existing rapid transit system. One example is the line of the city of Schoenberg, about 2 miles in length, now in course of construction. Berlin, also, is planning to build two lines across the city, one of them to be constructed jointly with the city of Rixdorf. Progress in this direction, however, is extremely slow, as the local authorities of the several cities concerned have adopted different lines of policy and are extremely jealous of their interests and privileges, while the existing company and the Government are hampered and opposed in any effort they may make toward progressive action.

Unfortunately, there are many of these municipal bodies and the policy of each is dictated so largely by local interests that they seem unable to adopt a broad co-operative and constructive policy. Instead, each indicates a desire to act alone and to leave questions of economy to the future. There is a general cry for subways. Even in the most remote suburbs of Berlin subways are demanded by the local authorities, and in these demands they have the backing of a population that does not care whether the taxpayer of subsequent years will have to pay the cost of non-paying underground railways. Up to the present, German cities have enjoyed good credit, but if they should embark on visionary and expensive schemes of rapid transit such as have recently been advocated, the policy undoubtedly will prove disastrous in many cases. The only local municipal body which professes it will be content with an open suburban line-cut and embankment is that of Dahlem. The Berlin public, as represented by the city authorities, daily papers and city engineers, wants nothing but the most expensive subway construction. They are opposed to elevated railways, and still more to suspended railways, notwithstanding the fact that the finest example of elevated railway construction in existence is in operation in the western part of Berlin. Of this road the city of Berlin may be justly proud, as it certainly disproves the necessity of constructing subways where elevated lines can be built.

III

I should like to recommend the following:

(1) Where the law prescribing the conditions under which railways are to be built does not provide adequately for the construction of rapid transit lines in cities, it ought to be amended, in view of the importance of this subject.

(2) There should be a central competent commission, with power to prevent undue and reckless competition, as well as the requirement of extravagant construction, and to insist that the railways be laid out according to sound and economic principles in accord with public demand, rather than to satisfy local interests. This authority should have power to settle all questions in a broad way and for the welfare of the community as a whole.

(3) All the interests concerned should join in furthering and supporting a sound transit policy; metropolitan rapid transit railways should be exempt from unnecessary financial charges and burdens regarding cost, fare, taxes, etc. To keep the cost of construction as low as possible, less expensive forms of structures, such as elevated or suspended lines, lines in cuts or on embankments, should be considered and allowed when feasible. Private enterprise should be encouraged.

(4) The economical aspects of a rapid transit railway ought to be examined and careful estimates of the probable cost, traffic receipts, expenses and other salient features of the undertaking should be made by competent persons before any financial steps are taken. The method which consists of beginning at the tail end by fixing a certain percentage of interest on capital and then working backward and deriving the items of traffic and cost, is objectionable. Sufficient allowance should be made for depreciation and reserve, and the estimates should be extended over a long enough term so that the increasing effect of depreciation shall be shown correctly.

(5) The fare ought to be reasonable and in accordance with the service rendered; that is, it ought to vary with the distance traveled, but should also be fixed with a view to simplicity. The Berlin zone tariff, with only 22 different kinds of passenger tickets, would seem a practicable solution in many cases. Low rate commutation tickets ought to be avoided entirely, and round-trip and through tickets as far as possible.

(6) A safe return of interest at the rate of, say, at least 5 per cent on the capital expended should be allowed, even with city lines.

ROLLING STOCK MAINTENANCE OF THE PHILADELPHIA RAPID TRANSIT COMPANY

The mechanical department of the Philadelphia Rapid Transit Company has prepared a summary of the work done by it in the past six months. Since Jan. 1, 1909, 986 closed cars and 946 open cars have been repaired. These, with 146 cars classified as miscellaneous, make a total of 2078 cars put through the company's shops in the first half of the year. In the same period 59 closed cars and 849 open cars were repainted, as well as 52 cars of miscellaneous types. There have been changed to the pay-within type 303 cars. These cars have now been in service eight months, and carefully kept accident records show that their introduction has practically eliminated boarding and alighting accidents, which form by far the larger proportion of all injuries on street cars.

In the shops 1,086 men have been employed. On the rolls of the Sixth Street shop alone are 420. The cost of carbody maintenance was \$314,492, and motor and electrical equipment maintenance \$147,945, making a total of \$462,437 for six months. Twenty new steel cars have been ordered for the elevated road at a cost of \$12,500 each, or a total of \$250,000. Delivery of these cars is expected to begin in August.

DENVER AS A CONVENTION CITY

BY JOHN A. BEELER, VICE-PRESIDENT AND GENERAL MANAGER,
DENVER CITY TRAMWAY COMPANY

I have been asked to summarize briefly what those who are planning to attend the Denver convention of the American Street & Interurban Railway Association and its affiliated organizations may expect to see in that city and its surroundings. Denver is the social, political and mercantile center of a State unequalled in scenery, climate and natural resources of every kind. It is young as cities count their age, having emerged from the sage brush barely 50 years ago, while Colorado was still a part of the Territory of Kansas. From a frontier settlement it has grown in half a century to a prosperous, beautiful city of 225,000 inhabitants. Situated on a high, flat tableland at the base of the foothills of the Rocky Mountains, it has developed in every direction, until it well deserves the name of a city of "magnificent distances." It covers an area of 54 square miles, has 1222 miles of streets laid out on the map, of which 38 miles are paved with hard paving and 75 miles macadamized, 282 miles of sanitary sewers, 82 miles of storm sewers and 229 miles of stone and cement sidewalks. These are rather dry figures, but they prove that Denver is by no means a village of the "Wild and Woolly West."

I shall not make more than passing mention of our street car system, which serves the large and comfortably housed population. The system includes 200 miles of track within the city limits and 75 miles of high-speed interurban lines. We believe the service given is as good as will be found in any city of the same size in the country. There are no subways or elevated lines as yet, as the congestion in the business district, which covers an area $1\frac{1}{4}$ miles long by $\frac{3}{4}$ mile wide, is not severe enough to warrant these expensive luxuries.

Denver is pre-eminently a city of homes, beautiful trees, fine lawns and spacious parks. In the days of the early settlers the only trees were a thin fringe of cottonwoods along the banks of the River Platte. The lawns and trees which add so much to the appearance of the streets have been brought up by hand; they represent a labor of love, and it is little wonder that they are appreciated by all of our citizens. Brick and stone buildings are the universal rule in Denver, as no frame buildings are allowed to be erected inside of the city limits. The skyscraper, however, has not come into vogue, as we have plenty of room in which to spread horizontally. Many of the best stores occupy one-story buildings downtown. Among the show buildings are the State Capitol, the new fireproof Auditorium, where the exhibits of the convention are to be displayed, and the buildings and grounds of Denver University.

Perhaps the greatest attractions of Denver are the climate and the scenery of the surrounding country. Contrary to the prevalent idea in many sections of the East, Denver is not in the mountains, but is 12 miles east of the lower range, on a plain approximately one mile above sea level. The mountains west of the city protect it from the severe storms and blizzards which come out of the west and northwest. This, combined with the high altitude, gives Denver a delightful and healthy climate, free from sudden changes and severe extremes of heat and cold. Nothing is more surely to be depended upon than the weather in Denver during the first half of October. It is neither too warm nor too cold then, and no rain is to be expected. It is, in fact, an ideal time of the year.

The scenery surrounding Denver is the most magnificent to be found anywhere in the world. In a day's ride on the Western Pacific Railroad one can reach an altitude of 11,000 ft. and throw snowballs in August. To the south is the beautiful Manitou country and the Garden of the Gods. Majestic Pike's Peak and many other imposing mountains can be seen from the streets of Denver. Few people who visit Colorado from the East stay long enough to fully appreciate all of its attractions. Those who come to the convention for the first time we know will want to come again, and we promise to do all that we can to make them enjoy their visit with us.

All of the electric railway interests in the far West are enthusiastic about Denver as a meeting place. We have been assured that practically all of the Pacific Coast companies will be represented. Few Eastern people realize how much nearer Denver is to the coast than are the cities of the Atlantic seaboard. Denver is the geographical center of the vast region extending from Galveston, Tex., on the south, to Portland, Ore., and Spokane, Wash., on the north, and from St. Louis and Chicago on the east to San Francisco on the west. This territory, embracing many large cities, will send a full quota of members and prospective members.

In closing I wish to say a few words to manufacturers regarding exhibits. The Denver meeting will open to many manufacturers of railway equipment and supplies quite a new field, which is rapidly developing; therefore the question of sending a comprehensive exhibit to the convention is worthy of very serious consideration, and we believe it will be well worth the trouble and cost to be fully represented at the convention, both in exhibits and salesmen. No doubt there will be opportunities for making sales of some of the apparatus exhibited. I dare not be too explicit for fear of disappointing, and I do not wish to make any definite promises. But on behalf of the Western railway men I can assure manufacturers that we will certainly do all in our power to save the exhibitors the expense of return freight on apparatus which is sent out to the convention largely for our instruction and benefit.

TRUSS-SUPPORTED TROLLEY BASES AT MOBILE

S. M. Coffin, master mechanic, Mobile Light & Railroad Company, has equipped the single-truck cars of that company with special bridges to support the trolley bases. Thus the roof of a car is not only protected from undue strains, but the noise within the car is minimized. The "trolley board" or truss on which the trolley base is mounted comprises two pieces of wood 2 in. x 6 in. in section at the center and sized to $1\frac{1}{4}$ in. x 6 in. at the ends. These pieces are trussed from end to end with two $\frac{5}{8}$ -in. rods. The wooden pieces are held about 4 in. apart by spacing blocks and are connected to the truss rods by two queen posts placed about 18 in. from the center. This combination of wood and steel trolley plank is in turn supported only at its ends, and therefore the load of the trolley base is entirely removed from the center of the car roof.

An iron saddle extending over the width of the monitor carries two rubber cushions supporting the trolley board. Two through bolts at each end securely fasten the trolley board to the roof, and the tightening of the nuts on these bolts compresses the rubber cushions so that the trolley board holds the trolley base securely in place. The cost of these trolley boards is small and the resulting saving in repairs to the roof is said to be quite marked.

GROSS RECEIPTS FOR 1908

The publication of "American Street Railway Investments," the Red Book for 1909, makes available the operating reports for 1908 of the principal electric railway companies in the country. These figures are given in the accompanying table. No attempt has been made in these statistics to indicate the trackage from which these earnings are secured, and in some cases a considerable difference exists between that in 1907 and 1908, owing to extensions and consolidations. The fiscal years of the companies also vary. That for the New York and Pennsylvania companies, as reported in the table, in most cases ends June 30, that of the Massachusetts companies on Sept. 30, and that of the Ohio companies on April 30. In the case of other companies the fiscal year is in general that ended Dec. 31.

The companies are graded according to gross receipts, but it should be understood that the list below does not give all of the companies in the country within the limits mentioned, simply those whose operating reports are made public. In some cases the company's report shows the gross receipts of all the subsidiary organizations; others give simply the receipts derived from securities owned. The latter companies are distinguished in the accompanying table by an (*) asterisk. Where holding companies have reports in both ways, both figures are given and the date. The meaning of the other emblems is explained at the foot of the second column on page 23.

COMPANIES HAVING GROSS RECEIPTS FOR 1908 OF OVER \$1,000,000.

NAME OF COMPANY.	1907.	1908.
Interborough Rapid Transit Co., New York City.....	\$23,179,635	\$25,279,470
Brooklyn Rapid Transit Co., Brooklyn, N. Y.....	19,936,753	20,548,390
Philadelphia Rapid Transit Co., Philadelphia, Pa.....	18,338,618	18,557,503
Stone & Webster Organization, Boston, Mass.....	14,996,712	17,328,336
New York City Ry. Co., New York City.....	18,549,109	16,923,189
Philadelphia Co., Pittsburg, Pa.....	19,332,306	16,829,156
Boston Elevated Ry. Co., Boston, Mass.....	13,952,966	14,074,196
Chicago Railways Co., Chicago, Ill.....	10,560,572	11,037,071
Public Service Railway Co., Newark, N. J.....	10,582,857	10,989,970
United Railways Co. of St. Louis, St. Louis, Mo.....	10,828,737	10,593,166
Pittsburg Railways Co., Pittsburg, Pa.....		9,846,984
Long Island Railroad Co., L. I. City, N. Y.....	10,130,407	9,818,544
Chicago City Ry. Co., Chicago, Ill.....	7,817,978	9,195,783
Massachusetts Electric Cos., Boston, Mass.....	7,758,511	7,809,010
California Gas & Electric Corp., San Francisco, Cal.....	6,923,664	7,746,750
Detroit United Ry., Detroit, Mich.....	7,133,751	7,179,717
Brooklyn Heights R. R. Co., Brooklyn, N. Y.....	11,705,860	9,710,313
Connecticut Co., New Haven, Conn.....	7,994,903	6,061,436
United Railroads of San Francisco, Cal.....	4,745,116	6,866,303
Brooklyn Union El. R. R. Co., Brooklyn, N. Y.....		6,853,057
United Rys. & Electric Co., Baltimore, Md.....	7,024,587	6,838,042
Twin City Rapid Transit Co., Minneapolis, Minn.....	6,055,743	6,399,509
Kansas City Ry. & Lt. Co., Kansas City, Mo.....	5,715,339	6,175,796
New Orleans Ry. & Lt. Co., New Orleans, La.....	5,999,731	5,968,498
American Cities Ry. & Lt. Co.....	5,437,796	5,434,495
International Ry. Co., Buffalo, N. Y.....	5,445,070	5,226,983
Boston & Northern St. Ry. Co., Boston, Mass.....	4,618,992	4,662,562
Seattle Electric Co., Seattle, Wash.....	3,949,434	4,520,488
Cincinnati Traction Co., Cincinnati, O.....	4,459,229	4,428,278
Portland Ry., Light & Pwr. Co., Portland, Ore.....	4,050,145	4,351,676
Rhode Island Co. (The), Providence, R. I.....	3,859,715	4,217,022

NAME OF COMPANY	1907	1908
Illinois Traction Syst., Champaign, Ill..	\$3,779,187	\$4,098,621
Milwaukee Elec. Ry. & Lt. Co. (The), Milwaukee, Wis.....	3,926,666	3,991,105
Montreal St. Ry. Co., Montreal, Que., Can.....	3,558,745	3,749,443
Washington Ry. & Elec. Co., Washington, D. C.....	3,385,749	3,720,573
Toronto Ry. Co., Toronto, Ont. Can...	3,511,198	3,610,273
Nassau Electric Railroad Co., Brooklyn, N. Y.....	3,300,126	3,434,132
Georgia Railway & Electric Co., Atlanta, Ga.....	3,309,341	3,339,021
Denver City Tramway Co., Denver, Col	2,913,650	3,152,567
Old Colony St. Ry. Co. Boston, Mass...	2,906,663	2,035,599
Oakland Traction Co., Oakland, Cal....	2,789,684	2,801,787
Louisville Ry. Co., Louisville, Ky.....	2,668,146	2,758,555
Metropolitan West Side El. R. R. Co., Chicago.....	2,878,588	2,746,840
*American Light & Trac. Co., New York City.....	2,463,158	2,723,064
Indianapolis Traction & Terminal Co., Indianapolis, Ind.....	2,683,826	2,673,436
Toledo Railways & Light Co., Toledo, O.	2,565,200	2,542,111
Washington Water Power Co., Spokane, Wash.....	2,094,282	2,464,118
Northwestern Elev. R. R. Co., Chicago, Ill.....	2,100,316	2,463,188
Ohio Electric Ry. Co. (The), Cincinnati, O.....		2,463,164
Rochester Ry. Co., Rochester, N. Y....	2,395,273	2,453,632
Omaha & Council Bluffs Street Ry. Co., Omaha, Neb.....	1,713,673	2,304,162
Columbus Ry. & Light Co., Columbus, O.	2,228,531	2,289,296
South Side Elevated R. R. Co., Chicago, Ill.....	2,105,193	2,241,690
Third Ave. R. R. Co. (The), New York City.....		2,231,303
Birmingham Ry., Light & Power Co., Birmingham, Ala.....	2,220,999	2,167,546
United Traction Co., Albany, N. Y.....	2,048,424	2,145,220
East St. Louis & Suburban Co., E. St. Louis, Ill.....	2,157,443	2,009,514
Havana Elec. Ry. Co., Havana, Cuba..	1,889,685	2,002,108
British Columbia Elec. Ry. Co. (Ltd.), Vancouver, B. C.....	914,157	1,979,319
Utah Light & Ry. Co., Salt Lake City, Utah.....		1,925,935
Indiana Union Traction Co., Anderson, Ind.....	2,089,232	1,902,330
Northern Ohio Trac. & Light Co., Akron, O.....	1,909,061	1,890,473
Capitol Traction Co., Washington, D. C.	1,786,508	1,855,974
Tri-City Ry. & Light Co. (The), Davenport, Ia.....	1,782,356	1,819,077
Brooklyn, Queens County & Sub. R. R. Co., Brooklyn, N. Y.....	1,618,905	1,789,980
Mahoning & Shenango Ry. & Light Co., Youngstown, O.....	1,900,662	1,747,927
*North American Co. (The), New York City.....	1,610,965	1,723,186
Puget Sound Elec. Ry. Co., Tacoma, Wash.....	1,664,281	1,694,973
Memphis Street Ry. Co., Memphis, Tenn.	1,604,385	1,627,648
Worcester Consolidated Street Ry. Co., Worcester, Mass.....	1,641,265	1,626,143
Dominion Power & Transmission Co., Hamilton, Ont., Can.....	1,461,757	1,600,312
Nashville Ry. & Light Co., Nashville, Tenn.....	1,578,207	1,597,030
Union Railway Co., New York City....	1,583,656	1,590,156
Coney Island & Brooklyn R. R. Co., Brooklyn, N. Y.....	1,621,615	1,562,061
*United Railways Investment Co., San Francisco, Cal.....	1,560,864	1,558,789
West Penn. Railways Co., Pittsburg, Pa.	1,242,379	1,551,138
Milwaukee Light, Heat & Traction Co., Milwaukee, Wis.....	1,172,278	1,471,477
Aurora, Elgin & Chicago R. R. Co., Chicago, Ill.....	1,340,244	1,408,892
Fort Wayne & Wabash Valley Traction Co., Fort Wayne, Ind.....	1,283,782	1,322,720
Springfield St. Ry. Co., Springfield, Mass.....	1,306,729	1,317,871
Syracuse Rapid Transit Ry. Co., Syracuse, N. Y.....	1,176,767	1,312,291
Chicago Consolidated Trac. Co., Chicago, Ill.....		1,235,307
Scranton Ry. Co., Scranton, Pa.....	1,090,149	1,183,687

NAME OF COMPANY		1907	1908	NAME OF COMPANY		1907	1908
Forty-second St., Manhattanville & St. Nicholas Ave. Ry. Co., New York City		\$1,083,871	\$1,171,463	Susquehanna Ry., Lt. & Pwr. Co., Lancaster, Pa.			\$551,479
Dallas Electric Corporation, Dallas, Tex.		1,125,673	1,160,967	*American Cities Ry. & Light Co., New York City		\$527,123	547,897
Utica & Mohawk Valley Ry. Co., Utica, N. Y.		1,045,278	1,151,031	El Paso Electric Co., El Paso, Tex.		506,693	534,222
Spokane & Inland Emp. R. R. Co., Spokane, Wash.		1,172,626	1,146,177	Trenton Street Ry. Co., Trenton, N. J.		528,325	528,463
Manila Elec. R. R. & Ltg. Corp., Manila, P. I.		967,345	1,110,941	Chattanooga Rys. Co. (The), Chattanooga, Tenn.		536,861	525,741
Galveston-Houston Elec. Co., Galveston, Tex.			1,088,447	*Lackawanna & Wyoming Valley R. R. Co., Scranton, Pa.		483,540	524,509
Lehigh Valley Transit Co., Allentown, Pa.		1,031,279	1,087,277	Savannah Electric Co., Savannah, Ga.		602,399	595,819
Northern Texas Trac. Co., Ft. Worth, Tex.		1,060,953	1,080,577	Altoona & Logan Valley Elec. Ry. Co., Altoona, Pa.		532,392	500,743
Wilkes-Barre & Wyoming Valley Traction Co., Wilkes-Barre, Pa.		939,951	1,000,273	COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN \$500,000 AND \$100,000.			
COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN \$1,000,000 AND \$500,000.				NAME OF COMPANY.		1907.	1908.
NAME OF COMPANY.		1907.	1908.	*American Rys. Co. (The), Philadelphia, Pa.		\$527,063	\$498,758
New York & Queens County Ry. Co., Long Island City, N. Y.		\$913,212	\$944,856	Ohio Valley Electric Ry. Co., Huntington, W. Va.		410,741	493,748
Grand Rapids Ry. Co., Grand Rapids, Mich.		944,916	940,645	Holyoke Street Ry. Co., Holyoke, Mass.		450,650	478,153
St. Joseph Ry., Light, Heat & Power Co., St. Joseph, Mo.		870,286	909,965	Richmond Traction Co., Richmond, Va.		454,713	475,512
Des Moines City Ry. Co., Des Moines, Ia.		779,958	906,747	Southwest Missouri R. R. Co. (The), Webb City, Mo.		561,535	474,473
Winnipeg Elec. Ry. Co., Winnipeg, Man., Can.		853,990	903,184	Union Street Ry. Co., New Bedford, Mass.		467,853	470,661
San Francisco, Oakland & San Jose Consolidated Ry., Oakland, Cal.		812,868	901,110	Johnstown Passenger Ry. Co., Johnstown, Pa.		461,385	466,718
Springfield Ry. & Light Co., Springfield, Ill.		863,728	893,342	Manchester Traction, Light & Power Co., Manchester, N. H.		455,337	464,211
Lake Shore Electric Ry. Co., Cleveland, O.		938,161	892,269	Bangor Ry. & Electric Co., Bangor, Me.		412,434	451,913
Duluth Street Ry. Co., Duluth, Minn.		846,084	890,295	Butte Electric Ry. Co., Butte, Mont.		475,138	446,571
Schenectady Ry. Co., Schenectady, N. Y.		1,068,741	887,921	Western Ohio Ry. Co. (The), Lima, O.		444,846	441,791
Chicago & Oak Park El. R. R. Co., Chicago, Ill.		892,569	860,892	Chicago & Joliet Electric Ry. Co., Joliet, Ill.		412,326	435,238
United Traction Co., Reading, Pa.		841,573	853,678	Jacksonville Electric Co., Jacksonville, Fla.		392,394	430,838
Fonda, Johnstown & Gloversville R. R. Co., Gloversville, N. Y.		794,933	800,925	Columbia Electric Street Ry., Light & Power Co., Columbia, S. C.		410,254	428,818
Portland R. R. Co., Portland, Me.		759,891	782,519	Halifax Elec. Tramway Co., Halifax, N. S., Can.		405,452	424,618
Cleveland, Southwestern & Columbus Ry. Co., Cleveland, O.		756,898	775,737	Lincoln Traction Co., Lincoln, Neb.		408,216	423,515
Conestoga Traction Co., Lancaster, Pa.		742,161	762,926	Fairmont & Clarksburg Traction Co., Fairmont, W. Va.		389,972	416,882
Charleston Consolidated Ry., Gas & Electric Co., Charleston, S. C.		727,661	756,327	Berkshire Street Ry. Co., Pittsfield, Mass.		409,286	406,150
Houston Electric Co., Houston, Tex.		681,724	732,171	Indianapolis & Northwestern Traction Co., Indianapolis, Ind.			399,368
Central Pennsylvania Traction Co., Harrisburg, Pa.		737,220	715,264	Richmond Light & R. R. Co., New Brighton, S. I., New York		335,008	395,145
*United Power & Transpt. Co., Philadelphia, Pa.		840,119	688,285	Honolulu Rapid Transit & Land Co., Honolulu, Hawaii		374,610	389,927
Wheeling Traction Co., Wheeling, W. Va.			679,799	Lewiston, Augusta & Waterville Street Ry. (The), Lewiston, Me.		366,234	387,185
Little Rock Ry. & Elec. Co., Little Rock, Ark.		642,011	670,897	Auburn & Syracuse Elec. R. R. Co., Auburn, N. Y.		354,346	377,372
Hudson Valley Ry. Co., Glens Falls, N. Y.		618,614	639,300	Evansville & Southern Indiana Traction Co., Evansville, Ind.		363,401	373,144
Ottawa Elec. Ry. Co. (The), Ottawa, Ont., Can.		574,278	616,229	Newton Street Ry. Co., Newton, Mass.		357,588	371,991
Chicago, S. Bend & Northern Indiana Ry. Co., South Bend, Ind.		604,163	612,538	Springfield Ry. & Light Co., Springfield, Mo.		378,046	367,639
Lexington & Interurban Rys. Co., Lexington, Ky.		561,580	611,812	East Liverpool Traction & Light Co. (The), East Liverpool, O.		202,028	363,551
Pueblo & Suburban Traction & Ltg. Co., Pueblo, Col.		601,795	608,642	Whatcom County Ry. & Light Co., Bellingham, Wash.		354,469	362,251
Dry Dock, East Broadway & Battery R. R., New York City		627,979	599,174	Columbus Electric Co., Columbus, Ga.		340,574	358,497
Buffalo & Lake Erie Trac. Co., Buffalo, N. Y.			583,718	Schuylkill Valley Traction Co., Norristown, Pa.		360,822	357,555
City Ry. Co. (The), Dayton, O.		562,840	575,789	Easton Consolidated Elec. Co., Easton, Pa.		376,341	356,615
Rockford & Interurban Ry. Co., Rockford, Ill.		591,396	575,249	Galveston Electric Co., Galveston, Tex.		369,168	356,275
Michigan United Rys. Co., Jackson, Mich.		449,958	573,439	Scioto Valley Traction Co., Columbus, O.		329,213	355,000
Knoxville Ry. & Lt. Co., Knoxville, Tenn.		605,777	572,271	Atlantic Shore Line Ry., Sanford, Me.		295,152	348,207
New Jersey & Hudson River Ry. & Ferry Co. (The), Hackensack, N. J.		508,179	564,338	Indianapolis, Columbus & Southern Traction Co., Indianapolis, Ind.		265,883	344,694
Mobile Light & R. R. Co., Mobile, Ala.		614,743	563,728	Washington, Alexandria & Mt. Vernon Ry. Co., Washington, D. C.		325,969	344,370
Eastern Pennsylvania Railways Co., Pottsville, Pa.		506,335	562,386	Atlantic Coast Elec. Ry. Co., Asbury Park, N. J.		395,465	343,055
Boston & Worcester St. Ry. Co., Boston, Mass.		531,560	553,613	Topeka Ry. Co. (The), Topeka, Kan.		310,344	342,067
Tampa Electric Co., Tampa, Fla.		521,181	552,574	South Brooklyn Ry. Co., Brooklyn, N. Y.			341,156
				Manchester Street Ry., Manchester, N. H.		339,541	340,469
				Ft. Smith Light & Traction Co., Ft. Smith, Ark.		309,842	335,518
				Toledo, Urban & Interurban Ry. Co., Toledo, O.		331,076	331,312

NAME OF COMPANY	1907	1908	NAME OF COMPANY	1907	1908
Kansas City-Western Ry., Kansas City, Kan.....	\$280,514	\$330,651	Pittsburg & Butler Street Ry. Co., Butler, Pa.....	\$ 36,684	\$215,272
Union Electric Co., Dubuque, Ia.....	294,922	323,320	Stark Elec. R. R. Co., Alliance, O.....	205,192	213,617
Columbus, Delaware & Marion Ry. Co., Columbus, O.....	310,995	321,578	Dartmouth & Westport St. Ry. Co., New Bedford, Mass.....	209,581	213,510
Rochester, Syracuse & Eastern R. R. Co., Rochester, N. Y.....		310,958	Citizens' Traction Co. (The), Oil City, Pa.....	198,200	212,876
Binghamton Ry. Co., Binghamton, N. Y.....	287,024	310,828	Interurban Ry. Co., Des Moines, Ia.....	220,099	211,326
Cleveland, Painesville & Eastern R. R. Co., Cleveland, O.....	296,318	295,811	Fries Manufacturing & Power Co. (The), Winston-Salem, N. C.....	229,201	209,587
Atlantic Shore Line Ry., Sanford, Me..	290,033	295,152	Pensacola Electric Co., Pensacola, Fla..	228,150	209,183
Western, N. Y. & Pennsylvania Traction Co., Olean, N. Y.....	140,779	291,780	Cincinnati & Hamilton Traction Co., Cincinnati, O.....	186,460	207,074
Oneida Ry. Co., Oneida, N. Y.....	26,409	290,253	Pittsfield Electric St. Ry. Co., Pittsfield, Mass.....	203,530	206,941
New York & Long Island Traction Co. (The), Long Island City, N. Y.....	242,526	280,756	Schuylkill Ry. Co., Girardville, Pa.....	202,252	206,480
Newport & Fall River St. Ry. Co., Newport, R. I.....	257,067	280,687	Valley Traction Co., Lemoyne, Pa.....	206,475	221,936
Rochester & Eastern Rapid Ry. Co., Rochester, N. Y.....	258,984	280,024	Grays Harbor Ry. & Lt. Co., Aberdeen, Wash.....	193,744	205,978
Phila. & West Chester Traction Co., Philadelphia, Pa.....	259,248	280,017	Long Island Electric Ry. Co., Jamaica, Long Island, N. Y.....	200,182	205,010
Beaver Valley Traction Co. (The), Beaver Falls, Pa.....	270,612	279,820	Meridian Light & Ry. Co., Meridian, Miss.....	208,278	202,657
Montreal Park & Island Ry. Co., Montreal, Que., Can.....	262,814	277,634	Indianapolis & Cincinnati Traction Co., Indianapolis, Ind.....	199,620	200,355
Fitchburg & Leominster Street Ry. Co., Fitchburg, Mass.....	289,170	276,899	Kokomo, Marion & Western Traction Co., Kokomo, Ind.....	188,269	199,209
Chester Traction Co., Chester, Pa.....	377,179	274,808	Benton Harbor-St. Joe Ry. & Light Co. (The), Benton Harbor, Mich.....	172,790	192,239
Wisconsin Traction, Light, Heat & Power Co., Appleton, Wis.....	254,599	273,666	Wilkes-Barre & Hazleton Ry. Co., Hazleton, Pa.....	170,998	191,951
Helena Light & Railway Co., Helena, Mont.....	268,774	270,674	Oneonta & Mohawk Valley R. R. Co., Oneonta, N. Y.....	165,937	190,043
Worcester & Southbridge Street Ry. Co., Worcester, Mass.....	229,019	270,561	Lehigh Traction Co., Hazleton, Pa.....	174,424	187,787
Niagara, St. Catharines & Toronto Ry. Co., St. Catharines, Ont., Can.....	270,463	268,209	Steubenville & East Liverpool Ry. & Light Co., Steubenville, O.....	184,115	185,495
Albany & Hudson R. R. Co., Hudson, N. Y.....	273,997	267,777	Cedar Rapids & Marion City Ry. Co., Cedar Rapids, Ia.....	170,904	185,028
Louisville & Southern Indiana Traction Co., New Albany, Ind.....	237,972	266,080	Hartford & Springfield Street Ry. Co., Warehouse Pt., Conn.....	178,092	184,612
Houghton County Traction Co., Houghton, Mich.....	249,919	265,575	Seattle, Renton & Southern Ry. Co., Seattle, Wash.....	149,494	182,295
Sea Beach Ry. Co., Brooklyn, N. Y.....		265,313	Connecticut Valley Street Ry. Co., Northampton, Mass.....	180,018	182,180
Asheville Electric Co., Asheville, N. C..	269,185	264,362	Toledo & Indiana Ry. Co., Toledo, O..	161,227	178,261
Consolidated Rys., Lt. & Pwr. Co., Wilmington, N. C.....	236,092	263,902	Toledo, Pt. Clinton & Lakeside Ry. Co., Toledo, O.....	109,172	176,267
Chicago, Ottawa & Peoria Ry. Co., Ottawa, Ill.....		263,416	Jamestown St. Ry. Co. (The), Jamestown, N. Y.....	166,445	172,096
Eastern Ohio Traction Co., Cleveland, O.....	244,360	259,172	Northampton St. Ry. Co., Northampton, Mass.....	174,487	171,440
Roanoke Ry. & Electric Co., Roanoke, Va.....	192,603	258,528	Western Massachusetts Street Ry. Co., Westfield, Mass.....	138,760	167,080
Interurban Ry. & Terminal Co. (The), Cincinnati, O.....	259,148	254,581	Railways Co., General, New York City..	171,019	167,071
Elmira Water, Light & R. R. Co., Elmira, N. Y.....	224,817	248,022	Cincinnati, Georgetown & Portsmouth R. R. Co., Cincinnati, O.....	153,616	164,493
Cape Breton Elec. Co., Ltd., Sydney, N. S., Can.....	250,065	247,545	Allentown & Reading Trac. Co., Allentown, Pa.....	165,169	164,462
Citizens Ry. & Light Co., Ft. Worth, Tex.....		246,664	Pittsburg, McKeesport & Greensburg Ry. Co., Greensburg, Pa.....	202,052	163,258
New York & Stamford Ry. Co., Port Chester, N. Y.....	136,748	246,514	Orange County Traction Co., Newburgh, N. Y.....	133,029	162,562
Rutland Ry., Light & Power Co., Rutland, Vt.....	254,835	246,336	Sandwich, Windsor & Amherstburg Ry. Co., Windsor, Ont., Can.....	135,517	159,959
Quebec Ry., Lt. & Power Co., Quebec, Can.....		*238,461	Sheboygan Lt., Pwr. & Ry. Co., Sheboygan, Wis.....	151,375	158,770
Toledo & Western R. R. Co. (The), Toledo, O.....	239,233	236,538	Interstate Consolidated Street Ry. Co., North Attleboro, Mass.....	174,491	158,379
London Street Ry. Co., London, Ont., Can.....	232,377	235,032	Camden & Trenton Ry., Trenton, N. J..	170,049	156,722
Mansfield Ry., Light & Power Co., Mansfield, O.....	189,906	234,456	St. John Ry. Co. (The), St. John, N. B., Can.....	140,230	156,654
Staten Island Midland Ry. Co., New Brighton, S. I., N. Y.....	223,033	233,949	Milford & Uxbridge St. Ry. Co., Milford, Mass.....	178,871	156,308
Joplin & Pittsburg Ry. Co., Joplin, Mo..	*179,227	*228,707	Southern Wisconsin Ry. Co., Madison, Wis.....	154,158	156,157
Paducah Traction & Light Co., Paducah, Ky.....	237,513	226,614	Chippewa Valley Ry., Light & Power Co. (The), Eau Claire, Wis.....	138,475	156,069
Dayton & Troy Electric Ry. Co., Dayton, O.....	213,139	225,057	Jersey Central Traction Co., Keyport, N. J.....	125,943	154,080
Ottumwa Ry. & Light Co., Ottumwa, Ia.....	208,177	222,534	North Carolina Public Service Co. (The), Greensboro, N. C.....	**150,000	**153,913
Hudson & Manhattan R. R. Co., New York City.....		**222,415	Boston & Maine R. R. (Concord & Manchester Electric Branch), Concord, N. H.....	154,772	152,863
Eastern Wisconsin Ry. & Light Co., Fond du Lac, Wis.....	189,996	218,611	Peoria Ry. Terminal Co., Peoria, Ill.....	150,782	152,457
West India Electric Co., Ltd. (The), Kingston, Jamaica.....	198,845	217,410	Lexington & Boston St. Ry. Co., Boston, Mass.....	151,135	151,503
Waterloo, Cedar Falls & Northern Ry. Co., Waterloo, Ia.....	205,321	217,103	Green Bay Trac. Co., Green Bay, Wis..	143,052	148,538
			Portsmouth St. R. R. & Lt. Co., Portsmouth, O.....	137,257	147,768

NAME OF COMPANY	1907	1908	NAME OF COMPANY	1907	1908
Muscatine Light & Trac. Co., Muscatine, Ia.	\$142,293	\$147,638	Delaware County & Philadelphia Electric Ry. Co., Philadelphia, Pa.	\$110,867	\$109,668
Austin Electric Ry. Co., Austin, Tex.	118,476	146,670	Galt, Preston & Hespeler St. Ry. Co., Galt, Ont., Can.	107,093	109,104
Allegheny Valley St. Ry. Co., Tarentum, Pa.	105,677	146,342	Pascagoula St. Ry. & Power Co., Scranton, Miss.	116,049	109,045
Fairmount Park Transportation Co., Philadelphia, Pa.	133,823	145,543	Power, Transit & Light Co., Bakersfield, Cal.		108,920
Southern Colorado Power & Ry. Co. (The), Trinidad, Col.	131,342	143,882	Denison & Sherman Ry. Co., Sherman, Texas		108,448
Lorain Street R. R. Co., Lorain, O.	177,804	143,381	Dayton, Covington & Piqua Traction Co., Dayton, O.	112,740	107,587
Syracuse, Lake Shore & Northern R. R., Syracuse, N. Y.	136,345	143,291	Groton & Stonington St. Ry. Co., Groton, Conn.	104,073	107,077
Kingston Consolidated R. R. Co., Kingston, N. Y.	142,246	142,467	New York City Interborough Ry. Co., New York City	62,466	106,935
Williamsport Pass. Ry. Co., Williamsport, Pa.	137,358	141,157	Lebanon Valley Street Ry. Co., Lebanon, Pa.	109,510	106,211
Washington & Canonsburg Ry. Co., Pittsburg, Pa.	125,961	140,667	Richmond & Petersburg Electric Ry. Co., Richmond, Va.	102,426	105,532
Louisville & Eastern R. R. Co., Louisville, Ky.	156,372	140,653	Burlington Traction Co., Burlington, Vt.	98,868	105,597
Cairo Electric & Traction Co., Cairo, Ill.		140,139	Cincinnati, Milford & Loveland Traction Co., Cincinnati, O.	91,337	105,145
Vicksburg Traction Co., Vicksburg, Miss	114,116	139,072	Cincinnati & Columbus Trac. Co., Cincinnati, O.	95,492	105,070
Northern Electric Street Ry. Co. (The), Scranton, Pa.		138,823	Citizens' Electric Street Ry. Co., Newburyport, Mass.	108,383	104,313
Bridgeton & Millville Trac. Co. (The), Bridgeton, N. J.	141,793	138,637	Ocean Elec. Ry. Co., Rockaway, L. I., N. Y.	92,578	102,733
Tarrytown, White Plains & Mamaroneck Ry. Co., White Plains, N. Y.	132,386	137,995	Steubenville & Wheeling Traction Co., Wheeling, W. Va.	73,114	102,225
Iowa & Illinois Ry. Co., Clinton, Ia.	124,026	136,719	Marion, Bluffton & Eastern Traction Co., Bluffton, Ind.		100,913
Carolina Power & Light Co., Raleigh, N. C.		136,357	Rome Railway & Light Co., Rome, Ga.	92,695	100,635
Rockland, Thomaston & Camden St. Ry. Co., Rockland, Me.	133,432	135,177	Hudson, Pelham & Salem Street Ry. Co., Hudson, N. H.	98,272	100,109
Cincinnati, Lawrenceburg & Aurora Electric Street Ry. Co., Cincinnati, O.	150,300	134,845	COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN \$100,000 AND \$50,000		
Texas Traction Co., Dallas, Tex.		134,825	NAME OF COMPANY.		
Poughkeepsie City & Wappingers Falls Electric Ry. Co., Poughkeepsie, N. Y.	124,650	131,679	1907.	1908.	
Anniston Electric & Gas Co., Anniston, Ala.	146,399	131,100	Salisbury & Spencer Ry. Co., Salisbury, N. C.		\$99,546
Pekskill Lighting & R. R. Co., Peekskill, N. Y.	111,164	128,987	Warren Street Ry. Co., Warren, Pa.	\$97,916	98,695
Athens Electric Ry. Co., Athens, Ga.	110,446	128,753	Philadelphia & Easton Elec. Ry. Co., Doylestown, Pa.	98,001	98,644
Clinton Street Ry. Co., Clinton, Ia.	122,000	128,000	Natick & Cochituate St. Ry. Co., Natick, Mass.	100,078	97,862
Southern Ry. & Light Co., Natchez, Miss.		126,786	Montreal Terminal Ry. Co. (The), Montreal, Que., Can.	95,526	97,354
Evansville, Suburban & Newburg Ry. Co., Evansville, Ind.	118,508	126,036	Springfield, Troy & Piqua Ry. Co., Springfield, O.	98,660	97,294
West Chester St. Ry. Co., West Chester, Pa.	100,422	125,933	Cortland County Traction Co., Cortland, N. Y.	77,298	97,197
Chautauqua Traction Co., Jamestown, N. Y.	95,739	125,306	Dover, Somersworth & Rochester St. Ry. Co., Dover, N. H.	95,993	96,454
Ithaca Street Ry. Co., Ithaca, N. Y.	113,644	122,149	Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Co., Geneva, N. Y.	97,148	95,979
Haverhill & Amesbury St. Ry. Co., Haverhill, Mass.	121,823	121,552	Hudson River Traction Co., Rutherford, N. J.	92,616	95,487
Cedar Rapids & Iowa City Ry. & Light Co., Cedar Rapids, Ia.	107,717	121,529	New Jersey & Pennsylvania Traction Co., Trenton, N. J.	104,259	95,248
Elec. Ry., Lt. & Ice Co. (The), Junction City, Kan.	93,738	121,177	Fargo & Moorhead St. Ry. Co., Fargo, N. D.	85,000	95,000
New Bedford & Onset St. Ry. Co., New Bedford, Mass.	117,888	120,737	Marshalltown Light, Power & Ry. Co., Marshalltown, Ia.	88,055	94,136
Brockton & Plymouth Street Ry. Co., Brockton, Mass.	121,749	119,862	Muskogee Elec. Trac. Co., Muskogee, Okla.	72,365	94,118
Dayton & Xenia Transit Co., Dayton, O.	127,555	119,784	Milford, Attleboro & Woonsocket Ry. Co., Milford, Mass.	105,470	93,901
Washington, Arlington & Falls Church Ry. Co., Washington, D. C.	106,338	119,289	Erie Traction Co., Erie, Pa.	83,538	93,893
Elgin & Belvidere Electric Co., Chicago, Ill.		118,478	Baton Rouge Electric Co., Baton Rouge, La.	80,054	93,257
Danbury & Bethel St. Ry. Co., Danbury, Conn.	113,200	117,966	Toledo, Fostoria & Findlay Electric Ry. Co., Toledo, O.	79,989	92,242
Syracuse & Suburban R. R. Co., Syracuse, N. Y.	107,473	117,752	Blue Hill Street Ry Co., Canton, Mass.	85,228	91,085
Holmesburg, Tacony & Frankford Electric Ry. Co. (The) Philadelphia, Pa.	116,339	116,989	Providence & Danielson Ry. Co., Providence, R. I.	92,061	91,023
Astoria Electric Co., Astoria, Ore.	107,493	116,760	Boise R. R. Co., Ltd., Boise, Idaho.		90,000
Toledo & Chicago Interurban Ry. Co., Kendallville, Ind.	102,592	116,028	Southwestern Traction Co., London, Ont., Can.		89,971
Bristol & Plainville Tramway Co., Bristol, Conn.	110,641	114,614	Butler Passenger Ry. Co., Butler, Pa.	92,420	89,626
Northampton Traction Co., Easton, Pa.	106,495	113,223	Great Falls & Old Dominion R. R. Co., Great Falls, Va.	72,664	88,861
Ponce Electric Co., Ponce, P. R.	120,087	113,131	Middlesex & Boston St. Ry. Co., Natick, Mass.	89,876	88,481
Atlanta Northern Ry. Co., Atlanta, Ga.		112,821	Conneaut & Erie Trac. Co., Erie, Pa.	80,594	88,380
Pennsylvania & Ohio Ry. Co. (The), Ashtabula, O.	118,427	112,664	Monmouth County Elec. Co., Red Bank, N. J.	83,500	88,274
Union Traction Co. of Kansas, Independence, Kan.		112,076			
Jefferson Traction Co., Punxsutawney, Pa.	57,022	111,212			
Sydney & Glace Bay Ry. Co., Sydney, N. S., Can.	113,614	110,698			

NAME OF COMPANY		1907	1908	NAME OF COMPANY		1907	1908
Shamokin & Mt. Carmel Transit Co., Shamokin, Pa.		\$77,294	\$88,100	Wilkes-Barre, Dallas & Harvey's Lake Ry. Co., Wilkes-Barre, Pa.		\$65,103	\$63,506
Port Arthur & Ft. William Electric Ry., Port Arthur, Ont., Can.		69,181	87,367	Toronto & York Radial Ry. Co. (The), Toronto, Ont., Can.		58,964	63,412
Sea View R. R. Co., Wakefield, R. I.		81,902	87,026	Sandusky, Norwalk & Mansfield Elec. Ry. Co. (The), Norwalk, O.		47,473	62,877
Danville Ry. & Elec. Co., Danville, Va.		77,315	87,007	Gardner, Westminister & Fitchburg St. Ry. Co., Gardner, Mass.		64,900	62,780
Worcester & Blackstone Valley Street Ry. Co., Worcester, Mass.		85,348	86,906	Tiffin, Fostoria & Eastern Electric Ry. Co., Tiffin, O.		52,812	62,752
Lawrence & Methuen Street Ry. Co., Lawrence, Mass.		79,473	86,236	Northern Cambria Street Ry. Co., Patton, Pa.		55,602	62,649
Warren & Jamestown St. Ry. Co., Jamestown, N. Y.		84,135	86,114	Chillicothe Electric R. R., Light & Power Co., Chillicothe, O.		56,229	62,355
Walla Walla Valley Traction Co., Walla Walla, Wash.			84,556	People's Street Ry. Co., Nanticoke, Pa.		58,569	62,240
Lewistown & Reedsville Electric Ry. Co., Lewistown, Pa.		119,919	84,052	Norton & Taunton St. Ry. Co., Norton, Mass.		57,104	62,031
Bennington & North Adams St. Ry. Co., Hoosick Falls, N. Y.		48,360	83,962	Slate Belt Electric Street Ry. Co., Bangor, Pa.		59,431	61,906
Niagara Gorge R. R. Co., Niagara Falls, N. Y.		75,175	83,757	Providence & Fall River Street Ry. Co., Swansea Centre, Mass.		62,057	61,667
Tri-State Traction Co., Steubenville, O.			83,354	Vincennes Traction & Light Co., Vincennes, Ind.		55,023	61,164
Black River Traction Co., Watertown, N. Y.		94,221	82,757	Walkill Transit Co. (The), Middletown, N. Y.		59,866	60,819
Southeastern Ohio Ry., Lt. & Pwr. Co. (The), Zanesville, O.		66,067	81,881	Youngstown & Ohio River R. R. Co., Youngstown, O.			60,796
Philadelphia, Bristol & Trenton St. Ry. Co., Philadelphia, Pa.		76,705	81,502	Newton & Boston St. Ry., Newton, Mass.		74,005	60,952
Freeport Ry., Light & Power Co., Freeport, Ill.		81,833	81,212	Trenton & New Brunswick R. R. Co., Trenton, N. J.		56,689	59,637
Joliet & Southern Trac. Co., Joliet, Ill.		80,109	80,488	Columbus, New Albany & Johnstown Trac. Co., Columbus, O.		52,582	59,499
Youngstown & Southern Ry. Co., Youngstown, O.		29,543	79,891	Mason City & Clear Lake Ry. Co., Mason City, Ia.		50,387	59,441
Jackson Ry. & Light Co., Jackson, Tenn.		68,827	79,209	Oshawa Ry. Co. (The), Oshawa, Ont., Can.		63,931	59,169
Ashland Light, Power & Street Ry. Co., Ashland, Wis.		25,972	78,849	Mattoon City Ry. Co., Mattoon, Ill.		55,374	58,760
Rochester & Suburban Ry. Co., Rochester, N. Y.		70,860	78,754	Ashtabula Rapid Transit Co., Ashtabula, O.		72,189	58,737
Maumee Valley Rys. & Light Co., Toledo, O.			76,212	Oswego Traction Co., Oswego, N. Y.		56,466	57,810
Rock Island Southern R. R. Co., Monmouth, Ill.		69,931	76,191	Van Brunt St. & Erie Basin R. R. Co., Brooklyn, N. Y.		61,447	57,519
Waverly, Sayre & Athens Traction Co., Waverly, N. Y.		77,303	76,127	Concord, Maynard & Hudson Street Ry. Co., Maynard, Mass.		59,982	57,500
Great Falls St. Ry., Great Falls, Mont.		62,467	75,911	Ohio River Elec. Ry. & Power Co., Pomeroy, O.		58,121	57,210
Cambridge Power, Light & Traction Co. (The), Cambridge, O.		74,032	75,142	Anderson Traction Co., Anderson, S. C.			57,023
Cohoes Ry. Co., Cohoes, N. Y.		70,051	74,810	Webster, Monessen, Belle Vernon & Fayette City St. Ry. Co., Monessen, Pa.		48,486	56,920
Columbia & Montour Electric Ry. Co., Bloomsburg, Pa.		80,724	74,565	Burlington County Ry. Co., Mt. Holly, N. J.		55,045	56,307
Bristol Gas & Electric Co., Bristol, Tenn.		70,142	74,358	Southwestern St. Ry. Co., Phila., Pa.		64,841	56,045
Hull Electric Co. (The), Aylmer, Que., Can.		101,905	74,311	Levis County Ry., Levis, Que., Can.		56,987	55,700
Northern Illinois Light & Traction Co., Ottawa, Ill.		66,420	74,202	Kittanning & Leechburg Rys. Co., Kittanning, Pa.		57,029	55,486
Sedalia Light & Trac. Co., Sedalia, Mo.			74,122	Phillipsburg Horse Car R. R. Co., Phillipsburg, N. J.		54,246	55,376
Biddeford & Saco R. R. Co., Biddeford, Me.		67,582	73,496	Chatham, Wallaceburg & Lake Erie Ry. Co., Chatham, Ont., Can.			55,002
Norfolk & Bristol St. Ry. Co., Norwood, Mass.		69,029	70,564	West Chester, Kennett & Wilmington Ry. Co., Chester, Pa.		56,309	54,995
Galesburg & Kewanee Electric Ry. Co., Kewanee, Ill.		63,275	69,432	Warren, Brookfield & Spencer Street Ry. Co., Brookfield, Mass.		61,322	54,778
Shamokin & Edgewood Electric Ry. Co., Shamokin, Pa.		60,064	68,269	Charlottesville & Albemarle Ry. Co., Charlottesville, Va.		52,162	54,745
Manistee Light & Traction Co., Manistee, Mich.			67,570	Corning & Painted Post Street Ry. Co., Corning, N. Y.		53,247	54,310
Norwich & Westerly Ry. (The), Norwich, Conn.		52,183	67,307	Lake Erie, Bowling Green & Napoleon Ry. Co., Bowling Green, O.		22,392	53,453
Portsmouth Electric Ry., Concord, N. H.		68,043	67,245	Oley Valley Ry. Co., Boyerstown, Pa.			53,689
Fort Scott Gas & Elec. Co., Fort Scott, Kan.		67,612	66,700	Exeter, Hampton & Amesbury Street Ry. Co., Exeter, N. H.		52,214	52,963
Sterling, Dixon & Eastern Electric Ry. Co., Sterling, Ill.		57,628	66,498	Sarnia Street Ry. Co., Sarnia, Ont., Can.		37,609	52,436
Farmington St. Ry. Co., Hartford, Conn.		62,342	66,435	Uxbridge & Blackstone Street Ry. Co., Co., Uxbridge, Mass.		29,692	52,305
Coney Island & Gravesend Ry. Co., Brooklyn, N. Y.		54,387	65,994	Taunton & Pawtucket St. Ry. Co., Taunton, Mass.		52,925	51,452
Suburban R. R. Co., Chicago, Ill.		65,650	65,917	Trenton, New Hope & Lambertsville St. Ry. Co., Yardly, Pa.		54,047	50,958
Newport & Providence Ry. Co., Newport, R. I.		64,179	65,339	Haverhill & Southern New Hampshire Street Ry. Co., Haverhill, Mass.		46,925	50,614
Elmira & Seneca Lake Traction Co., Elmira, N. Y.		52,568	65,199	Waterville & Fairfield Ry. & Light Co., Waterville, Me.		75,680	50,017
Springfield & Xenia Ry. Co. (The), Xenia, O.		63,979	64,446	COMPANIES HAVING GROSS RECEIPTS FOR 1908 BETWEEN \$50,000 AND \$25,000.			
Southern Boulevard R. R. Co., New York City		57,648	64,262	NAME OF COMPANY.			
Hattiesburg Traction Co., Hattiesburg, Miss.			63,943	Centre & Clearfield Street Ry. Co. (The), Phillipsburg, Pa.		\$48,909	\$49,731
Buffalo Southern Ry. Co., Buffalo, N. Y.		58,940	63,786	Fishkill Electric Ry. Co., Fishkill-on-the-Hudson, N. Y.		51,182	49,710
Toledo, Ottawa Beach & Northern Ry. Co. (The), Toledo, O.			63,596				

NAME OF COMPANY	1907	1908	NAME OF COMPANY	1907	1908
Paul Smith Electric Light, Power & R. R. Co., Paul Smith's, N. Y.....	\$47,329	\$49,368	Brantford St. Ry. Co., Brantford, Ont., Can.....	\$31,294	\$32,909
Titusville Electric Traction Co., Titusville, Pa.....	44,431	49,031	Ogdensburg Street Ry Co., Ogdensburg, N. Y.....	33,509	32,880
Ft. Wayne & Springfield Ry. Co., Decatur, Ind.....		48,498	Peterborough Radial Ry. Co., Peterborough, Ont., Can.....	33,597	31,042
Easton & Washington Traction Co., Washington, N. J.....	52,546	48,476	Citizens' Electric Co., Eureka Springs, Ark.....	50,225	30,084
Nahant & Lynn St. Ry. Co., Lynn, Mass.....	47,325	48,247	Claremont Ry. & Ltg. Co., Claremont, N. H.....	51,998	¹⁷ 30,652
Egerton Tramway Co., Ltd., Stellerton, N. S., Can.....	46,466	47,229	Paris Traction Co., Paris, Ill.....		30,489
Coal Belt Electric Ry. Co., Marion, Ill.....	53,420	46,565	Waterville & Oakland St. Ry. Co., Waterville, Me.....	32,338	30,364
Pottstown & Reading Street Ry. Co., Pottstown, Pa.....	47,583	46,518	Penn Yann, Keuka Park & Branchport Ry., Penn Yann, N. Y.....	30,028	30,241
Berlin Street Ry. Co. (The), Berlin, N. H.....	44,512	45,806	Homestead & Mifflin St. Ry. Co., Homestead, Pa.....	30,300	30,151
Pittsburg & Allegheny Valley Ry. Co., Leechburg, Pa.....	51,531	45,757	Susquehanna Traction Co., Lock Haven, Pa.....	30,416	30,010
Athol & Orange Street Ry. Co., Athol, Mass.....	45,674	45,197	Kingston, Portsmouth & Catarauqui Elec. Ry. Co., Kingston, Ont., Can.....	30,693	29,712
New London & East Lyme St. Ry. Co., New London, Conn.....	43,756	45,170	Richmond & Chesapeake Bay Ry. Co., Richmond, Va.....		29,706
Escanaba Electric Street Ry. Co., Escanaba, Mich.....	47,043	44,398	DeKalb, Sycamore & Intcurban Traction Co., DeKalb, Ill.....	¹⁵ 44,195	¹⁶ 29,691
St. Francois County Ry. Co., Farmington, Mo.....		44,337	Bush Terminal R. R. Co., Brooklyn, N. Y.....	33,798	29,545
Lancaster Trac. & Pwr. Co. (The), Lancaster, O.....	44,826	44,149	Central Passenger Ry. Co., Atlantic City, N. J.....	32,094	29,488
Owosso & Corunna Elec. Co., Owosso, Mich.....	42,000	44,000	Eastern New York R. R. Co., Ballston Spa, N. Y.....	45,109	29,479
Lowell & Fitchburg St. Ry. Co., Lowell, Mass.....	38,725	43,745	Hornellsville & Canisteo Ry. Co. (The), Hornell, N. Y.....	26,152	29,355
Hannibal Ry. & Electric Co., Hannibal, Mo.....		43,458	Chicago, Harvard & Geneva Lake Ry. Co., Walworth, Wis.....	29,506	29,161
Westmoreland County Ry. Co., Pittsburg, Pa.....	46,997	42,870	Sharon & Newcastle St. Ry. Co., Sharon, Pa.....	30,838	29,030
Templeton St. Ry. Co., Templeton, Mass.....	44,265	42,669	Bangor & Portland Traction Co., Bangor, Pa.....	27,929	29,000
Hutchinson Interurban R. R. Co., Hutchinson, Kan.....		42,358	Blue Ridge Light, Power & Rys. Co., Staunton, Va.....	28,578	28,547
Meadville & Cambridge Springs Street Ry. Co., Meadville, Pa.....	40,924	41,911	Lewisburg, Milton & Watsonstown Passenger Ry. Co., Milton, Pa.....	28,151	28,546
Worcester & Holden St. Ry. Co., Holden, Mass.....	43,722	41,854	Guelph Radial Ry. Co., Ltd., Guelph, Ont., Can.....	28,304	28,304
People's Traction Co., Galesburg, Ill.....	38,717	41,440	Calais Street Ry. Co., Calais, Me.....	28,466	28,293
Chambersburg & Gettysburg Electric Ry. Co., Chambersburg, Pa.....	41,636	40,951	Philadelphia & Chester Ry. Co., Chester, Pa.....	30,445	28,267
East Taunton Street Ry. Co., Taunton, Mass.....	40,319	40,760	Henderson Traction Co., Henderson, Ky.....		28,103
Manchester & Nashua Street Ry. Co., Manchester, N. H.....		40,123	Tama & Toledo Electric Ry. & Light Co., Toledo, Ia.....		28,094
International Transit Co. (The), Sault Ste. Marie, Ont., Can.....	43,744	40,019	Ware & Brookfield Street Ry. Co., Ware, Mass.....	25,673	27,502
Dubois Electric & Traction Co., Dubois, Pa.....	39,773	39,407	Omaha, Lincoln & Beatrice Ry. Co., Lincoln, Neb.....	26,612	26,956
Montgomery Traction Co., Norristown, Pa.....	39,526	39,216	Keene Electric Ry. Co., Keene, N. H.....	28,077	26,694
Toronto Suburban Street Ry. Co., Toronto Junction, Ont., Can.....	36,257	39,010	Marcellus & Ostica Lake Ry. Co., Marcellus, N. Y.....	23,597	26,557
Kankakee Electric Railway Co, Kankakee, Ill.....	22,456	38,796	Granite City Ry. Co., St. Cloud, Minn.....	27,098	26,492
Port Jervis Electric Light, Power, Gas & R. R. Co., Port Jervis, N. Y.....		38,478	Dedham & Franklin Street Ry. Co., Dedham, Mass.....	23,248	26,212
Trans-St. Mary's Traction Co., Sault Ste. Marie, Mich.....		38,141	Cornwall Elec. Ry., Lt. & Pwr Co. (The), Cornwall, Ont., Can.....	25,814	26,244
Buffalo & Williamsville Electric Ry. Co., Williamsville, N. Y.....	36,603	37,977	Jersey Shore Electric Street Ry. Co., Jersey Shore, Pa.....	24,065	26,233
Haverhill, Plaistow & Newton St. Ry. Co., Plaistow, N. H.....	36,964	37,681	Hummellstown & Campbellstown Street Ry. Co., Hershey, Pa.....	24,126	26,101
Portland & Brunswick Street Ry. Co., Brunswick, Me.....	45,447	37,672	Latrobe Street Ry. Co., Latrobe, Pa.....	27,415	26,074
Sunbury & Northumberland Electric Ry. Co., Sunbury, Pa.....	29,575	37,523	Pawtucket Valley St. Ry. Co., Westerly, R. I.....	35,927	25,979
Vallamont Traction Co., Williamsport, Pa.....	34,705	36,972	Amesbury & Hampton Street Ry. Co., Amesbury, Mass.....	26,187	25,964
Grand Valley Ry. Co., Brantford, Ont.....	41,064	36,947	Plattsburg Traction Co., Plattsburg, N. Y.....	25,522	25,796
Marlborough & Westborough St. Ry. Co., Westborough, Mass.....	31,253	36,600	Danville & Bloomsburg Street Ry. Co., Grovania, Pa.....	28,864	25,093
Berlin & Waterloo St. Ry. Co., Ltd., Berlin, Ont., Can.....	36,571	36,215			
Carbon Transit Co., Mauch Chunk, Pa.....	32,520	35,783			
Windsor, Essex & Lake Shore Rapid Ry. Co. (The), Kingsville, Ont., Can.....		35,585			
Millville Traction Co., Millville, N. J.....	37,186	34,565			
Sherbrooke St. Ry. Co., Sherbrooke, Ont., Can.....	32,899	34,132			
Chambersburg, Greencastle & Waynesboro Street Ry. Co., Waynesboro, Pa.....	53,428	33,924			
Laconia Street Ry. Co., Laconia, N. H.....	32,851	33,722			
Troy & New England Ry. Co., Troy N. Y.....	33,463	33,355			

*Income derived from securities owned; ¹covers 11 months' operation; ²covers 13 months' operation; ³for Brooklyn Heights R. R. only; ⁴consolidated report of the Denver & Northwestern Ry.'s properties; ⁵Receiver's statement, June 12 to Sept. 30, 1908; ⁶Receiver's statement, June 25 to Dec. 31, 1908; ⁷1908 figure includes West Shore R. R.'s electrified division; ⁸net earnings; ⁹covers partly completed road only; ¹⁰operation from Feb. 26 to June 30, 1908; ¹¹figures are for Greensboro Electric Co.; ¹²covers only 7 months' operation; ¹³ operation from Nov. 12, 1906, to June 30, 1907; ¹⁴covers 14 months' operation; ¹⁵includes gas, light and heat returns; ¹⁶does not include gas, light and heat returns; ¹⁷1908 figures do not include lighting plant returns.

LATEST DEVELOPMENTS IN ELECTRIC RAILWAY APPARATUS*

BY C. D. EVELETH, GENERAL ELECTRIC COMPANY

Among the latest developments in interurban railroading the performance of the 1200-volt system stands out prominently. In many ways it has proved to be a remarkable advance in economy, both in first cost and cost of maintenance, while the perfection of the system as shown by operation is the most phenomenal of any radical change in methods as yet applied to electric railways.

Without exception the results with 1200 volts have been successful and the apparatus has given the manufacturing company no more trouble than do the standard 600-volt equipments after they leave the factory. This is remarkable when one considers the long experience and the successful operation of the present interurban 600-volt system. There are several fundamental reasons for the success with 1200 volts. It is different in few details from the standard 600-volt system and as there are no radical changes, experience on the 600-volt roads has been directly applicable. With the exception of the duty on circuit-breakers and control switches, the problem is purely one of insulation, a simple condition to meet.

The 1200-volt interurban railway system has been installed on the four roads named below. The statements regarding performance are based on experience, and some tests made to determine the performance of substation apparatus under abnormal conditions.

Indianapolis & Louisville.—Consists of a 41-mile section operated at 1200 volts and some foreign operation over 600-volt tracks in Louisville. Country ranges from slightly rolling at the northern end to a rather hilly section at the south. This road operates under representative interurban conditions.

Indianapolis, Columbus & Southern.—Principal operation, 600 volts direct current, but runs cars to Louisville over the tracks of the Indianapolis & Louisville Railway.

Pittsburgh, Harmony, Butler & Newcastle Railway.—There are 73 miles of single-track operated at 1200 volts and about 30 minutes of 600-volt city running in the city of Pittsburgh. The natural difficulties have forced the railway to adopt sharp curves and frequent grades of 3 to 6 per cent. Conditions of service unusually severe, as cars are either running with brakes on down-hill or accelerating up-hill most of the time. In Butler there is a 7.9 per cent grade at the end of a 13-mile stub-end trolley feed. Equipments which operate well on this line should give satisfaction anywhere.

Central California Traction Company.—Six hundred-volt operation in the city of Stockton. The rest of the system is operated at 1200 volts from a third-rail. Country, level; schedules, moderately severe.

OPERATION OF 1200-VOLT LINES

Maximum economy is obtained when the entire road can be operated from single direct-current station located at the center of distribution, doing away with all high-tension wires and substations; such is the case on the Indianapolis & Louisville line, where the stub-end feed is 21 miles one way and 20 miles the other way from the power house. As will be noted from the schedule speed performed and the level running speed of the car, the voltage must be reasonably good, better than on the average 600-volt interurban road. In this station each generating unit consists of two 300-kw, 600-volt machines connected in series. There has been absolutely no trouble with this generating outfit from an electrical standpoint and it is a matter of record that the power house in over a year has delivered power to the line continuously, except when ordered off by the train dispatcher or during momentary interruptions when feeder circuit-breaker has blown from overload. The switchboard is extremely simple, consisting of panels for the generators and two feeders. There has been no trouble of any description with the switchboard apparatus.

On the Central California Traction Company's line power is purchased at 60 cycles and changed to 1200-volt direct current through a motor-generator set, the direct-

current generator being wound directly for 1200 volts. At first some trouble was experienced with the arc holding over in case of a bad short-circuit, but this has been entirely overcome by better protection of brush-holders.

On the Pittsburgh, Harmony, Butler & Newcastle line power is generated three-phase, 13,200 volts, 60 cycles, and transmitted directly to motor-generator substations without step-up or step-down transformers. Experience in this power house has been the same as for any 60-cycle power installation and requires no comment.

There are no special features in connection with transmission between power house and substations for 1200-volt work, but attention might be called to the fact that either 60-cycle or 25-cycle power may be used.

The existing substations are operated either with 1200-volt motor-generator sets, the direct-current machine being wound directly for 1200 volts, or motor-generator sets with two 600-volt machines connected in series. The preference and tendency at the present time is for two 600-volt commutators in series since the same set is frequently called upon to supply not only 1200 volts for the interurban running, but 600 volts for use in city service, the substation being located between the city and interurban sections. While there are not as yet any 1200-volt roads operating with rotary converters, this will probably be the most common form of substation on account of the higher efficiency. Tests under all conditions corresponding to operation, including short-circuits with various combina-

	J. & L., I., C. & S.,		P., H., B. & N., C. C. T.,	
	600, 1200 Volts.	600, 1200 Volts.	600, 1200 Volts.	1200 Volts.
Months in operation.....	21	12	12	14
Miles of track.....	41	41	73	16
Total number of passenger cars.....	10	3	12	4
Number required for time-table.....	5	2	8	3
Average daily car-miles operated.....	1,650	860	3,025	900
Miles per car per day.....	165	286	252	225
Miles per car in service.....	330	430	378	300
Stops per mile local service.....	.45	.8
Schedule speed m.p.h.—locals*.....	27.8	...	22	21
Stops per mile limited.....	.12	.12	.1	...
Schedule speed m.p.h.—limited*.....	38.4	38	31	...
Speed level track with avge. voltage.....	42	42	45	43
Diameter car wheels, inches.....	33	33	36	.33
Acceleration m.p.h.p.s.....	1.76	1.76	1.6	...
Motors horse-power rating.....	75	75	75	75
Armature speed free running.....	940	940	932	970
Motors open or closed.....	Closed	Closed	Closed	Closed
Condition.....	Excellent	Excellent	Excellent	Excellent
Motor voltage.....	600	600	600	1,200

*Speeds given are for interurban section.

tions of conditions, have shown that there is no reason to anticipate any more trouble with two 600-volt converters operating in series as a unit than there is with converters operating in parallel. It may be of interest to know that six sets, each consisting of two 750-kw rotary converters in series, have been sold to the Southern Pacific Railway Company for its Oakland-Alameda division; that 15 300-kw converters for series operation will be used on the Washington, Baltimore & Annapolis road, and that similar arrangements are contemplated for several other roads under construction.

Motor-generator substations on the Pittsburgh line have been found no more difficult to operate than standard 600-volt converter stations, and the same class of substation operators have been employed at the wages customary for 600-volt substations.

OVERHEAD CONSTRUCTION

At Pittsburgh, Mr. Bryan and his associates have developed an especially interesting overhead construction which has proved admirable for the service on his road. On the other roads using overhead trolley standard 600-volt material has been used, generally by the addition of strain insulators in series with standard hangers to give double insulation. Such constructions have given no trouble and may be relied upon. On none of the roads has a case been known where service has been interrupted due to a trolley grounding, showing that the 1200-volt overhead system is as reliable as the 600 volts. It has been found in case of the failure of an insulator or a trolley becoming grounded to a bracket arm that the insulation of the pole itself is sufficient to prevent leakage which would interfere with service.

The Central California Traction Company uses an under-

*Abstract of a paper read before the Street Railway Association of the State of New York, Bluff Point, N. Y., June 29-30, 1909.

running third-rail very similar to that used in the New York Central terminal electrification. The rail is standard section, 40 lb. per yard and is supported on ties 12 ft. apart. The operation has been successful from the start, and the maintenance has been practically nothing up to the present time.

No difficulty has developed in working on either 1200-volt trolley or third-rail, and it has been found unnecessary to take off power when making repairs.

A typical weight distribution for a 1200-volt interurban car equipment is as follows:

Car body	30,000 lb.
Trucks	17,000 lb.
Electrical equipment	20,000 lb.
Heaters, brakes, etc.	3,000 lb.
Total tons	35
Seating capacity, 50 passengers, plus baggage compartment, or 60 passengers, without baggage compartment.	

The control is series-parallel Type M, additional rupturing capacity of contactors being obtained by using more breaks in series.

Six hundred-volt power for operation of control and lighting circuits is obtained by a small direct-current compensator or dynamotor which operates automatically from the 1200-volt trolley. This machine has liberal bearings, transmits no power through its shaft, the armature running free like a rotary-converter armature, and is not giving the slightest trouble.

By the adoption of 1200 volts and winding the motors for 600 volts on each commutator, the problem of operating on both 1200-volt and 600-volt trolleys has been much simplified. Cars by using 1200-volt connections may be run on the 600-volt sections at half speed with good economy for city service, or at full speed with all motors in parallel where there are 600-volt interurban sections.

The control is giving entire satisfaction and the troubles from the start have been of a trivial nature, such as snow causing rheostats to ground, a few cases of grounded 1200 leads punctured by lightning, etc.

The trolley-wheel life is somewhat longer than with similar 600-volt service, averaging 5000 or 6000 miles.

MAINTENANCE OF ELECTRICAL EQUIPMENT

Up to the present time there has not been a failure of insulation requiring replacement of a single armature coil or field coil in any motor. One of the principal roads carries no motor repair parts of any description except armature and axle bearings.

With 600 volts on each motor, with two in series, it is evident that when a motor slips the car wheels it will be subjected to abnormal voltage and speed. In meeting this mechanical condition in the design it has been found that the low armature speed has practically eliminated armature-bearing trouble and in meeting the commutating requirement the performance of the motors in operation has shown them to be the most perfect commutating railway motors which have ever been built.

Brush life in a railway motor is the criterion of its performance, since commutation, commutator wear and exposure of windings to dirt, etc., are all dependent upon this item. The actual life of brushes on 600/1200 motors has not yet been determined as on no road have any brushes as yet worn out, though a few have been replaced on account of breakage.

Some sample brushes taken from a motor on the Pittsburgh, Harmony, Butler & Newcastle line, which operates under the most severe interurban conditions, have run approximately 70,000 miles and show 1/8 in. wear. Seven-eighths inches may be worn off before the brush need be thrown away. It is, therefore, safe to assume that the life in some cases may be over 200,000 miles.

No commutators have been reslotted and none has been reduced in diameter over 1/32 in. by wear.

SUMMARY

1. First Cost.
Generally decidedly lower than for 600 volts, as less copper is required and fewer substations.
2. Reliability.
In operation the equipments have in all cases proved as reliable as the best 600-volt equipments.
3. Maintenance.
Has proved as low, or lower, than for 600 volts, due to

fewer substations, greater distribution efficiency and low motor armature speeds.

4. Safety.

There have been no fatalities from employees or the public coming in contact with trolley, third-rail or station apparatus.

5. Flexibility.

There are many places where the 1200-volt trolley can be applied to existing 600-volt systems; an extension of 10 to 15 miles on present lines can be made by the simple addition of a 600-volt converter insulated for 1200-volt operation and connected in series with the machines in existing 600-volt stations which will then feed the trolleys from both 600-volt and 1200-volt busbars. This makes a simple and economical arrangement without additional substation attendants.

The 600/1200-volt motors can be made in small or large sizes to suit all classes of service.

The success of the 1200-volt system is assured. It will probably be as common as 600 volts for interurban roads in a very few years. There are now either in operation or under contract eleven (11) 1200-volt railway systems equipped with 50-hp, 75-hp and 150-hp motors.

LATEST IMPROVEMENTS IN ELECTRIC RAILWAY APPARATUS*

BY J. L. DAVIS, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

Two years ago in papers by Messrs. Renshaw and Hill before this association the advantages of the interpole construction for railway motors were set forth. Subsequent experience with several hundred thousand horse-power of these motors in service has more than substantiated the claims made for them. A brief resumé of these claims may be of interest.

The greater percentage of electrical troubles in a motor arise from the faulty collection of the current at the commutator, and they commence with the sparking, which burns away the copper and the brush, causing high mica, irregularity and roughness of surface, flashing, break-down of insulation from carbon and copper dust, and deterioration of brushes, brush-holders and commutators. In a non-interpole motor, sparking is due primarily to stray magnetic fields, produced by the magnetizing power of the armature winding. These fields are not useful in producing actual power at the axle, and are sources of trouble, as the coil connected to adjacent bars of the commutator, on which the brushes lie, cuts these stray fields and produces a voltage and a strong extra current under the brush which short-circuits the coil. As the brush leaves the commutator bar, the voltage and the extra current induced produce a spark. This spark is of a very destructive nature to both brush and commutator, and especially so if heavy overloads are put on the motor.

The interpoles are small poles placed between the main poles, and excited by coils placed permanently in series with the armature, and so connected as to oppose the effect of the armature winding. The field produced by the armature is thus neutralized and consequently all sparking is stopped. As the same current goes through both interpole and armature coils, the sparking is annulled at all loads within the operating range of the motor.

The ability of an interpole motor to commutate the current is remarkable. On a 65-hp motor, rated at 500 volts, and 100 amp a load of 300 amp at 750 volts can be momentarily carried without showing the least sparking. At any ordinary speed this voltage may be thrown on and off without producing a flash or serious spitting at the brushes. The interpole motor will establish its right to survive if for no other reason than its ability to withstand the abuse of the motorman.

Electric braking, owing to severe abuse of the motors in the past, has had a limited field of application, but with the advent of the interpole motor and the modern designs of traction brakes, this method of braking will become more popular.

* Abstract of a paper read before the Street Railway Association of the State of New York, Bluff Point, N. Y., June 29-30, 1909.

The interpole construction also offers the possibility of speed control, through weakening the field strength, and thus largely reducing the rheostatic losses in starting up. The gain of this economy in power consumption in city service is sufficient to justify the extra complication, and led once in the early days to the introduction of shunted-field motors. This type rapidly passed out of favor, due conjointly to the inability of the older types of motors to properly commutate the loads under these conditions and also to the introduction of the series-parallel control, which gave greater efficiency in acceleration.

In heavy elevated and subway service with frequent trains and stops, and where the motor power required is large, the use of the interpole motor offers a possibility of a material saving in power consumption, effecting very high economy not only in acceleration by shunted-field control, but also in braking by a system of regenerative control returning power into the line.

MAINTENANCE OF INTERPOLE MOTORS

After an experience covering a year and a half of operation, we find all claims for the interpole motor fully realized. On a large elevated system using 200-hp motor equipments, the commutators have maintained a very high degree of polish from the start, the wear on the commutators can hardly be detected, and the average life of brushes is found to be from 100,000 to 150,000 miles.

On another large system where motor flashes averaged at times 300 per month, and proved a most serious source of trouble and interruption to the service, the use of interpole motors entirely stopped the flashing from all causes. Records show inappreciable wear on the commutators, with a resulting brush life of over 100,000 miles. Motors are free from copper and carbon dust. Under these conditions electrical troubles have been practically eliminated.

The same good reports come from small motors in city service and indicate that the saving in the wear on commutators, brush-holders and brushes, together with increased reliability of service, will many times over pay for the extra cost of the interpole construction. Operating records show a brush life of 60,000 to 70,000 miles with the softer grades of carbon brushes.

The general troubles from commutation on the non-interpole motors have been enormously reduced by the expedient of slotting out the mica in the commutator below the surface and by the adoption of a softer brush with a larger graphite content and somewhat lower brush tension. Many operating companies which have been led to adopt this method are most enthusiastic over the results obtained. Operating records show that where 10,000 miles was a good mileage without slotting, the brush life runs from 20,000 to 30,000 miles with slotting, and the commutators do not have to be turned down more than one-third as often. Great improvements have been made in the quality and strength of carbon brushes. Operating engineers are finding out that there is economy in the use of a high-grade carbon brush.

SOLID FRAME MOTORS

The increasing use of larger cars with heavy motor equipments and the rapidly extending practice of retiring equipments for general overhauling at regular periods, are bringing the solid-frame motor more and more into general favor. Pit work in making repairs is being abandoned on these double-truck cars, and with an operating life of motor equipments of later design greatly overlapping the periods between overhauling, the less accessibility of the solid-frame motor for repairs has become much less of a factor than the sturdy mechanical advantages gained by the box-frame design. In the past year the three largest individual orders for purely city service motors have been for the box-frame type.

Of great importance in increasing the length of time between general overhauls is the use of higher grade and longer life material in the pinions and gears. For a small additional cost the steel of the pinion can be put through special processes and treatments which will add to its life 33 to 50 per cent. The solid cast-steel gear is coming more and more into favor, and with the general introduction of the annealed and specially treated cast-steel gears, the principal objection to the use of solid gears should be overcome. The annealing of the casting toughens

the fiber, makes it finer of grain, and at the same time eliminates shrink strains and other weaknesses.

On heavy equipments, where the design is limited, the material must be carefully selected for strength, wear and toughness. In such gears wrought-tire steel rims specially treated are shrunk on annealed cast-steel centers.

The improper meshing of gears and pinions from wear on them, and in the armature and axle bearings, is recognized as being the cause of rapid deterioration of the motor armatures under the excessive vibration, and means are taken to increase the life of the gearing and armatures by the use of higher-grade materials, the protection of bearings by proper dust shields and allowing less wear on the teeth.

An attempt to make the armature windings more compact and resistant to vibration as substantially as in the larger strap-wound armatures, has led to the introduction of the two-turn strap winding for the smaller armatures. This winding packs very solidly in the slot and on the ends. The straps are molded side by side around the whole coil, and there are no crossings of a single strap on another to offer edges, as in a wire-wound coil, to cut through the insulation in winding or to abrade through under vibration. This type of winding marks as distinct an improvement over wire windings as has been given by the substitution of flat strap windings in the field coils of smaller motors for wire windings. Interpole motors of recent design from 50 to 100 hp capacity are provided with windings of this two-turn, strap-wound type.

IMPROVEMENTS IN CONTROL APPARATUS

It is desirable to remove the possibility of arcing in the platform controller. The controller can be so arranged as to break the arc on a separate auxiliary contactor under the car. In a recent design this contactor is an electro-pneumatic switch, operated from a storage air tank and controlled by a valve magnet, energized through a high resistance from the trolley circuit. The storage air tank has a capacity sufficient to provide enough air pressure after standing several days to operate the switch. This system can only be applied on cars with air brakes.

The complications of the entirely automatic multiple-unit control become of less consequence the better the conditions of inspection and maintenance. For smaller city and interurban roads with less favorable conditions of supervision, the control can be greatly simplified by eliminating all automatic features and arranging it for direct operation at the will of the motorman.

ELECTRIC LOCOMOTIVES

While the connecting rod has been a long-established and favorite method of transmission with the steam-railway engineer, the electrical engineer has exploited to the greatest degree the advantages of a uniform torque produced by the motor and gearing. There is a general tendency toward two-motor equipments rather than four-motor equipments, on account of the lower first cost, higher efficiency, less weight and maintenance of the two-motor equipment. At the same time it is desirable to utilize the full tractive effort of all the wheels for acceleration and braking. A large city system, after experimenting with the side-rod method of drive, has recently placed in service a large number of equipments of this type.

While this device has been often proposed in the past for heavy high-speed locomotives, the development of the electric locomotive has been along the lines of the electric car with the motor on the axle. The dangers of having a heavy motor or armature pounding at the rails from a low position over the track were not fully realized until recently. The use of connecting rods enables the motor to be mounted up in the cab where it is easily accessible and provides a high center of gravity with as light and unrestricted running gear and wheels as possible—two essential requisites for heavy high-speed operation.

The Pennsylvania Railroad Company has adopted a design of this type for its powerful direct-current electric locomotives to be used in hauling trains through the tunnel into Manhattan. The motor equipment consists of two large motors, each individually connected to two 68-in. coupled drivers through an intermediate countershaft placed forward of the wheels.

SINGLE-PHASE SYSTEMS

No discussion of the improvements in railway apparatus during the last two years would be complete without some mention of the single-phase system. Although the system was well developed prior to this period and no essential changes have been made other than in details of construction, such as are continually being made in every class of apparatus, new roads have been installed and additional operating experience gained. Several of the earlier installations have been in operation for over four years and have thus reached a point where they may be reviewed from the standpoint of the accountant and the financier and the results relied upon.

The economies in first cost and the saving in power and substation attendance which can be effected in the case of interurban and other heavy electric railway lines by the use of the single-phase system can very readily be demonstrated conclusively by means of calculations or on a test track, but many conservative operators, educated to regard with suspicion any new system or device, have hesitated to consider the single-phase system until actual operating costs from existing lines could be obtained. Accurate figures of this kind for several different roads are now available and bear out to a remarkable degree the predictions made in advance by the promoters.

One of the single-phase lines referred to lies partly in New York State, and the figures given form a part of the records of the Public Service Commission. This line is the Warren & Jamestown Street Railway Company, which operates 22 miles of road between Warren, Pa., and Jamestown, N. Y. The road owns a total of six cars, each equipped with four 50-hp single-phase motors, with hand-operated controllers, and weighing complete, but without load, approximately 29 tons. The line was started during the summer of 1905, and during the year ending June 30, 1907, a total of 284,886 car-miles were run, which was increased during the year ending June 30, 1908, to 296,804. The accounts are kept upon the standard association basis and showed a total operating expense for 1907 of 14.8 cents and for 1908 of 13.9 cents per car-mile. These costs are remarkably low for a small interurban railway and would have been considerably greater had the direct-current system been used. From an engineering standpoint also the mileage record of the cars is a good one, the average per car per year being approximately 47,500 for the first year and 49,500 for the second. These figures give a good indication of the reliability of the apparatus, since with the speeds and service in force on this line such a mileage per car would be impossible if much time was spent in the shop.

The second single-phase line for which operating costs are available is that of the Indianapolis & Cincinnati Traction Company, which operates 24 cars over 108 miles of line between Indianapolis and Connersville and Indianapolis and Greensburg, Ind.

This line was the first single-phase railway in the world to be started on a large commercial scale, and now is operated under conditions of speed and mileage per car which eclipse all other records. The cars weigh approximately 50 tons complete, without load, and are equipped with four 100-hp motors with multiple-unit control.

Certain limited cars on the line make the run of 58.3 miles between Indianapolis and Connersville in 1½ hours, or at an average speed of approximately 39 miles per hour between terminals. About 30 minutes of this time is required, moreover, for covering about 6 miles in Indianapolis, Rushville and Connersville, so that a little over 52 miles is covered in the remaining hour.

During the year 1908 the entire number of cars of this road averaged nearly 65,000 miles each and eight of the cars averaged nearly 99,000 miles each.

COST OF SINGLE-PHASE OPERATION

The entire cost of operation for this road on the standard Street Railway Association basis was approximately 15.5 cents per car-mile for the year 1908, and that of maintaining the electric equipment of the cars approximately 0.72 cent.

The economies which have been effected in the operation of this road by the single-phase system are clearly indicated by comparing its cost of operation with that of sev-

eral direct-current interurban lines also operating out of Indianapolis.

The following table gives comparative figures of total operating expenses (i. e., accounts Nos. 1 to 38, inclusive, of the American Street Railway Association classification) for the year ending Dec. 31, 1908, on a car-mile basis and also on a basis of the cost per mile of road:

	Miles of road.	Car-miles.	Op. exp. per mile of road.	Operating expenses per car-mile.
Terre Haute, Indianapolis & Eastern Traction Company:				
Danville Division.....	19.83	245,600	\$2,525.18	20.5c
Martinsville Division.....	30.18	441,275	3,037.05	20.8c
Northwestern Division.....	91.99	1,280,260	2,383.86	17.1c
Indianapolis, Columbus & Southern Traction Company.....	62.22	1,054,766.16	3,282.65	19.36c
Indianapolis, Crawfordsville & Western Traction Company (year ending June 30, 1908, the car-mileage for 1908 not being at hand).....	45.10	557,194.67	2,260.88	18.3c
Indianapolis & Cincinnati Traction Company.....	107.38	1,550,060	2,175.92	15.46c

It will be seen from these figures that in spite of the fact that the Indianapolis & Cincinnati Traction Company operates larger and heavier cars, equipped with more powerful motors and gives a considerably higher speed service, its costs of operation, both on a basis of car-miles and road-miles, were considerably less than those of its neighbors, which are typical high-grade roads under exceptionally capable management. Figures of this sort, which are now becoming available, have established the single-phase system on a basis where even the most conservative cannot hesitate to adopt it for roads where investigation shows that the conditions are suitable.

SCHOOLING OF TRAINMEN*

BY N. W. BOLEN, GENERAL SUPERINTENDENT, PUBLIC SERVICE RAILWAY COMPANY

All persons employed by railways in the transportation department as trainmen require sufficient training to be able to satisfactorily and safely perform their duties. After the employment superintendent has made his selections from the applicants presenting themselves, and after he has culled his selection again upon receiving the applicants' histories and letters from their indorsers, the so-called new men are ready for their training. The system followed generally by the street railways all over the country in their preliminary training of employees is fairly uniform. The embryo motorman is put on with an experienced man, who shows him the right way to handle the controller and brake, and after 10 days or two weeks the instructor reports that he has taught his student all the things which are necessary for him to know concerning the operation of a street car. Usually the student is then quizzed by a traffic officer, and upon his satisfactorily answering the various questions asked, his name is put upon the extra list and he is ready to go forth and either successfully pilot his car over the road or smash the first wagon which gets in the way.

The training of a conductor is similar to that accorded the student motorman, in that he is taught the duties by an experienced conductor in regular service. Usually there is little to be added to the instruction of a conductor beyond that which he obtains from actual practice in collecting and registering fares. The young conductor, unfortunately, usually learns many things from his brother conductors, and others, which are neither to his interest nor to that of his employer. The schooling of the motorman requires greater time and more careful supervision than is usually given him by the average superintendent of transportation.

PRELIMINARY TRAINING

A systematic education of trainmen should start with the date of their employment, and should continue until they withdraw from the service. The applicant for a position as motorman should receive his preliminary training in the use of brake and controller in a school room, and from a school teacher who should not only be an experienced

*Abstract of a paper read before the Street Railway Association of the State of New York, Bluff Point, N. Y., June 29-30, 1909.

trainman, but capable of imparting his knowledge, practical and theoretical, to the rawest recruit turned over to him for instruction. The student should then be placed on a car, preferably one equipped with hand brakes and operated on a side line, where, under the direction of an experienced motorman, he should be given practice in the actual operation of a car. After the student has become familiar with the operation of the hand brake and controller, he should be turned over to the motorman of a car operating on a heavy trunk line, where the service requirements are more severe, and air brakes are used. Upon the completion of his service under two or more motormen, and upon his having learned the routes and time points of lines in his division, and having received a certificate stating that fact, the student should be returned to the school room for examination. Upon passing this final examination he may be assigned to work as the transportation superintendent may direct.

Bearing in mind that in two weeks the student has grasped only the rudiments of his work, and that his various faults will rapidly develop when he is sent out alone on a car, then the real work of the instruction department begins. Certain employees, whether they be division superintendents, inspectors or instructors, should now begin their systematic work of following up the green motorman to ascertain his weak points and eradicate, if possible, his faults. This polishing process requires constant work and means daily hammering, with encouraging remarks interposed where they will do the most good. It is usually found that motormen who have been in the service for 15 years are as careless in some details as the rawest recruit. Old motormen have a proneness to overlook the notches on the controller, to misuse the air brake, to start the car before releasing the hand brakes, to take chances when passing wagons, and by at least a thousand and one things new men know nothing of, cause damage or expense. It is by following up and correcting these points that the school for trainmen can show its value. Lectures on the use and abuse of controllers, demonstrated with actual apparatus, together with a clear, practical statement about the equipment of power plants, "the reason why" for various operating rules, and also lectures on accidents resulting from careless operation, form the basis for continuous instruction work. As it is usually found that old trainmen, having once been forced to attend the school, come again voluntarily for further information, greater interest in their work is renewed, and frequently it is possible to note improvements in their methods. The effect, however, is not lasting unless the work is followed up by a constant day-by-day inspection, instruction and supervision. Below is given the method followed by the Public Service Railway Company, of New Jersey, in training motormen in the school of instruction, and also the instructions which are given to them by the chief instructor.

INSTRUCTION OF MOTORMEN

The student motormen, as previously stated, are employed by the superintendent of employment and assigned to the different car houses, where they are placed in charge of instructing motormen, who are the picked men in the service and who are allowed an extra compensation when instructing a student. A student is kept busy on the road from seven to 12 days, breaking in, on both hand and air-brake cars, and after all lines have been covered and the instructing motormen consider him competent, they sign his "breaking in card," which he receives at the time of his appointment. He is then sent to the school of instruction for examination, presenting his card to the chief instructor for identification. Three schools of instruction are maintained, one located at Camden, covering the men of the Southern Division; one in Newark, covering the Essex, Passaic and Central Divisions, and one at Jersey City, covering the Hudson Division. These schools of instruction are in charge of a chief instructor, who has two assistants, both practical men, who were formerly employed as motormen, promoted to road officers or inspectors, and then to assistant instructors, after receiving a thorough training by the chief instructor.

The schools of instruction are equipped with an exact duplicate of car platforms, on which are attached fender, arc headlight, controller, brake staff, fender trip and motorman's brake valve. In the center of the room is a trolley pole on a wire, with cables leading to an overhead circuit-breaker, fuse box and controller. On the floor is practically the equipment of a four-motor car, consisting of four dummy motors, upon each of which is a group of five lights—four white lights, representing the fields, and a center light, which is purple—representing the armature. Between motors Nos. 2 and 3 are three boxes of grid resistance on a frame represented by six red lights, all being wired to a K-6 controller as on a car. On the first position of the controller all lights on resistance and motors are lighted, and as the controller is notched lights on the resistance go out one at a time and lights on the motors become brighter, until the sixth position of the controller is reached, when all lights on resistance go out, which shows the running point of series when the current is going direct to the motors. When the controller is thrown to the seventh or first parallel position part of resistance (about two-thirds) is again picked up, when four red lights are shown on resistance, and as the controller is notched these lights go out one at a time for each position of the controller until the running point of parallel is reached, when the lights on the motors show very bright. For further illustration, diagrams showing how motors take current in series and parallel positions are exhibited on the walls. To fully complete the school for proper instruction, a full air-brake equipment and a truck with motor, pinion, gear and axle attached, have been installed. The terminals of the armature are uncovered to show where damage is done by failing to notch or recognize points on controller; also from starting and stopping car with a jerk, and to show how the current enters and leaves the armature with the reverse handle in different positions. A large horseshoe magnet with iron filings is used to give the student an idea of what causes an armature to revolve.

The student is started with what is called a "Students' Primer," which shows him, first, what is meant by a complete circuit, starting from the dynamo in the power house, how the current passes through the car, why it is necessary to have a complete circuit to operate anything electrical, what is meant by open circuit, short-circuit and ground; the proper names of the different equipment of a car so he can report intelligently any defects, avoiding any delay; standing position on platform and how to handle brake and controller; what to do before starting out of barn with car, etc. While going through the "Primer" with the student every move is illustrated by the machine, and students are requested to ask any questions on points which they do not thoroughly understand before taking up the oral examination, which consists of 100 questions, given below:

QUESTIONS FOR MOTORMEN

- Q. Have you read your book of rules?
- Q. Is ignorance of rules any excuse for violation of same?
- Q. Name principal parts of car necessary for operation of same:
 1. On top of car?
 2. On platform?
 3. Under car?
- Q. Where are motors located?
- Q. How many motors under car?
- Q. What work does controller perform in operating car?
- Q. When controller is turned on what causes car to start?
- Q. In starting out with car, what is it necessary to do?
- Q. What are series positions of controllers?
 1. Four-motor car, K-6 controller?
 2. Four-motor car, K-28 controller?
 3. Four-motor car, K-14 controller?
 4. Two-motor car, K-11 controller?
- Q. Are all motors getting all current on running point in series? If 500 volts in overhead wire, how divided?
- Q. What are multiple positions on controller?
 1. Four-motor car, K-6 controller?
 2. Four-motor car, K-28 controller?
 3. Four-motor car, K-14 controller?
 4. Two-motor car, K-11 controller?
- Q. Are all motors getting all current in running position multiple?
- Q. Course of current from trolley wheel to running rail?
- Q. What are the positions of reverse handle?
- Q. What are the running points on a K-6 controller?
- Q. What are the running points on a K-28 controller?
- Q. What are the running points on a K-14 controller?
- Q. What are the running points on a K-11 two-motor controller?
- Q. Before attempting to fuse a car, cut out motors or touch any part of electrical equipment, what is it necessary to do?
 - Q. Where is the resistance located?
 - Q. What is the meaning of the word resistance?
 - Q. How many leads to your resistance?
 - Q. Why is it dangerous to run car on resistance points?
 - Q. Why is all resistance on first position of controller?
 - Q. How notch controller?
 - Q. Why is it necessary to recognize every point on controller?
 - Q. What happens when controller is operated too quickly?
 - Q. If it becomes necessary to decrease the speed of car, would you attempt to notch your controller backward, and how proceed?
 - Q. Would you leave car on street at any time without locking controller, taking reverse handle and setting hand brake?
 - Q. Would you attempt to use power with brake on, and what does it mean?

- Q. Case controller is jammed, finger caught so it cannot be thrown to off position, how proceed?
- Q. From which end of car do motors start to number?
 1. On single-end car?
 2. On double-end car?
- Q. Where do you find motor switches?
- Q. How are motors coupled on switches in controller?
 1. Four-motor car?
 2. Two-motor car?
- Q. Would you attempt to reverse car except to avoid accident?
- Q. Do motors generate on reverse four-motor cars without notching controller?
- Q. Do they on two-motor cars, and what is it necessary to do?
- Q. Where is overhead switch or circuit-breaker located on car, and how throw and reset?
- Q. What is overhead switch or circuit-breaker placed on car for?
- Q. Where is fuse box located.
- Q. What would you do in case cable leading to overhead switch or fuse were burned out or disconnected?
- Q. In case you had finger so badly burned that it could not be adjusted to make contact, which finger could be taken off and used to best advantage?
- Q. What is fuse placed on car for?
- Q. In fusing car would you use any but standard size wire furnished by company, and what does using a heavier wire mean?
- Q. Is there any excuse for holding in or tying overhead switch, and what does it mean?
- Q. What will cause overhead switch or fuse to blow?
- Q. If you had a car which blew overhead or fused several successive times, what would you think was the cause, and how proceed?
- Q. Why throw controller to off position going over circuit-breaker?
- Q. Would you, in case power was off, attempt to notch controller to find out when power was turned on, and how proceed?
- Q. Car failing to move, how locate trouble, starting from trolley pole? How were you instructed?
- Q. How would you proceed to complete circuit on running rail in case of dirt on rail or off track?
- Q. If cable was disconnected at base of trolley, how proceed?
- Q. If car failed to start on first position controller, but started on second or third, where locate trouble, how proceed?
- Q. In case fire in any part of electrical equipment, what would you use to put out same?
- Q. How many points can you feed controller with one motor cut out on a two-motor car? With two motors cut out on a four-motor car?
- Q. Should trolley leave wire, what would you do?
- Q. What is result of dragging controller handle around when shutting off power?
- Q. Where does trolley cable tap on to controller?
- Q. How proceed down grade in case pole came off and brakes give out?
- Q. How proceed up grade in case pole comes off and brakes give out?
- Q. Would you allow car to coast or drift whenever possible? Give reason?
- Q. As soon as you discover any defect in motor which you cannot remedy, what is it necessary to do?
- Q. Electrical troubles as they develop, do they ever improve?
- Q. When disabled car is being pushed or pulled by another car, in what position would you set reverse handle and overhead switch?
- Q. What would you do in case you picked up loose wire in street and it caught in resistance or motor? How proceed?
- Q. What would you do in case you found broken trolley wire? How proceed?
- Q. Storage air—how charge?
- Q. Where is pump switch located?
- Q. Where is pump fuse located?
- Q. If pump failed to start, where locate trouble?
- Q. If you found air pressure going too high, what would you do?
- Q. Follow course of air from reservoir to brake cylinder?
- Q. How apply air to make ordinary service stop?
- Q. How release?
- Q. How apply air on down grade?
- Q. How apply air on bad rail?
- Q. Do you get better results with small application on bad rail?
- Q. What is it necessary to do when you find car sliding?
- Q. One bell means what?
 - Two bells mean what?
 - Three bells, car running?
 - Three bells, car standing?
 - Four bells, car running?
 - Four bells, car standing?
- Q. Case of obstruction on overhead wire, how signal conductor to pull pole?
- Q. Who may operate car while on line?
- Q. Which side of street stop for passengers?
- Q. Have you read bulletin relative to stopping on crosswalks, and what does it say?
- Q. Who is to throw derailing switches, and would you look back before starting car?
- Q. Car coming in opposite direction against facing point switch, would you attempt to move car until trucks of other car were clear of the point?
- Q. Who is allowed to ride on the front platform?
- Q. Would you attempt to make up excess amount lost time, and what does it mean?
- Q. How proceed in case of lightning?
- Q. Where is lightning arrester located on car, and what duty does it perform?
- Q. How proceed in case water on track?
- Q. Would you attempt, in case blockade, to move car right on top of leader, and what will happen if you attempt same?
- Q. How many feet give leader in case of above?
- Q. Under special work and around curves, what rate of speed run?
- Q. Is it advisable to stop car in a curve except to avoid accident? Give reason.
- Q. Is it necessary to make a full stop at all trolley and railroad intersections?
- Q. What is rule for operating car in foggy weather?
- Q. Why is it necessary to sign book at your respective car barns as to condition of car?
- Q. Pulling car into car barn, what is it necessary to do before leaving same?
- Q. What does red light being displayed mean?
- Q. How proceed approaching all street intersections?
- Q. How proceed passing standing car?
- Q. How proceed following wagon going same direction as car on track? How close get to wagon?
- Q. How proceed following car on independent line? How close approach?
- Q. In case you hear fire engines approaching, how proceed? Don't attempt to get ahead of your leader. Don't see how close you can get to wagon without striking same.

Don't see how near you can stand car on end when making stops.
 Don't see how many people you can throw down when starting car.
 PUBLIC SERVICE RAILWAY COMPANY.

After the oral examination the student is requested to leave the room while different parts of the machine are crippled or cut out. For instance, the reverse handle is placed at rest and the overhead switch or circuit-breaker thrown off, fuse is taken out, cable disconnected, base trolley, lamp or resistance unscrewed, causing open circuit, field lead light unscrewed, causing open circuit in that motor, etc. The student is then called in to locate these defects. He is also allowed to handle the machine, is shown how to throw out the overhead circuit-breaker and reset same, how to cut out motors, how to fuse car, how to splice cable, the movements he would make in case he was coming down hill and brake and power were gone, the course air pursues from the compressor to the atmosphere, how to make an application of the brakes, how to release, how to make an application on bad rail, what to do when wheels slide, etc.

The subject of prevention of accidents is also taken up thoroughly. The company has certain rules for insuring safe operation of cars, which may be summarized as follows: Shut off controllers at all street intersections 30 ft. before reaching the corner. In passing a standing car ring the gong and have the car under such complete control that it can be stopped in 2 ft. Remain at least 200 ft. behind the next car ahead. Remain at least 20 ft. behind a wagon on the track going in the same direction.

Occasionally the instructing motormen are called to the school in the evening and suggestions are made by the chief instructor for their government in handling students. Printed slips are distributed to them from time to time, with suggestions like the following:

Take more interest in the student, showing and telling him all you know about a car; remember he is watching every move you make and is going to operate a car as he sees you do. If you take chances he will do the same, and his judgment of distance may not be as good perhaps as yours, and he may get in trouble, but encourage him if he lacks confidence.

1. Show him where all switches and fuses are located.
2. Tell him proper names of the equipment of a car, so he can report intelligently condition of a car.
3. Show him the necessity of notching a controller, notch for notch, giving time on first and second positions, so as not to throw any passengers. A car which is started smoothly makes the best time.
4. Show him how to take off controller cover and throw back deflector. Warn him against trying to adjust fingers.
5. Show him how to knock off overhead switch or circuit breaker and to reset same.
6. Show him how to drop and reset fender.
7. Show him how to adjust arc headlight.
8. Tell him of the necessity for making a thorough examination of his car before leaving car house, trying brakes and controller.
 - (a) In following a wagon going in same direction as car on or near the track, if you remain at least twenty (20) feet behind wagon he will do the same.
 - (b) If you throw off your power for street intersections, anticipating a wagon coming out across the street, he will do the same.
 - (c) If you have car under control passing standing car, being able to stop in two feet, he will do the same.
 - (d) If you remain three hundred (300) feet behind your leader when running faster than series point speed, he will do the same.
 - (e) The neat and tidy condition of the instructing motorman, also keeping car in clean condition, is very essential as an example for the new man.
9. Show him the necessity of recognizing every point on controller at all times, even after shutting off for section insulator or circuit breaker.
10. Show him the necessity of allowing his car to coast or drift at all times whenever possible, saving machines and power and danger to motors if power is used when going down hill.
11. Show him points on lines where rail is bad and crosswalks are not to be blocked by car.
12. Tell him why he must cut out motors the minute any defect shows.
13. Tell him the necessity for reporting any defect on the car, so the car may be kept in good condition.
14. Have him properly instructed in making out accident reports, and in rendering every assistance possible in securing witnesses to all accidents.

INSTRUCT HIM, ABOVE ALL, TO TAKE THE SAFE SIDE AT ALL TIMES.

C. H. COE.
 APPROVED
 N. W. BOLEN, Supt. of Transportation.
 APPROVED
 R. E. DANFORTH, General Manager.

This school work occupies the last day of the student's breaking in, and if in the estimation of the chief instructor he is not then competent he is given an opportunity to break in for a few days longer, after which he again comes to the school for another examination, which is considered a final one. As a last test he is taken out with an assistant instructor on a car and given a trial run, and if found incompetent he is dropped as failing to qualify.

The student after leaving school is followed up for two or three days by the chief instructor or one of his assistants, and his movements carefully watched. If found

wanting in any way he is ordered to the school for further instruction.

Reports are received daily from inspectors of motormen who abuse the equipment or fail to follow out instructions. For first offense they are ordered to school when off duty, but on second offense are sent to the school with loss of time.

Student motormen who operate pay-as-you-enter cars are given an examination sheet regarding rules governing the operation of this type of car, which they are obliged to fill out, as follows:

QUESTIONS FOR MOTORMEN

The following questions apply to the operation of "pay-as-you-enter" cars.

1. Would you open front exit door before car had come to a full stop?
2. What exit door should be closed before starting car?
3. Is it necessary to keep front exit door closed at all times?
4. Would you allow any person to enter car through exit door?
5. On what signal would you stop car?
6. On what signal would you start car?
7. Under what conditions would it be necessary for you to call out "Front way out"?
8. Between what points are you allowed to use stools?
9. In case it becomes necessary for conductor to leave the car, how proceed?
10. Do you understand the operation of destination signs, and that it is necessary to examine same and see that they are set square?
11. When you receive four (4) bells from conductor, what does it mean?

(Signed).....

APPROVED Name.

..... Instructor.

APPROVED Supervisor.

.....

A conductor when employed by the superintendent of employment and assigned to a car house is given a "breaking-in card" and placed on a car with an instructing conductor, who permits him to do the actual work of collecting and registering fares under his direct supervision. After seven days if he finds the student able to do the work, he so certifies on the blank provided for that purpose. After the student works the various other lines of the division he is examined as to the rules, time points, etc., by a supervisory official, and his name is placed upon the working list. If the conductor is to work on a pay-as-you-enter line, his final examination is given by the chief instructor, who has the student try a written examination on the operation of pay-as-you-enter cars.

All further instructions received by the young conductor on the average railroad come to him in the form of admonition or reproof from an inspector and others whose duties require them to follow the operation of the car; and, beyond a few perfunctory warnings from the division superintendent, he is usually not given any attention so long as he properly collects and registers his fares.

TRAINING OF CONDUCTORS

An analysis of the accident statements of the average railway emphasizes the necessity for a more thorough schooling of the conductor. While collecting fares is an important duty of the conductor, it is by no means the only one, for in his keeping is the safety and comfort of the passengers. He must be conscious of the movements of all his passengers, and look after their safety when they do not do so themselves. He must be polite and courteous at all times, and it must be impressed upon his mind that he is the company's personal representative in dealing with the public, that upon him falls the burden of caring for the passengers and creating public opinion. The careless and heedless conductor in a day may undo the work of months, to say nothing of dissipating the profits of the corporation for a great length of time. The schooling, therefore, of the conductor should in a general way follow that above described for motormen. His work should be carefully scrutinized, he should be kept thoroughly alive to the rules and regulations, both in printed order and bulletins; he should receive regular and systematic instruction and advice concerning the improper operation of a car liable to result in an accident, and should be the subject of a daily, hourly and a continuous supervision.

Loyalty is the one trait necessary in the employee, and in these days is especially difficult to create and retain in the trainmen. Good discipline is the key to successful operation, and good discipline depends upon the willingness to do, on the part of the trainmen, as well as upon the methods followed in directing his work. Fair treatment,

with a firm, kindly personal hand administering instruction and corrective reproof—equal or uniform treatment for all—the instant correction of evils and unfair acts from whatever source are prime necessities where loyalty is desired. Loyal employees obey the rules cheerfully, take an interest in their work and are amenable to kindly discipline.

ELECTRIC RAILWAY ACCOUNTING *

BY A. L. LINN, JR.

In presenting to the convention this paper, which is based upon six months' experience with all three schedules of the new classification, my first wish is to express my hearty appreciation of the co-operation and assistance of my associates in its preparation.

On Dec. 22, 1908, the commission issued an order to the effect that on and after Jan. 1, 1909, every electric railroad corporation and every street railroad corporation shall keep, "so far as the said accounts are pertinent to the facts and circumstances of the corporation," the accounts prescribed in Schedule A of the uniform system of accounts for street railroads thereto annexed, and that on July 1, 1909, Schedules B and C shall be adopted; corporations having gross earnings in excess of \$500,000 annually to use the full detail of the classification, which contains, in Schedule A, 94 capital accounts; in Schedule B, 160 income accounts, with 17 subdivisions, 22 of these accounts for operating revenues, 6 for non-operating revenues; 110 with 6 subdivisions for operating expenses, 1 for taxes, with subdivisions for different classes, 1 with 7 subdivisions for non-operating revenue deductions, 10 with 4 subdivisions for income deductions and 10 for appropriations; in Schedule C, 9 accounts covering mileage and 1 account for car-hour statistics.

Corporations having gross earnings less than \$500,000 and more than \$100,000 per annum may use a condensed scheme, which contains, in Schedule A, 94 capital accounts; in Schedule B, 117 income accounts, 22 of which are for operating revenues, 6 for non-operating revenues, 67 with 6 subdivisions for operating expenses, 1 for taxes with subdivisions for different classes, 1 with 7 subdivisions for non-operating revenue deductions, 10 with 4 subdivisions for income deductions, and 10 for appropriations; in Schedule C, 9 accounts covering mileage and 1 account for car-hour statistics.

Corporations having gross earnings of less than \$100,000 per annum may use a second condensed scheme, which contains, in Schedule A, 94 capital accounts; in Schedule B, 100 income accounts, of which 22 are for operating revenues, 6 for non-operating revenues, 50 with 6 subdivisions for operating expenses, 1 for taxes with subdivisions for different classes, 1 with 7 subdivisions for non-operating revenue deductions, 10 with 4 subdivisions for income deductions, and 10 for appropriations; in Schedule C, 9 accounts covering car-mileage and 1 account for car-hour statistics.

Where the accounts of both large and small companies are kept in the same office it has proved advisable that the accounts of all the companies be kept on the basis of the detailed scheme. The average electric railroad company required to keep its accounts in detail will find applicable approximately 111 of the accounts in Schedule B. It should be remembered that if the experience of accounting corporations with this classification shows opportunities for improvements, such improvements will receive the careful consideration of the commission and its representatives.

The classification adopted by the American Street & Interurban Railway Association and formerly used by the governing commission in this State provided 40 capital accounts and 63 income accounts, 12 of the latter for operating revenues, 4 for non-operating revenues, 38 for operating expenses, 8 for income deductions and 1 appropriation account, the corporations subdividing them for the purpose of furnishing the heads of various departments with detailed information as desired, the number of subdivisions varying to suit conditions and requirements. If it be desired to subdivide any of the accounts in the new

*Abstract of a paper read at the meeting of the Street Railway Association of the State of New York, Bluff Point, June 29 and 30, 1909.

CLASSIFICATION FOR CORPORATIONS HAVING GROSS REVENUES OVER \$500,000

CLASSIFICATION FOR CORPORATIONS HAVING GROSS REVENUES LESS THAN \$500,000 AND MORE THAN \$100,000

CLASSIFICATION FOR CORPORATIONS HAVING GROSS REVENUES LESS THAN \$100,000

Public Service Comm'n Acct No.	Account No.		Public Service Comm'n Acct No.	Account No.		Public Service Comm'n Acct No.	Account No.	
<i>Maintenance of Way and Structures</i>			<i>Maintenance of Way and Structures</i>			<i>Maintenance of Way and Structures</i>		
701	1	Superintendence of Way and Structures.	701	1	Superintendence of Way and Structures.	701	1	Superintendence of Way and Structures.
704	2	Ballast.						
705	3	Ties.						
706	4	Rails.						
707	5	Rail Fastenings and Joints.						
708	6	Special Work.	703	2	2-10 Roadway and Track Repairs.	703	2	2-10 Roadway and Track Repairs.
709	7	Underground Construction.						
710	8	Roadway and Track Labor.						
711	9	Paving.						
712	10	Miscellaneous Roadway and Track Expenses.						
713	11	Cleaning and Sanding Track.	713	3	11 Cleaning and Sanding Track.	C-713	3	11-12 Cleaning and Sanding Track and Removing Snow.
714	12	Removal of Snow, Ice and Sand.	714	4	12 Removal of Snow, Ice and Sand.			
716	13	Repairs of Tunnels.	715	5	13 Other Repairs of Way.	715	4	Other Repairs of Way.
717	14	Repairs of Elevated Structures and Foundations.						
718	15	Repairs of Bridges, Trestles and Culverts.						
719	16	Repairs of Crossings, Fences and Signs.						
720	17	Repairs of Signals and Interlocking Systems.						
721	18	Telephone and Telegraph Repairs.						
722	19	Other Miscellaneous Way Expenses.	723	6	14-24 Repairs of Electric Power Line.	723	5	13-24 Repairs of Electric Power Line.
5-522	20	Pole and Fixture Repairs.						
S-523	21	Underground Conduit Repairs.						
S-524	22	Transmission System Repairs.						
S-527	23	Distribution System Repairs.						
724	24	Miscellaneous Electric Line Expenses.						
725	25	Repairs of Buildings and Structures.	725	7	25 Repairs of Buildings and Structures.	725	6	Repairs of Buildings and Structures.
726	26	Other Operations—Dr.	726	8	26 Other Operations—Dr.	726	7	Other Operations—Dr.
727	27	Joint Way and Structures—Dr.	727	9	27 Joint Way and Structures—Dr.	727	8	Joint Way and Structures—Dr.
728	28	Other Operations—Cr.	728	10	28 Other Operations—Cr.	728	9	Other Operations—Cr.
729	29	Joint Way and Structures—Cr.	729	11	29 Joint Way and Structures—Cr.	729	10	Joint Way and Structures—Cr.
730	30	Depreciation of Way and Structures.	730	12	30 Depreciation of Way and Structures.	730	11	Depreciation of Way and Structures.
<i>Maintenance of Equipment</i>			<i>Maintenance of Equipment</i>			<i>Maintenance of Equipment</i>		
741	31	Superintendence of Equipment.	741	13	31 Superintendence of Equipment.	741	12	31 Superintendence of Equipment.
S-508	32	Repairs of Furnaces, Boilers and Accessories.						
S-509	33	Repairs of Steam Engines.						
S-510	34	Repairs of Hydraulic Power Plant.						
S-511	35	Repairs of Gas Power Equipment.	743	14	32-38 Repairs of Power Plant Equipment.	743	13	32-38 Repairs of Power Plant Equipment.
S-512	36	Repairs of Power Plant Electric Equipment.						
S-513	37	Repairs of Miscellaneous Power Plant Equipment.						
742G	38	Repairs of Cable Power Equipment.						
S-528	39	Repairs of Sub-Station Equipment.	S-528	15	39 Repairs of Sub-Station Equipment.	S-528	14	39 Repairs of Sub-Station Equipment.
743	40	Repairs of Passenger and Combination Cars.						
744	41	Repairs of Freight, Express and Mail Cars.	744	16	40-43 Repairs of Cars and Locomotives.	744	15	40-43 Repairs of Cars and Locomotives.
746	42	Repairs of Locomotives.						
747	43	Repairs of Service Cars.						
749	44	Repairs of Electric Equipment of Cars.	749	17	44-45 Repairs of Car and Locomotive Electric Equipment.	749	16	44-45 Repairs of Car and Locomotive Equipment.
750	45	Repairs of Electric Equipment of Locomotives.						
751	46	Repairs of Shop Machinery and Tools.						
753	47	Shop Expenses.	752	18	46-49 Miscellaneous Equipment Expenses.	752	17	46-49 Miscellaneous Equipment Expenses.
754	48	Repairs of Vehicles.						
755	49	Other Miscellaneous Equipment Expenses.						
756	50	Other Operations—Dr.	757	19	50 Other Operations—Dr.	757	18	Other Operations—Dr.
757	51	Maintaining Joint Equipment—Dr.	758	20	51 Maintaining Joint Equipment—Dr.	758	19	Maintaining Joint Equipment—Dr.
758	52	Other Operations—Cr.	759	21	52 Other Operations—Cr.	759	20	Other Operations—Cr.
759	53	Maintaining Joint Equipment—Cr.	760	22	53 Maintaining Joint Equipment—Cr.	760	21	Maintaining Joint Equipment—Cr.
760	54	Depreciation of Equipment.	761	23	54 Depreciation of Equipment.	761	22	Depreciation of Equipment.
<i>Traffic</i>			<i>Traffic</i>			<i>Traffic</i>		
771	55	Superintendence and Solicitation.						
772	56	Advertising.	770	24	55-58 Traffic Expenses.	770	23	55-58 Traffic Expenses.
773	57	Parks and Other Attractions.						
774	58	Miscellaneous Traffic Expenses.						
<i>Conducting Transportation</i>			<i>Conducting Transportation</i>			<i>Conducting Transportation</i>		
781	59	Superintendence of Transportation.	781	25	59 Superintendence of Transportation.	781	24	59 Superintendence of Transportation.
<i>Power</i>			<i>Power</i>			<i>Power</i>		
S-501	60	Power Plant Labor.	S-501	26	60 Power Plant Labor.	S-501	25	60 Power Plant Labor.
		a—Power Plant.			a—Power Plant.			a—Power Plant.
		b—Boiler Room Labor.			b—Boiler Room Labor.			b—Boiler Room Labor.
		c—Producer Labor.			c—Producer Labor.			c—Producer Labor.
		d—Engine Labor.			d—Engine Labor.			d—Engine Labor.
		e—Electric Labor.			e—Electric Labor.			e—Electric Labor.
		f—Cable Power Plant Labor.			f—Cable Power Plant Labor.			f—Cable Power Plant Labor.
S-525	61	Sub-Station Labor.	S-525	27	61 Sub-Station Labor.	S-525	26	61 Sub-Station Labor.
S-502	62	Fuel for Power.	S-502	28	62 Fuel for Power.	S-502	27	62 Fuel for Power.
S-503	63	Water for Power.	S-503	29	63 Water for Power.			
S-504	64	Lubricants for Power.	S-504	30	64 Lubricants for Power.			
S-505	65	Miscellaneous Power Plant Supplies and Expenses.	S-505	31	65 Misc. Power Plant Supplies and Expenses.			
S-526	66	Sub-Station Supplies and Expenses.	S-526	32	66 Sub-Station Supplies and Expenses.	28	63-67	Other Power Supplies and Expenses.
785	67	Horse Power—Revenue Car Service.	785C	33	67 Horse-power—Revenue Car Service.			
786	68	Power Purchased.	786	34	68 Power Purchased.	786	29	Power Purchased.
787	69	Jointly Produced Power—Dr.	787	35	69 Jointly Produced Power—Dr.	787	30	Jointly Produced Power—Dr.
788	70	Power Exchanged—Balance.	788	36	70 Power Exchanged—Balance.	788	31	Power Exchanged—Balance.
789	71	Other Operations—Dr.	789	37	71 Other Operations—Dr.	789	32	Other Operations—Dr.
790	72	Other Operations—Cr.	790	38	72 Other Operations—Cr.	790	33	Other Operations—Cr.
791	73	Jointly Produced Power—Cr.	791	39	73 Jointly Produced Power—Cr.	791	34	Jointly Produced Power—Cr.
<i>Operation of Cars</i>			<i>Operation of Cars</i>			<i>Operation of Cars</i>		
802A	74	Passenger Motormen.	802	40	74-77 Passenger Motormen, Conductors and Trainmen.	801	35	74-78 Conductors, Motormen and Other Trainmen.
802B	75	Passenger Conductors.						
802C	76	Horse Car Drivers.						
802D	77	Other Passenger Trainmen.						
803	78	Freight and Express Motormen and Trainmen.	803	41	78-79 Freight and Express Motormen and Trainmen.			
805	79	Miscellaneous Car Service Employees.						
806	80	Miscellaneous Car Service Expenses.	805	42	80 Misc. Car Service Employees and Expenses.			
807	81	Station Employees.	808	43	81-82 Station Employees and Expenses.			
808	82	Station Expenses.						
809	83	Car House Employees.	811	44	83-84 Car House Employees and Expenses.			
810	84	Car House Expenses.						
811	85	Operation of Signal and Interlocking Systems.	814	45	85-86 Operation of Signal and Telephone Systems.	805	36	79-89 Miscellaneous Transportation Expenses.
812	86	Operation of Telephone and Telegraph Systems.						
813	87	Express and Freight Collections and Delivery.	817	46	87 Express and Freight Collections and Delivery.			
814	88	Loss and Damage.	818	47	88 Loss and Damage.			
815	89	Other Transportation Expenses.	819	48	89 Other Transportation Expenses.			
816	90	Joint Operation of Cars—Dr.	820	49	90 Joint Operation of Cars—Dr.	820	37	90 Joint Operation of Cars—Dr.
817	91	Joint Operation of Cars—Cr.	821	50	91 Joint Operation of Cars—Cr.	821	38	91 Joint Operation of Cars—Cr.
<i>General and Miscellaneous</i>			<i>General and Miscellaneous</i>			<i>General and Miscellaneous</i>		
S-831	92	Salaries and Expenses of General Officers.	S-832	51	92-93 General Officers and General Office Clerks.	831	39	92-95 General Administration.
S-832	93	Salaries and Expenses of General Office Clerks.	S-835	52	94 General Office Supplies and Expenses.			
S-833	94	General Office Supplies and Expenses.	S-836	53	95 General Law Expenses.			
S-834	95	General Law Expenses.	S-837	54	96 Insurance.			
S-835	96	Insurance.	S-838	55	97-98 Relief Department and Pensions.	S-838	40	96 Insurance.
S-836A	97	Relief Department Expenses.	S-839	56	99 Miscellaneous General Expenses.	S-839	41	97-98 Relief Department and Pensions, included in General Administration.
S-836B	98	Pensions.						
S-838	99	Miscellaneous General Expenses.	S-842	57	100 General Amortization.	S-842	42	100 General Amortization.
S-839	100	General Amortization.	S-843	58	101 Other Operations—Dr.	S-843	43	101 Other Operations—Dr.
S-840	101	Other Operations—Dr.	S-844	59	102 Joint General Expenses—Dr.	S-844	44	102 Joint General Expense—Dr.
S-841	102	Joint General Expenses—Dr.	S-845	60	103 Other Operations—Cr.	S-845	45	103 Other Operations—Cr.
S-842	103	Other Operations—Cr.	S-846	61	104 Joint General Expenses—Cr.	S-846	46	104 Joint General Expense—Cr.
S-843	104	Joint General Expenses—Cr.	S-847A	62	105 Accidents and Damages.	S-847	47	105-106 Injuries to Persons and Property.
S-844	105	Accidents and Damages.	S-847B	63	106 Law Expenses connected with Damages.			
S-845	106	Law Expenses connected with Damages.	S-848	64	107 General Stationery and Printing.	S-848	48	107 General Stationery and Printing.
S-846	107	General Stationery and Printing.	S-850	65	108 Store Expenses.	S-850	49	108-109 Store and Stable Expenses.
S-847	108	Store Expenses.	S-851	66	109 Stable Expenses.			
S-848	109	Stable Expenses.	S-852	67	110 Undistributed Adjustments—Balance.	S-852	50	110 Undistributed Adjustments—Balance.
S-849	110	Undistributed Adjustments—Balance.						

classification, the same method may be pursued by first filing with the commission a statement showing the subdivisions proposed. It is not necessary, however, that these subdivisions appear in reports to the commission. For purposes of comparison, last year's income revenue and operating expense accounts may be reclassified on the basis of the new classification. A suggestion for a method of remembering operating expense accounts is shown in the accompanying table. Railway corporations operating electric lighting or gas departments will have to use in addition the accounts prescribed therefor.

The preparation of a uniform system of accounts necessitated that all known contingencies be provided for, and it will simplify matters greatly if each corporation will eliminate from consideration such accounts as are not pertinent to the facts and circumstances. A careful study and analysis of the classification will correct any impression that it will be expensive and burdensome, detailed accounts being necessary for the information and guidance of the corporations. The first cost of printing new blanks is not an important matter for small companies, as they may be typewritten.

The books and records of a corporation simply reflect its actions and transactions. For example, a contract between an accounting corporation, designated as company A, and another corporation, designated as company B, provides that B operate its cars over A's tracks. This means that A shall credit to rent of tracks and terminals such amount as may be received therefor, B charging the cost thereof to track and terminal privileges under the general heading of other rent deductions. If the contract provided that A operate the cars of B over A's tracks and receive the revenue therefrom, then A should charge the amount paid to B to rental of cars and credit the earnings therefrom to the proper account under revenue from transportation. The service rendered and the result obtained are absolutely the same in both instances, the method of treating the accounts being determined by the wording of the contract.

CAPITAL ACCOUNTS

The capital accounts are well defined in the new classification, and it should be borne in mind that it is not the intention of the commission to be technical. For example, the paragraph headed "First entries must enable identification," states that "throughout all capital accounts the first entry in respect of any particular thing shall describe it with such particularity as to enable its identification, and shall give it a distinguishing name, number, or other designation by which it shall thereafter be designated in every entry in any capital account which in any way concerns it." If cars of a certain type are purchased, the bill being explanatory and the record through the voucher, voucher record, journal and ledger clear, this will be ample means of identification to determine at any future time the actual and not the estimated cost of that portion of the property.

Discount upon securities—The ruling that discounts upon securities shall not be charged to capital accounts is one upon which there seems to be considerable difference of opinion. The Railroad Commission of Wisconsin, for example, permits the capitalization of discount on bonds and the expense incurred in connection with their issue, while this classification provides that such discounts be charged to unamortized debt discount and expense, that account to be credited and surplus debited with the amount at the option of the corporation, in whole or in part, either at the time of the sale of the securities or monthly or yearly pro rata, according to a rule uniformly applied during the term for which the securities were issued. When a premium is realized upon the sale of any particular class of stock, such premium shall be credited to the proper sub-account under premium on stock, and remain in such account as long as the stock is outstanding. This should not prevent the corporation from using the funds for any legal corporate purpose.

Withdrawals or retirements—When anything is withdrawn or retired from service, the actual cost, if known (estimated if not), shall be credited to the capital account in which it stood charged at the time of withdrawal. For example, the construction of a \$20,000 bridge to take the place of a smaller bridge, the actual cost of which cannot

now be determined, the original cost being estimated at \$10,000, would necessitate the following entries: Debit account bridges, trestles and culverts, \$20,000; the estimated cost of the structure replaced, namely, \$10,000, to be credited to fixed capital, Dec. 31, 1908, and charged to the proper account under corporate surplus or deficit. This will leave the fixed capital account increased by \$10,000, the difference between the estimated original cost of the old structure and the actual cost of the new. Assuming that the old structure had been in use 10 years, during one year of which the company had charged a proper proportionate amount to depreciation, crediting the same to accrued amortization of capital, the proportion of depreciation applicable to the year, namely, \$1,000, would necessitate the following entry:

Accrued amortization of capital, debit.....	\$1,000
Other deductions from surplus.....	9,000
Fixed capital, Dec. 31, 1909, credit.....	\$10,000

MATERIAL AND SUPPLIES

Small companies may feel it burdensome to keep a material and supplies account in the prescribed form. If these companies will take an inventory each year, placing the amount of the same on the general books under the head of material and supplies, and each month thereafter charge to this account on their vouchers an amount approximately equivalent to one month's supply of material purchased, instead of charging the various construction or operating accounts direct, as heretofore, then by journal entry each month credit material and supplies and debit each construction or operating account with the entire amount assignable to it (assuming that approximately all has been consumed), adjusting any differences at the end of the fiscal year, they will have complied with the intent of the classification.

EXPRESS AND FREIGHT REVENUES AND EXPENSES

The accounts covering express and freight revenues and expenses may be gathered together and subdivided on a special form for the purpose of furnishing the management with a fairly accurate idea of the revenues and expenses of this portion of the company's business. Careful estimates should be made of the department's pro rata share of all accounts not directly affected, such as those for use of tracks, power consumed, etc.

DIVIDEND REVENUES

The monthly report of a corporation owning any considerable amount of securities will be distorted by crediting dividend revenues at the time of payment with amounts received on account of dividends. In the case of securities upon which there is a reasonable expectation of dividends, however, there is nothing to prevent an estimated accrual, carefully made, not upon the books of the company, but upon the operating reports, showing what the result would be if the pro rata share of the dividends on such securities were received monthly.

EXPENSE ACCOUNTS

The classification provides for certain expense accounts, which may be assembled as desired by the accounting corporation. When reporting to the commission, however, it will be necessary to assemble the accounts as in the form of report provided.

ACCIDENTS AND DAMAGES

The determination of the accounting corporation's probable liability on account of casualties has met with some opposition, the objections being to the labor involved and the difficulty of estimating such liability with exactness. The experience of actual application may in time produce fairly accurate results. The adoption of the method of estimating yearly in advance the probable amount necessary to be charged to operating expenses will not affect those expenses, whether the claims are settled promptly or not, except through the saving which may be effected by prompt settlements. When beginning the use of this method, careful estimates should be made of the liability for unsettled accident claims then outstanding, charging the same to surplus and crediting casualties and insurance reserve. A further estimate, based on past experience, should be made of the probable expenditure for the ensuing 12 months, a pro rata share of this amount to be charged

each month to operating expenses, preferably on some arbitrary basis, such as car-miles operated, car-hours operated, or per cent of gross earnings.

DEPRECIATION

Depreciation accounting is a method of conserving capital and maintaining assets intact by providing for renewal and replacement of wasting properties at the expense of revenue, a practice which has obtained to a considerable extent in the past under other designations. Assuming that electric railway corporations have not charged the proper amount of depreciation in the past, an examination of the sums expended in dividends would indicate not that they have suffered from a too generous distribution of profits, but that rates of fare have been too low. It may be contended that, through the issue from time to time of additional securities to provide funds for the renewal and replacement of wornout property which should have been provided out of earnings, interest charges have become burdensome to an extent which will not permit proper dividends to be paid. As a matter of fact, such increase in capitalization has been brought about not by depreciation, but by obsolescence occasioned by the phenomenal development of electrical science and changes made in methods of transportation to meet demands of the public which could not have been foreseen or otherwise provided for; and if it is the purpose of depreciation accounts to provide that the capitalization of a public service corporation shall represent its true value, the appreciation in the value of its assets should be considered in connection therewith. The public, however, is more interested in the efficiency of the service when rendered for a reasonable consideration than in the amount invested in the properties or the rate of return that the security holders may receive.

The difficulty of determining the point at which maintenance ceases and depreciation begins necessitates that each company ascertain as nearly as possible the amount required to take care of maintenance and depreciation not due to obsolescence of the various portions of its property. This amount may then be arbitrarily apportioned on the basis of a unit; for example, car-mileage. For the purpose of illustrating, assume that the estimated amount necessary to be provided to cover the maintenance and depreciation of equipment (as provided in the classification of operating expense accounts) is approximately 5 cents per car-mile per annum. Such being the case, in some particular month an amount equal to 3 cents per car-mile having been expended on account of maintenance, 2 cents per car-mile should then be charged to depreciation of equipment. The method or the amount, or both, may have to be changed from time to time, the amount of depreciation depending on local conditions, the type of property originally constructed, and the degree of maintenance, past and present. The amount of depreciation on different properties or different portions of the same property will vary, making it impracticable to lay down a rigid rule. The commission has left it to the corporations to determine to the best of their ability the amount to be charged to depreciation on their particular properties, and provided only that there shall be filed with them prior to its use the rule adopted. This can be changed at any time by filing the amended rule with the commission prior to its use.

The development of electric railways in the future more and more depends upon public confidence in street railway investments and public confidence more and more depends upon complete and accurate information as to the conditions upon which it is invited. It is possible for individuals to build and operate small electric railways, but such development must of necessity be on a comparatively small scale. It is only when the use of corporate methods and the creation of corporate securities is resorted to that larger enterprises can be developed and the demands of the public met. A corporation is merely a body of persons legally associated and empowered by the State to transact business as an individual might do. Under these circumstances it owes to the general public from which it has received its charter, and more particularly to that portion of the public which constitutes its security holders, such information concerning internal conditions and affairs as may be necessary effectually to safeguard the public interest. As the agency for the collection and dissemination of such information,

the activities of public-service commissions should go far to replace the drastic examinations by special commissions and the resulting hasty legislation which in the past have had such an unsettling effect upon the financial world. A suspicion on the part of the public, possibly occasioned in part by the past attitude of public-service corporations toward regulation by government commissions, that facts essential to the safeguarding of public interest were being withheld is being gradually overcome largely through publicity. The purpose of the public in creating such commissions is not to work hardship upon corporations by assuming the functions of management to such an extent as to destroy the incentive to ambition resulting from the prospect or possibility of wealth or attainment to be achieved by energy and close application. Now that public-service corporations may feel that they are to receive fair and impartial treatment will they not be benefited by promptly and graciously furnishing government commissions with all the information desired? In this connection it is sufficiently suggestive to call attention to the salutary effect upon the market for securities resulting from scientific accounting conducted under such restrictions and conditions as constitute a virtual guarantee by law of the figures upon which the value of such securities is based.

WORK OF THE STATE TAX COMMISSION*

BY RALPH R. RUMERY, ENGINEER, NEW YORK STATE TAX COMMISSION

During the past two years I have had a very good opportunity to become familiar with the grievances of most of your companies, and when Mr. Fassett was kind enough to invite me to speak about the reports of traction companies to the State Tax Commission I was very glad to avail myself of the opportunity to tell you of a few of the troubles that the Tax Commission has in making the special franchise assessments. There is no feeling of hostility on the part of the Tax Commission as far as the public service companies are concerned. The commission wishes to avoid as much as possible the misunderstandings which seem bound to occur each year and which react sometimes to the disadvantage of the companies and at other times to the locality where the tax is collected. From year to year we have asked for more information, and have gone more into detail, but experience has shown us that this detailed information is necessary in order to deal justly with the companies concerned.

I want particularly to urge upon you the necessity of filing these reports as early as possible. We can appreciate the fact that with some of the larger companies it is a matter of some weeks to close the books for the year ending Dec. 31, but there is no reason why the supplemental sheets for description of the property and the various schedules should not be filled out by Dec. 31, so that the report may be in shape to forward to us as soon as the books are closed and the financial statement and classification of operating receipts and expenditures are made up. Between April 1 and the middle of May the board certifies tentatively over 8000 special franchise assessments, and you can easily understand how the work is hindered by companies not reporting.

There were several companies represented at the spring hearing this year who wished to protest against the assessment and file their annual report at the same time. These are the tactics which have forced the board to ask for the dismissal of writ of certiorari in certain cases where companies have not reported within the time allowed, which prevents the companies from obtaining the equalized reduction to which they would otherwise be entitled. There is a penalty for not reporting within the time allowed of \$100 for the offense, \$10 a day for each day that the report is refused, and the company is not entitled to review the assessments by certiorari proceedings.

In justice to you, gentlemen, I will say, however, that we have less trouble with the traction companies than with any other class of public service corporations. If you have any other than the formal objection to file at the

*Paper read before the Street Railway Association of the State of New York, Bluff Point, June 29, 1909.

hearing, it is very essential that the attorney representing the company should be familiar with the physical condition of the property or that some person who is familiar with the property should be at the hearing to answer questions concerning local conditions, as in many cases we are obliged to carry a higher tentative assessment than would be the case if the facts were set out clearly. It is not necessary to wait until the day set for the hearing, as you will always find one of the engineers of the board at the office, and we shall be glad to take up at any time any proposition which may seem to affect the value of the franchise and which might not be shown in your report. This coming year we are putting two new blank pages in the report for any statements which you may care to make about the property, and we want you to give us all the facts that may seem in your minds to affect the value of the franchise in any way.

I would suggest that the companies that operate amusement places or parks, for the sake of the increased traffic on the lines leading to the park, should state the amount of their investment or interest in the park, and should also give us the estimate of what per cent of their receipts they consider to be due to the travel to or from the park or amusement place. The profit or loss from the places themselves, where they are operated by the railroad company, can be shown in the schedules which provide for the classification of operating receipts and expenses.

There will also be a new page for a general description of property outside of streets and public places, as well as an estimate of its value. This information is necessary in order that we may know the total amount of property upon which the company is entitled to a return. The most common failing of the traction companies is the failure to furnish the information called for in Schedule H of our report, where you are asked to give the estimate of receipts from operation according to tax districts, and to subdivide these amounts into receipts "on private right of way" and receipts "on streets, highways and public places." We understand perfectly that it is a very difficult thing for you to do, but it has to be done in order that the total assessment may be properly proportioned among the tax districts, and it is infinitely easier for you to make the approximation with your thorough knowledge of local conditions than for us to try to estimate it in the office.

We often have reports where the source of amounts charged against reconstruction and new construction is not shown. If you sell securities to obtain money for betterments it should be shown as stock issued in the current year. If taken from reserve for improvements and extension or borrowed, it should show in the statement of liabilities, and if paid for out of earnings it should show under appropriations for extensions and improvements. At the bottom of the page for the financial report is a note, "distribution of expenditures for reconstruction and new construction." Several companies, when part of the expense of reconstruction has been charged to capital account, have shown that amount as against new construction. By "new construction" we mean additional mileage, or property, and in a case where we find an amount charged against new construction and no additional mileage or property is shown on the supplemental sheets, it necessitates a higher tentative assessment until the matter is explained.

I am speaking of reports to the Tax Commission only, for I think that where you replace with heavier construction or improved pavement, the difference in cost is a proper charge against capital account. By reconstruction we mean the replacement of wornout or useless material by new or fit material other than the small repairs which must be constantly made. You may have paid for your reconstruction partly from your appropriation for maintenance and partly from your reserve for betterments. We ask for this information, as it is one of the elements which aids us in determining to what extent the property is being kept up. Formerly the only details of operating expenses required were salaries, conducting transportation, maintenance of way and equipment, legal expenses, but the amounts charged against "other operating expenses" were so large that we were obliged to have the additional classification now required.

One of the greatest embarrassments that the commission has to contend with is the failure of the reporting com-

panies to give the detailed information called for in the supplemental sheets. The length of tracks, the weight and type of rail, the ballast used, the kind of paving, the type of overhead construction and the length and size of cables and conductors. All these details are necessary in order that we may properly estimate the cost of reproduction. This year we have asked for the same classification of operating receipts and expenditures as required of all companies reporting to the Public Service Commission. There was some delay on that account last year, as I believe that the Public Service Commission did not decide upon its classification until after our reports were due.

In the supplemental sheets we ask for the value of property as new for the current year; also the depreciated value. By the "value, new 1909," as the new supplementals will read, we mean the cost of reproduction at the present time, and not the original cost of the property. There seems to be a wide difference of opinion regarding depreciation, some companies allowing no depreciation, and others depreciating down to what the property would bring if scrapped. We invariably allow for depreciation in estimating the value of the property, but try to keep between the two extremes.

One thing I must ask you to bear in mind, an assessing officer must assess, but if you will give us the information called for in the schedules and supplemental sheets, I hope the time may come when your only reason for filing complaints against the special franchise assessment will be to get the equalized reduction.

CONVENTION OF THE NEW YORK STATE STREET RAILWAY ASSOCIATION

The twenty-seventh annual convention of the Street Railway Association of the State of New York was held at the Hotel Champlain, Bluff Point, New York, June 29-30, 1909. It was originally planned to hold the convention at the Fort William Henry Hotel, Lake George, but as announced in last week's issue of this paper the Fort William Henry Hotel was destroyed by fire on the morning of June 24. Upon receipt of the news at Albany, President Fassett, of the association, notified such members of the executive committee of the association as could be reached by long-distance telephone, made arrangements to change the hotel reservations to the Hotel Champlain and informed the technical and associated daily press of the arrangements—all so promptly that the press was advised of the revised plan by 10 a. m. Within 12 hours after the discovery of the fire at Lake George printed notices of the change of location had been mailed to all railway companies and electric railway supply houses in New York State and to many in adjoining States. At a meeting of the executive committee, held at the Transportation Club, New York, at 5 p. m., on June 24, Mr. Fassett reported what he had done and received the thanks, in behalf of the association, of all those present, as well as compliments for his quick action and satisfactory decisions.

A number of delegates to the convention went to Bluff Point, by way of Lake George, to take the boat ride on that lake Monday, June 28, and saw the ruins of the Fort William Henry Hotel. Nothing is left but the foundation walls.

The change in location seemed to make no difference in the attendance, which was up to the standard of previous years.

SESSION OF JUNE 29

The morning session of June 29 was called to order at the Hotel Champlain by President Fassett at 10:30 a. m. After the usual roll call the secretary introduced W. L. Pattison, general counsel of the Plattsburg Traction Company, who referred briefly but in a very interesting way to

some of the historical incidents connected with points in the vicinity of the hotel. He concluded by welcoming the delegates to Plattsburg in the name of the company and of President Sanderson, and stated that transportation on the lines of the company during the convention would be afforded those who wore the badge of the association. The secretary then said that he had received letters of regret from Governor Hughes, Horace E. Andrews, August Belmont and some others to whom invitations to be present at the convention and banquet had been extended.

The secretary then read a letter from President Shaw, of the American Street & Interurban Railway Association, calling attention to the meeting of that association at Denver and urging all present to attend. Mr. Shaw also said that committees had been appointed to organize two special trains from New York to carry delegates and others who desired to go to the Denver convention. One of these trains would go to Denver by way of New Jersey and Pennsylvania, the other over the New York Central lines. The committee in charge of the latter train was C. Loomis Allen, chairman, James H. McGraw and John H. Pardee. This committee would make all necessary arrangements for the train, and those desiring to travel by it should notify some member of the committee.

The secretary then read a cordial invitation to the association from E. J. Cook, general manager Rochester Railway, to meet in Rochester in 1910. Mr. Cook's letter was accompanied by invitations from the Mayor of the city and the president of the Chamber of Commerce, urging the association to select Rochester next year and stating that a fine auditorium, recently erected, would be at the disposal of the association during the convention. Upon motion of Mr. Peck the letters were referred to the committee on next convention which should consider the invitation with the committee on nominations.

The president then read his annual address. It follows:

ADDRESS OF PRESIDENT

Owing to the disastrous fire which completely destroyed the Fort William Henry Hotel at Lake George last Thursday morning, it was necessary to decide quickly on another place to hold the twenty-seventh annual convention of this association. Your executive committee immediately took steps in the matter and concluded that, inasmuch as our twenty-fifth annual convention was held here so satisfactorily two years ago, the Hotel Champlain offered the only appropriate solution to the problem, and we hope that our action has met with your approval.

The financial depression of 1908 was the source of never-ceasing strife on the part of railroads generally throughout the country for their very existence. The receipts of trolley companies, however, suffered far less than those of the steam roads, for which we can thank the doing of principally a passenger business. With the dawning of the current year the business interests of the country, and particularly of our own State, have commenced to show a rapid recovery from the panic conditions, and I think it is safe to say that we are once more beginning another era of prosperity, and that with the perceptible reactionary sentiment in favor of progressive business advancement, we may all hope for a future that will permit the proper and logical development of public service industries, which the public is beginning to see is linked so closely with the very life of general prosperity.

The association during the recent legislative session rendered especial service to the member companies. Arrangements were made for complete information relative to all legislation, and an attorney employed, who was particularly familiar with legislative procedure, to make careful inspection of all legislation and to report on such as affected our interests, making such memoranda in connection with it as would bring out the points involved. Copies of his reports were sent out from the president's office almost daily to the various companies. It has been with much satisfaction that we have heard it freely remarked that the service rendered was of the utmost value to numerous companies, together with the assurance that this service, alone, has amply repaid the amount of the assessed dues. If this is a fact, it is particularly gratifying, as we were able to furnish it at a less expense to the association than has previously been done, which, no doubt, was owing to

the fact that your president, being located in Albany, had readier facilities at his command. It is also to be understood that in addition to the detailed reports sent out, there was very careful attention given in Albany to the sundry adverse bills introduced, which we can assure you materially assisted in preventing the passage of a number of them. The one measure introduced during the session which vitally affected the street railways was the proposed amendment to the Public Utilities Act. As you are all familiar with this amendment through the reports sent out by the association, it is unnecessary for me to review it here; it suffices to say the bill did not reach the Governor's hands, a committee having been appointed, not only to investigate the need of the proposed amendment, but also to investigate the results obtained under the present act and to report to the next legislature.

During the preceding year the association held two very successful and well-attended quarterly meetings: one in Utica, Nov. 10, 1908, and one in Schenectady, March 24, 1909. The Utica meeting was called especially to discuss the subject of "Track Construction," and two very able papers were presented on questions pertaining to the matter, one by Chas. R. Clark, chief engineer, New York & North Shore Traction Company, entitled "Steel and Concrete Ties," and one by R. A. Dyer, Jr., general manager, Auburn & Syracuse Electric Railroad Company, entitled "Tee Rail in City Streets." At the Schenectady meeting the general subjects for discussion were "Transfers" and "Claims." The topics were capably introduced by C. Loomis Allen, vice-president and general manager, Syracuse Rapid Transit Railway Company, and Hubbell Robinson, attorney, Schenectady Railway Company, with their respective papers, "Transfers—Use and Abuse" and "Claims—Co-operation of Operating and Legal Departments." In addition to these subjects, the meeting received the reports of committees on the various subjects recommended by C. R. Barnes, electric railroad inspector, Public Service Commission, at our last annual convention, namely: "Use of Curtains in Car Vestibules," "Signaling Interurban Cars at Way Stations," and "Carrying Musical Instruments on Passenger Cars." As these reports were merely read and accepted at the Schenectady meeting, they have been placed, at the request of the Public Service Commission, on the program of this convention for final discussion and definite action by the association.

It is with sincere gratefulness that I wish to express my thanks to the various officers of the association, the executive committee, and the members of the several committees appointed during the past year, for their unceasing efforts in behalf of the association, as it was only through their assistance that it has been possible to render the benefits that have been given to the members.

In closing, I wish to earnestly request each attending delegate to make it his especial business to enter enthusiastically into the spirit of this convention. It is of the utmost importance that we all appear promptly at the hour set for the various sessions, remain during the entire time, and enter the discussions with vim and energy. The gentlemen who have prepared papers which will be presented for your consideration have devoted much careful labor in their preparation, and in justice to them and in order that we may derive the benefits for which we are assembled, I personally appeal to each of you to feel that the success of this convention depends absolutely on your individual contribution in the way of attendance and in entering into the various discussions.

REPORT OF EXECUTIVE COMMITTEE

The report of the executive committee was then read by the secretary. It stated that the number of active members of the association had been reduced by one, owing to the consolidation of the Rochester Railway and the Rochester & Eastern Rapid Railway Company into the New York State Railways Company. The number of associate members, which include street railway companies outside of New York State, had decreased by one. Of the allied members, which consist of the supply houses, five had resigned and ten had joined the association, so that the allied members now number nearly 100.

REPORT OF THE TREASURER

An abstract of the report of the treasurer follows:

Balance on hand	\$3,978
Receipts	6,485
Total	\$10,463
Disbursements	4,361
Balance on hand.....	\$6,101

The report of the treasurer was received with applause.

Arthur L. Linn, Jr., general auditor, New York State Railways, then read a paper on "Electric Railway Accounting." An abstract of this paper is published on page 30 of this issue.

DISCUSSION ON MR. LINN'S PAPER

W. H. Davies, comptroller, Delaware & Hudson Company, said in opening the discussion that the first point to which he wished to refer was the subject of improvement in the system of accounts. Mr. Linn had stated that "it should be remembered that if the experience of accounting corporations with this classification shows opportunity for improvements, such improvements will receive the careful consideration of the commission and its representatives."

Of course, faults could easily be found in any new system that might be promulgated; and, no doubt, this system would not prove an exception, and therefore there was a field for the earnest endeavor and co-operation of this association in order that the best results might be obtained; this could be done by committees already in existence or by new committees specially created for the purpose.

The greatest latitude should be allowed by the authorities in which to work out these improvements; by this Mr. Davies meant that the electric railways should not be compelled to make their improvements along the lines of the present classification, which was patterned so much after the classification adopted for steam railroads.

No fault could be found with a uniform system of accounts where the character of the business was precisely the same; but in a great many particulars the street railway classification must of necessity differ from one designed for steam railways, and Mr. Davies felt that the commissions had gone too far in their efforts to make the two systems comparable.

In discussing the subject of reclassification, Mr. Davies said Mr. Linn had stated that, for the purpose of comparison, last year's income revenue and operating expense accounts may be reclassified on the basis of the new classification. Mr. Davies said that some corporations may find it advantageous, and certainly less burdensome, to reclassify the coming year's accounts on the basis of the old classification. This could be done without the slightest difficulty, for in the majority of cases it could be accomplished by simply grouping together some of the new accounts.

Referring to the identification of charges to capital account, Mr. Davies said it must be borne in mind that the first cost may not always be the cost to credit to capital when a replacement is made. For instance, a structure may originally cost, say, \$3,000, and soon after may be improved by an addition which would bring the new value up to \$3,100. The \$100 must be taken into account in determining the credit to capital by a replacement. This went to show that not only must the original entries be clear and concise as to identification, but also all other entries subsequently made that would affect its cost, and it was necessary to have the last entry refer properly to the former entries which it supplemented. In the case of rolling stock it might be well to have an historical record concerning each item of equipment, which would set forth all these facts and refer to the original entries on the books.

The commission had ruled that discounts on securities issued shall not be capitalized under any circumstances. Those who favored this practice claimed that by issuing securities at a discount corporations were enabled to secure a lower interest rate, and therefore the discount should be

periodically charged against income during the life of the security, which in effect increased the interest charge against income, but this premise was not strictly correct. Very few new corporations which had a credit to establish could float bonds at par, no matter what the rate of interest was, for the reason that as soon as a bond bearing a high rate of interest was put out, unfavorable attention was immediately attracted to the security back of the bond, and the result would be to defeat the object sought to be obtained. Mr. Davies, personally, was inclined to favor the claim that, in a majority of cases, discount on securities sold was a price paid to obtain money to construct the railway, just as much as the cost of the different materials used in construction; and, therefore, in such cases, at least, it should be considered a capital expenditure. At any rate, uniformity which was sought by this system of accounts would not obtain, for the reason that many new concerns would issue their securities to a construction company at par, instead of otherwise disposing of the securities and paying for the construction in cash.

Mr. Davies endorsed what Mr. Linn had said in respect to handling the material and supply account, and added that some little trouble may be occasioned by such a method, but it could be easily overcome. For instance: An interurban road might buy its ties all in one month and therefore would not want to charge them all out at one time. But in such cases there would be no objection to distributing such charges over a longer period, provided, however, the account was properly adjusted at the end of the year.

The system of accounts provided two methods for taking care of the wasting of capital:

First when anything was withdrawn or retired from service, the amount at which such thing stood charged in the capital account shall be credited to capital account at the time of withdrawal. Such a practice would provide for wear, tear and obsolescence which had not been taken care of through maintenance.

Second, depreciation accounts were also set up, to which estimated losses shall be charged. This account was very objectionable, Mr. Davies said, particularly from the fact that, if over-estimates were made, the profits were unduly diminished and, vice-versa, under-estimates resulted in an over-statement of the profits. It could readily be seen what an opportunity for juggling the accounts was encouraged thereby.

A suggestion was made by Mr. Davies that a question box for problems connected with the system of accounts be included in the programs for the quarterly meetings of the association.

W. C. Austin, auditor, Oneonta & Mohawk Valley Railway, asked the titles of the accounts to which depreciation had been charged.

A. J. Gies, auditor, United Traction Company of Albany, inquired the object of the total of seat car-miles, which is required by the schedule of traffic statistics.

Mr. Fassett called attention to the Committee on Classification of Accounts, consisting of Messrs. Linn, Davies and Beardsley, and said this committee had co-operated with the commission and would continue to do so.

R. M. Searle, general manager, Rochester Railway & Light Company, said that nine years ago the lighting interests found it necessary, in order to protect their securities, to set up depreciation accounts. It was determined at a meeting in New York City that it would be good practice to set aside 10 per cent of gross revenue. The United States Supreme Court had admitted the necessity for changes by

public service corporations of rates large enough to provide for unforeseen casualties. Real estate frequently was lessened in value. Applying the possibility of similar change to the railway it could be imagined that the installation of a new car would make necessary the removal of a bridge and no fund would exist to meet the expenditure required unless provision had been made for it in advance. With scientific accounting there was no reason why a buyer of securities in a public service corporation should not go to the commission and learn whether the property was well-managed and its accounts kept correctly. The commission had been saturated steadily with truths by the system of accounts. Three years ago the Rochester Railway & Light Company was glad to sell its bonds at 92; they were now 101 $\frac{1}{4}$ bid, none offered, on the Rochester Exchange.

As a security holder Mr. Searle appreciated the wiping out of the day of exploitation. That day was gone and officials of public utility corporations might as well recognize it and lift themselves where they belonged and draw the better salaries to which their work entitled them. By the decision in the case of the Longacre Company, which tried to set up in business in New York City as a competitive plant, and by that of the Buffalo, Rochester & Eastern Railroad, which sought to parallel the New York Central & Hudson River Railroad, the commissions had indicated their attitude. These decisions were due to the enormous amount of truthful data submitted by the companies to the commissions; when the commissions analyzed the figures they were able to do so intelligently. When the commission asked for information it should be given more than it asked.

Referring to Mr. Linn's conclusion that street railway fares had been too low, Mr. Searle said that the same assertion had been made for the lighting interests. If it had been argued all along that the companies had charged enough to meet the results of depreciation, they would now have funds, the properties would be more valuable and the officials would be drawing better salaries.

Capt. J. W. Hinkley, Jr., Poughkeepsie City & Wappingers Falls Electric Railway, asked about the treatment of the inquiries and damages reserve.

C. Loomis Allen, vice-president, Utica & Mohawk Valley Railway, asked what effect the estimates would have on the monthly and annual reports. Would the reports reflect facts or estimates? If the reports reflected only estimates did they not give the unscrupulous railway man and the unscrupulous banker a chance to do the very thing that the commission was trying to prevent?

Mr. Linn, replying to the foregoing questions, said that depreciation would be charged to maintenance of equipment and maintenance of way and structures. The object of seat car-miles was to show the commission the results, if it desired the information, on lines where cars of varying seating capacity had been used. All of the companies with which Mr. Linn was connected had charged for a number of years a certain amount to operating expenses each month to cover the estimated expense of injuries and damages. The reports rendered under the new system were both facts and estimates. It was not possible to get at the facts without estimates. There was nothing in the law to prevent companies from making up reports for their own purposes from which allowances for depreciation were omitted. The heads of departments would need to know for their own information what the operating expenses had been independent of any allowance for depreciation.

Mr. Allen said that assuming that there were men who had had experience in electric railways since their incep-

tion, and had been guided by it, that experience could not guide them in the next 10 years. Development of the properties had been along lines that had never been known before.

Mr. Searle said that during the last 10 days he had endeavored to float securities on a property. He had been asked in every instance by the people with whom he talked, including one lady, about the allowance for depreciation. He had been taught as a child to save for a rainy day. It was possible to start a fund modestly and let it grow, and when a crash came, as it did come to everyone, the fund would help.

Mr. Allen said the question was as to the best method of providing for maintenance of the property. If a fund was set aside to take care of renewals or extraordinary maintenance the problem would be soived in that way rather than by provision for a theoretical depreciation.

Mr. Fassett said the action of the association had caused a modification of the original plan of the commission touching depreciation. He thought that the classification committee had a wide field for action and would recommend its continuance in order that it might keep in touch with the commission for another year.

The committee was thereupon continued, by vote of the association.

TRAINING OF EMPLOYEES

The first paper presented at the afternoon session was that of N. W. Bolen, superintendent of transportation, Public Service Railway, New Jersey. This paper will be found in abstract on page 27 of this issue.

At the conclusion of the reading of this paper George L. Radcliffe, general superintendent, Schenectady Railway Company, complimented the author upon the completeness with which he had covered the subject. He thought it very important that the education should be continuous. Knowledge acquired only by cramming at the start cannot be retained. The instructors also should be kept fresh. On a large system especially, they tend to get into a rut unless care is taken that this should not happen. Mr. Radcliffe called attention to the final paragraph of Mr. Bolen's paper in regard to fair treatment of the men. This is very important and should be begun in the employment department. The employment superintendent should be a capable man and familiar with human nature, particularly the nature of men who make good motormen and conductors. He should be able to impress them at the start with the fact that the company intends to treat them fairly and squarely, that this will continue to be the case as long as a man remains with the company and that the company will do all it can to make him a good motorman or a good conductor if he has the right material in him.

W. R. W. Griffin, general superintendent of transportation, Rochester Railway, said he understood that the paper referred entirely to the operation of city lines and he thought that in such service it was unnecessary to give a man much instruction in mechanical matters. With cars running on a 2 minute schedule it would be impossible for a motorman to do anything effectual in the repair of a car on the road. What the superintendent of transportation wanted was for the car to get out of the way. The most important things to teach the city employee were the questions of operation and of safety. He asked whether the inspectors on the Public Service Railway report good work on the part of the men as well as bad work. He thought the positive records as valuable as those of a negative character.

Mr. Bolen said both kinds of reports were turned in by the inspectors.

W. C. Callaghan, superintendent of city lines, Rochester Railway, was opposed to giving the motormen being taught too much instruction about mechanical matters. He also criticised the term "hammer," used in the paper. He also thought that a man should be given more than two times to qualify. The best men, he said, often take the longest to make good. In Rochester reports of good as well as bad actions are turned in. It is also the practice there, after a new man has been out two weeks, to bring him in and have the inspector or instructor talk over with him the troubles he has had.

R. E. Danforth, general manager, Public Service Railway, explained that the word hammer, used in the paper, did not mean to "knock" but was intended to convey the idea of constant effort. One can hammer up as well as hammer down. If good results are to be secured all must be encouraged to do their best. Unlimited praise is not effective. There must be constant instruction and suggestion. The men above the trainmen need this more, as a rule, than the trainmen, to avoid getting in a rut. He thought that the criticisms upon the amount of mechanical instruction given the men were based upon a misapprehension. This instruction was all covered by what could be taught in one or two hours, and that given had proved very useful. He had known of men on other roads who could not take out a brush, or open a circuit breaker, and who knew nothing of what was behind the controller. They had simply been taught to turn a handle and that was all. He thought the plan of bringing the men in at the end of two weeks an excellent idea, which if possible should be followed out. Frequent meetings of all departments are desirable to keep up the constant efficiency which he advocated. The general manager can key up the department heads by reminding them of the things they may have forgotten. The superintendent of transportation can meet frequently with and talk to the inspectors and so on down the line. The work of the instruction of trainmen begins with the instruction of the inspectors. Too many inspectors cannot see anything unless it hits them. His suggestion of corps efficiency, based upon checking up the work of each department by the heads of those departments and of the department heads by the general manager did not mean one man responsibility. Each individual on the road had his duty to perform, but in the last analysis the conduct of a large transportation system depends largely upon one man. If he is lax, all become careless.

W. J. Harvie, chief engineer, Utica & Mohawk Valley Railway, referred to the importance of instruction of the men in mechanical matters. He said that in Syracuse an instruction car had recently been fitted up and the older men on the system manifested a great interest in it and were anxious to take the course which it afforded. Another matter to be taught was the cost to the company of injury to its property. Too many trainmen have the most hazy ideas of the expense caused by an accident to their car or its equipment. Another point was to have the instruction given in the instruction room duplicate as nearly as possible actual operating conditions. He believed that the mechanical side of instruction to be subordinate in importance to the operating side, but both are necessary. In fact, it is practically impossible to teach intelligent men what to do in cases of emergency without telling them something about the "why and wherefore" of what they are being taught. He then asked Mr. Bolen if his rules required the men to

test the controller, air and sand box before taking a car out.

Mr. Bolen replied that that was the case with the controller and air, but not with the sand box, as the Public Service Railway Company was now using sand cars instead of sand boxes.

John Cain, superintendent, Buffalo, Lockport & Rochester Railway, said it was very important to teach a motorman to know when the wheels slide, a condition which an experienced motorman immediately realizes. He did not believe a new man should be considered as competent until finally approved by the chief inspector. On his road all motormen were instructed to test the controller and the air when the car started out, and also after cars had been coupled together.

E. E. Peck, general manager, Schenectady Railway, thought written examinations desirable, and asked Mr. Bolen if on the Public Service Railway they were given in any cases besides those described for the P. A. Y. E. cars. Mr. Bolen said they were not.

E. S. Fassett, general manager, United Railway, Albany, called attention to the question of instruction in the operation of cars at night. Often a new man is put on a run which extends into the evening as a relief and finds the service very different from the daylight run which he had been accustomed with his instructor. The practice in Albany is to give instruction in night as well as day operation. Another point is to prevent a new man from forgetting what he has learned during his period of instruction. When the Albany road has a large extra list, the practice is to have each new man make at least one run a day after breaking in. By the end of that time he would probably get an assignment which would require at least two or three runs a week.

D. M. Beach, attorney, Rochester Railway, advocated recognition of good conduct of the men, saying that it encouraged loyalty in service. He thought some sort of premium should be given for good records.

C. Loomis Allen, vice-president, Utica & Mohawk Valley Railway, believed that thorough education of the men was money well invested. On the original Oneida Railway, the trainmen were first employed at work in the shop assembling equipment. Then they were put on the road for 30 days running the cars up and down. Then they ran the full schedule for seven days without passengers. This training cost the road about \$360 per man, but it was money well spent. The Oneida Railway was a high-speed line and the conditions there were somewhat exceptional, so that this plan might not often be necessary.

H. M. Beardsley, secretary and treasurer, Elmira Water, Light & Railroad Company, said his company had the merit system in use. The motorman and conductor at the head of the list for each stated period received a vacation, with pay.

R. E. Danforth, in answer to a question, said that the only premium system in use on the Public Service Railway was one which had been in force at Camden. There a motorman and conductor, after five years' service, were given by the company a new suit or overcoat. Since the present sliding scale of wages had gone into effect this practice had been discontinued.

W. C. Callaghan, Rochester, said that when the merit and demerit system was first introduced at Rochester the men paid but little attention to the acquisition of merits. Now they realize the importance of helping their records by obtaining these good marks by meritorious acts. One man on the system has 186 merits, although 10 is the high-

est number that can be earned at one time. The plan undoubtedly is a good thing.

L. F. Hoffman, general consulting counsel, Public Service Railway, thought the merit and demerit system would be inadvisable in some cases, particularly on large roads. One great difficulty experienced by the legal department was the large number of "no report" cases. These are very dangerous. He thought that when the men were penalized for accidents for which they were responsible the temptation was very great to make no report of such an accident.

W. R. W. Griffin said that in Rochester there had been no trouble from this cause. There is a standing rule there that if a man fails to make a report of an accident in which he has been involved he is discharged. No conductor would want to take this chance to save the motorman from demerits, and vice versa.

TAXATION OF CORPORATIONS

President Fassett then introduced Ralph R. Rumery, expert appraiser, State Board of Tax Commissioners, who read the paper published on page 35 of this issue. There was no discussion of Mr. Rumery's paper.

COMMITTEE REPORTS

President Fassett then said that he would call for the reports on the "Use of Curtains in Car Vestibules," "Signaling Interurban Cars at Way Stations" and "Carrying Musical Instruments on Passenger Cars." Mr. Fassett explained that at the quarterly meeting of the association held at Schenectady, March 24, 1909, reports had been submitted on these three subjects, but no definite action had been taken by the association. This was due largely to two reasons. One was that the association could not compel its members to adopt its recommendations. The other was that the by-laws of the association did not recognize the quarterly meetings, and such action could be taken only at the annual meetings. He thought, also, that if the association should adopt recommendations of this character the Public Service Commission might conclude that all members should abide by them.

C. Loomis Allen then briefly sketched the history of these reports. The committees to investigate them were appointed last autumn at the request of Charles R. Barnes, expert of the commission, and the commission was anxious to get the conclusions of the association on these subjects. He made a very strong plea for the adoption of definite recommendations.

C. Gordon Reel, Kingston Consolidated Railway, agreed with Mr. Allen.

President Fassett thought that in these matters local conditions were controlling factors. If the association should adopt certain recommendations which were best for one road, they might not be the best for another, yet if the association gave them its stamp of approval the Public Service Commission could accept them as the best recognized practice of the association. The legal departments would recognize the force of that situation.

USE OF CURTAINS IN CAR VESTIBULES

A majority and a minority report were presented by the committee on the use of curtains in car vestibules. The majority report was presented by W. R. W. Griffin, general superintendent, New York State Railways, chairman of the committee, and John E. Duffy, superintendent, Syracuse Rapid Transit Railway. The minority report was presented by R. H. Smith, general manager, Albany & Hudson Railroad. The reports were read by Secretary Pardee, and state:

MAJORITY REPORT

Your committee respectively presents majority and minority recommendations. The majority of the committee favors the convenience and unrestricted privilege of the passengers, and in view of the data submitted there does not seem to be any evidence that there is any more danger from accidents in having the curtains open than from having them closed, and in their opinion, this association should express the opinion that the curtains should be left open during the day time so that the passengers could have an unobstructed view of the road-bed and the surrounding country.

There is no doubt in the minds of the majority of the committee but that the public would be better pleased in enjoying this view ahead than by having the curtains closed.

W. R. W. GRIFFIN, Chairman.
JOHN E. DUFFY.

MINORITY REPORT

In presenting a minority report on the use of car curtains in the daytime, the undersigned wishes it understood that where conditions are right, he is highly in favor of leaving the curtains open so as to permit passengers to see the track ahead, but he does not approve of doing this at the expense of safety, which in railroad operation is of first consideration. Conditions as to road characteristics, type of car, etc., vary so greatly among railroads and have such a direct bearing on the use of car curtains, that it seems hardly wise to decide either for or against the use of curtains in the daytime without at least indicating the type of equipment under consideration at the time the decision is made.

There is no question about the practice at the present time, as the majority of roads operate with curtains open during the daytime. That it is a pleasure to look out the front end of a moving car cannot be denied, but the question before this committee has been whether, taking all phases of the subject into consideration, the desire of the passengers in this respect, together with the advantages pointed out by the advocates of this method, are sufficient in importance to offset the objections advanced from a standpoint of safety. Those who believe in keeping the curtains drawn in the daytime are not prompted by any desire to detract from the pleasure of the ride, but in all cases the object is to promote safety of operation. Those not in favor of using curtains in the daytime have argued that, in addition to the general desirability of allowing passengers to see the country ahead, the motorman being in full view of the passengers (when operating on full-width platform) must feel the beneficial effect of this supervision and will operate his car with greater care; furthermore, if the motorman has an attack of sickness, his condition will be readily noticed.

Those advocating the use of curtains in the daytime are greatly in the minority, but have adopted their practice as a result of their general railroad experience applied to the conditions on their respective lines. Their arguments are that with the curtains open, the motorman is subject to the annoyance of passengers banging on the door in search of information, and that the lighting of matches, moving of newspapers, etc., inside of the car further tends to attract his attention from his work on account of the reflection caused on the window ahead. It may be that such distraction will last but a moment, but good fortune cannot always guide the coming of these interruptions. Rules cautioning passengers not to attract the attention of the motorman can be generally enforced, but in most cases only after the act of interruption has occurred. It is human nature for the motorman at such times to turn around (if curtains are open) when the doors rattle behind him, for the purpose of "squelching" his annoyer, if not to answer his query. Timid passengers when riding on a single-track road, especially one with a generous supply of curves and grades, are inclined, in case the curtains are open, to peer out the forward end of car and be the first to discover signs of danger either real or imaginary. Such people have been known in several instances to give an unnecessary alarm, thereby throwing the passengers into a state of panic, and a rapid movement on the part of the motorman, whether as an emergency measure or an act of routine operation, brings a nervous person again into the center of the aisle.

Controller and circuit-breaker troubles when severe are quite conducive to panic among passengers, and the undersigned believes that the elimination of such occurrences from the sight of the passengers in itself goes a long way toward vindicating the use of the curtains from a standpoint of safety. This has been the experience of the minority, and if similar experiences have not been met on other roads, it is very safe to say that this situation is the result of a difference in conditions, whatever they may be.

The conclusions to be reached from the answers received by this committee are obvious as far as the general practice at the present time is concerned, but it is somewhat difficult to see how, in view of the character of these answers, it is possible to consistently approve of a general recommendation to operate with the curtains open without pointing out the conditions

under which such practice would be undesirable. No good railroad man would knowingly bring about any conditions which would be inimical to the safety of passengers.

In response to the questions as to whether it would add to the safety of operation to isolate the motorman from all possible chance of interference, 14 of the 17 companies have replied in the affirmative. Thus, it would seem that a large majority of the member companies are in favor of completely isolating the motorman, either by the use of a motorman's cab, the drawing of the curtains, or by such rules as will prevent the passengers from interfering with the motorman, those in favor of the cab being in the majority. Nine of the 17 companies replying do not believe that proper isolation of the motorman can be accomplished, if the conditions surrounding him are such that he can turn around, look through the glass door, and see the actions of any person or persons inside of the car; in other words, over half of those answering do not believe, according to these responses, that it is a matter of safe operation to have the curtains open.

In case of an impending collision of cars, the ability of passengers to see the track ahead is considered to be an advantage by only three of the companies answering, seven being of the opinion that such a condition would result in increased personal injuries, and seven of the companies expressing themselves as being in doubt on this point. Bringing the matter of safety into the consideration of this subject, it will be seen that on the strength of the answers alone, there is a grave question as to the propriety of leaving these curtains open during the daytime, and if it is true, as the majority have decided, that the safety of the public is best conserved by completely isolating the motorman, then it seems that the only consistent recommendation that can be made is as follows:

1. That when cabs are used, the portion of the front bulkhead not occupied by such cab should be unobstructed by curtain.

2. That when no cabs are used, and the motorman occupies the full width of the vestibule, curtains should be drawn during the daytime.

R. H. SMITH.

E. F. Peck, general manager, Schenectady Railway, moved the adoption of the majority report.

Mr. Allen said he did not believe the recommendation of the association would act as an order of the commission. It would be considered by the commission as evidence of the character that would be presented at a formal hearing. The point, however, was that the commission had submitted three questions and asked the association for answers. If it was a fact that the members of the association were agreed on the recommendation of the majority report he did not see why the association should not make a recommendation as requested by the commission. He believed that the commission, before issuing an order on this subject, would investigate local conditions governing each case.

The report of the majority of the committee was then adopted.

SIGNALING INTERURBAN CARS AT WAY STATIONS

A supplementary report was presented by the committee on this subject. The committee was composed of J. G. Phillips, assistant general manager, Hudson Valley Railway; S. J. Dill, general manager, Elmira Water, Light & Railroad Company, and George L. Radcliffe, general superintendent, Schenectady Railway. The report states:

A description of a signal, presented with the supplementary report, is as follows:

The committee on signaling interurban cars at way stations begs leave to submit to this association the following recommendation, viz:

Of the signals now in use for the purpose of signaling interurban cars at way stations, the one best adapted to that purpose consists of an enclosed signal located at the station and operated by the passenger, and which, when so operated, shows a light toward the approaching car.

This signal was described in our report made in Schenectady on March 24, 1909. [See ELECTRIC RAILWAY JOURNAL of April 3, Page 619.—Eds.]

We do not recommend the use of a semaphore arm with this signal, as we believe it impossible to enforce the use of any signal by the public except as necessity requires.

Another signal to be used for this purpose consists of a box enclosing five incandescent lamps with a glass disk or lens in

one or both sides of the box. This box is attached to a pole at the stations so that the light, when the connection is made, shines through the disks in such a way that it is visible to the motorman approaching the station. The signal is lighted by means of a rope extending down the pole to within easy reach of the platform, this rope being pulled by the passenger when he desires to stop the car. The connection by which these lights are turned on is weighted so that it shuts off automatically.

The supplementary report of the committee was adopted.

CARRYING MUSICAL INSTRUMENTS ON PASSENGER CARS

Albert Eastman, general express and passenger agent, Utica & Mohawk Railway, chairman of the committee which considered this subject, read the report. The report was signed by Mr. Eastman and C. H. Smith, general superintendent, United Traction Company of Albany, and is as follows:

Owing to the fact that the replies received from the various electric railways in the State of New York indicated a great diversity of opinion as to rules and regulations governing the carrying of musical instruments on passenger cars, your committee did not feel justified in making any recommendation at the Schenectady meeting.

It now seems desirable that a definite recommendation be made, and in considering the matter further we beg to make the following report: We believe that to prohibit the carrying of musical instruments on passenger cars would cause a great inconvenience, especially when no other facilities are offered for transportation of such instruments, and in order to regulate this traffic the committee begs to make the following recommendations, namely:

That large musical instruments be carried on passenger cars only on permit, such permits to be issued in books of 10 or 20 coupons, or a permit to cover one particular movement signed by proper officer. These permits to be issued after a release has been signed and subject to the rules and regulations of the individual companies as to what hours such instruments will be carried and on what part of the car. In making this recommendation we believe the same rule should apply to any large or bulky article that passenger desires to carry on a passenger car and that cannot be carried on the lap of the passenger.

Mr. Fassett described the practice of the United Traction Company, which requires a release in each case before a book of permits is issued. The permits provide that the holder shall not attempt to board cars with bulky instruments during rush hours or at other times of heavy load.

The report of the committee was then adopted.

President Fassett appointed the following nominating committee, and adjournment was then taken until Wednesday morning: C. Loomis Allen, B. B. Nostrand, R. E. Danforth, Joseph K. Choate and C. H. Smith.

WEDNESDAY SESSION

The Wednesday session was called to order by President Fassett. The first order of business was the presentation of a paper by J. L. Davis on "Latest Improvements in Electric Railway Apparatus." This paper will be found on page 25 of this issue. After the reading of his paper, Mr. Davis said in answer to a question that tests on regenerative control with interpole motors had proved very satisfactory. He thought there was a future for this system, but it had not been commercially perfected. Mr. Davis also briefly described the Pennsylvania Railroad side-rod locomotive, which he said was designed to make 90 miles an hour. Several locomotives were in course of construction and would be tested this summer.

C. D. Eveleth then read his paper on "Latest Developments in Electric Railway Apparatus," which will be found on page 24 of this issue. At the conclusion of this paper he read a short addition on automobile block signals. He said that the General Electric Company had developed such a signal with track circuit control and that it afforded the same high-class protection as the ordinary d.c. steam railroad system. The new method is known as the "two-frequency" system, and does not require any insulated joints or impedance bonds.

W. H. Davies spoke of the lack of unity between the Interstate Commerce Commission's classification of accounts and that of the New York Public Service Commissions. He said that there were differences of opinion concerning the course to be followed regarding matters connected with the accounts. President Fassett said that this subject would be taken up by the committee on classification of accounts. In view of the great interest in the subject he suggested further that the accounting system be considered at the next quarterly meeting of the association.

During the session, Matthew C. Brush, general manager of the Boston Suburban Electric Companies, entered the room and was invited by the president to take a chair at his table.

On motion of C. Gordon Reel, a rising vote of thanks was extended to President Fassett for his efficient conduct of the affairs of the association and the promptness with which he acted in changing the location of the convention after the Fort William Henry Hotel had been destroyed by fire. Mr. Fassett acknowledged his thanks to the executive and entertainment committees which had assisted him in this work.

C. Loomis Allen, general manager of the Oneida Railway Company, Syracuse, then presented the report of the nominating committee as follows: President, E. F. Peck, general manager of the Schenectady Railway Company, Schenectady; first vice-president, C. Gordon Reel, general manager of the Kingston Consolidated Railroad Company, Kingston; second vice-president, E. J. Cook, general manager of the Rochester Railway Company, Rochester. Executive committee: E. S. Fassett, general manager of the United Traction Company, Albany; J. W. Hinkley, general manager, Poughkeepsie City & Wappingers Falls Electric Railway Company, Poughkeepsie; W. H. Collins, general superintendent, Fonda, Johnstown & Gloversville Railroad Company, Gloversville; J. K. Choate, president, Oneonta & Mohawk Valley Railroad Company, Cooperstown; secretary, J. H. Pardee, operating manager, J. G. White & Company, New York; treasurer, H. M. Beardsley, secretary and treasurer, Elmira Water, Light & Railroad Company, Elmira. All the foregoing were unanimously elected.

President Peck was then escorted to the chair by Messrs. Reel and Choate. He expressed the hope that he would have the co-operation of all the delegates in making the work of the association a success during the coming year.

The next annual convention will be held at Rochester.

The Engineers' Society of Pennsylvania has offered a series of prizes for the best design for ornamental poles to be used as combination supports for trolley wires and electric lights. Designs will be considered based on using any desired material for these poles, such as iron, wood or concrete, but, as the competition is based on practical lines, economy in design will be taken into consideration.

The poles should be constructed so that wires carried in conduits can be brought in at the base and passed through to necessary outlets for feed wire connections. This will necessitate one or more passages. Provision should be made for good foundations and anchorage, so that all lateral strain will be taken care of without it being necessary to furnish outside supports. Each design must be accompanied by specifications, estimate of weight, and cost based on 100 poles being required.

The competition is open to the general public and all specifications and estimates must be in the hands of the committee by noon of July 15. The prizes offered are: First prize, \$25; second prize, \$15; third prize, \$5.

THE SOCIAL SIDE OF THE CONVENTION

The fine weather and the picturesque surroundings of the Hotel Champlain assisted the entertainment committee in providing a very attractive and popular program during the two days' stay at Bluff Point. A number of ladies were present and took part in the golf tournament which occurred Tuesday morning. The first prize was won by Mrs. H. N. Ransom, of Albany, and the second prize by Mrs. Fuller, of Springfield, Mass. Mr. Garland, of the Ohio Brass Company, had charge of the tournament. At its conclusion the Fifth Regiment Band, from Plattsburgh, gave a concert on the hotel piazza. On Tuesday afternoon an automobile ride was given the ladies by courtesy of the Lozier Company.

The great social event of the day, outside the banquet, was the ball game at 5 p. m. between the railway men and the supply men. The former were captained by E. J. Cook, of Rochester, whose side, including substitutes, were Captain Hinckley, E. F. Peck, C. Gordon Reel, E. S. Fassett, C. Loomis Allen, W. H. Collins, R. E. Danforth, Henry Page, George Radcliffe, W. R. W. Griffin, A. E. Reynolds and N. W. Bolen. The supply men were under the doughty leadership of H. N. Ransom, and consisted of J. B. Smiley, C. R. Ellicott, Jr., R. M. Campbell, E. H. Chapin, B. Standish, B. Bradfield, C. S. Hawley, W. G. Corey, T. Thompson, N. Garland, W. M. Wampler, N. W. Grier. The field umpire was A. L. Linn, Jr., and the home umpire Major H. C. Evans. After a vigorously contested game, in which several home runs were made, the score stood 18 to 11 in favor of the supply men.

The annual banquet of the association was held in the main dining room of the Hotel Champlain on Tuesday night, June 29. The attendance was large, and the speeches were listened to with appreciation and enthusiasm. The following menu was served:

	Little Neck Clams	
	Cream of Chicken a La Reine	
Olives	Salted Almonds	Radishes
	Boiled Salmon, Mouseline	
Cucumbers	Pommes Hollandaise	
	Sweetbread Croquettes with Peas	
	Sirloin of Beef with Green Peppers	
	Punch Cardinal	
	Broiled Squab on Toast	
	Lettuce and Tomato Salad	
	Neapolitaine Ice Cream	
	Fancy Cakes	
	Coffee	

President Fassett introduced J. H. Stedman, of Rochester, who presided as toastmaster. The speakers were C. S. Sims, general manager of the Delaware & Hudson Railroad, whose subject was "Railroad Capitalization"; Hon. Martin H. Decker, member of the Public Service Commission of New York, Second District, who spoke on "Corporation Advantages Under Comprehensive Regulation"; Howard MacSherry, general counsel, Public Service Railway, Newark, N. J., whose text was "Our Critics," and Rev. H. D. L. Grabin, rector of Trinity Episcopal Church, Plattsburg, who spoke in place of Warnick L. Kernan, of Utica, who was unable to be present.

On Wednesday the ladies joined in a bridge whist tournament in the hotel, and in the afternoon all went to Plattsburg to inspect a dress parade of the Fifth Regiment of regular infantry stationed there. The party occupied the grand stand erected in anticipation of the Champlain ceremonies next week, and greatly enjoyed the military display, as well as the music of the regimental band. Altogether, the social festivities, as well as the technical features of the convention, were very successful.

DISTANCE BETWEEN CENTERS OF TRACKS IN CHICAGO.

The distance between centers of tracks and width of cars has been the subject of a heated controversy in Chicago during the past three months. On June 23 the committee on local transportation of the City Council held a public hearing at which the advocates of both wide and narrow spacing were heard. George Weston, member of the Board of Supervising Engineers, presented a written discussion on the subject in which he reviewed the action of the board in this matter during the first year of its existence and at other meetings of later date. He also expressed himself in favor of the narrow spacing now being used in reconstructing the surface tracks.

The distance between track centers was one of the first questions taken up for decision by the Board of Supervising Engineers after its organization and prior to the passage of the rehabilitation ordinances. The decision was to adopt 9 ft. 8½ in. where wide cars were to be used and this was incorporated in the ordinances as follows:

The distance between track centers may remain as at present, but in order to accommodate large modern cars and provide for their safe passage, this distance may be at least 9 ft. 8½ in. between center lines of tracks.

The centers of existing tracks with few exceptions were 9 ft., 9 ft. 6 in. and 10 ft. Cars 9 ft. wide were being operated on the 9-ft. 6-in. tracks and cars 8 ft. 6 in. wide on tracks with 9-ft. centers. The maximum distance between cars was 18 in. and the minimum distance 6 in. Mr. Weston called attention to these facts as showing that the use of narrow spacing was not of recent origin. In July, 1907, the board adopted standard specifications for tracks which fixed the distance between centers at 9 ft. 8½ in. and the work of rehabilitation was actively begun. Shortly afterwards a fatal accident occurred to a person caught between cars and the newspapers began a campaign against the narrow spacing. B. J. Arnold, chairman of the board, directed that an investigation be made at once into the practice in other cities. The result of this investigation is shown in the accompanying table. In addition to the data

was put to vote. Charles V. Weston, then a member of the board representing the city of Chicago, and Harvey B. Fleming, representing the Chicago City Railway, voted in favor of retaining the dimension of 9 ft. 8½ in. B. J. Arnold, chairman, and J. Z. Murphy, representing the Chicago Railways Company, voted for a change in the spacing. As a result of the tie vote the distance was not changed and all new construction carried on to date has been in accordance with the original specifications.

The present agitation has been caused by a bill introduced in the State Legislature fixing the minimum distance between cars at 3 ft. and a similar ordinance introduced in the Chicago City Council. It was this ordinance on which the public hearing was held. Mr. Weston continued his discussion by expressing his personal views as follows:

A condition should be maintained that will result in the least number of accidents. In order to make the space between tracks safe for a cool-headed, self-possessed man the space should be 30 in. to 36 in., and it would be better if it could be made 48 in. I am not convinced that the safety would be greater with a 20-in. space between cars than with an 8½-in. space. A medium or undersized person, at least, would not be crushed to death between cars in a 20-in. space, but it is believed by many people who have studied the subject and who are engaged in the business of operating cars on public streets that a space between cars approaching 20 in. would result in a condition that would invite people to seek refuge in that space, who might be knocked down or fall and be dragged under the trucks, and thereby greatly increase the number of crossing accidents.

This question is not strictly a technical or engineering question, and it is impossible to theorize on which condition will result in the least number of fatal accidents. The crossing policeman, who is stationed at the busy street intersections to regulate traffic and to safeguard the pedestrians, and who is in daily contact with the problem, is competent to pass judgment upon this subject. I have recently interviewed a number of the crossing policemen at intersections where street cars are being operated, and in every instance these men say that if the space cannot be made wide enough to be absolutely safe then it should remain as it is. There should be no condition existing that would invite people to take refuge in an unsafe space.

With tracks 10 ft. 2 in. center to center and cars 8 ft. 6 in. wide overall, the distance between the overhang of the car and the curb will be practically the same as with a track center of 9 ft. 8½ in. and cars 9 ft. wide overall, namely, 9 ft. 7¾ in. in one case, and 9 ft. 8 in. in the other. This distance between car and curb is the minimum that should be considered, particularly upon a business street with a 38-ft. roadway, because with the ordinary delivery wagon backed up to the curb for loading or unloading the space is just sufficient to allow a car to pass; and with a large coal wagon or truck moving parallel with the track there is just space sufficient for the car to pass and allow some variation in the exact position of the wagon in the space. The Chicago Railways Company now have under contract 350 cars 8 ft. 6 in. wide overall and this new equipment and widened centers on some streets will give an opportunity to study by comparison the net result in accidents to pedestrians.

At a meeting of the Board of Supervising Engineers, held on June 29, a resolution was adopted fixing the minimum distance between track centers at 10 ft. 2 in. and the maximum width of cars to be built hereafter at 8 ft. 6 in. This is in accord with Mr. Arnold's original recommendation.

COST OF SPRINKLING STREETS IN DETROIT

Some data on cost of sprinkling tracks in Detroit was published in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, page 949, in connection with the report of F. H. MacPherson & Co., accountants, made to the Committee of Fifty, which is investigating the street railway situation in that city. A correction should be made in the heading of the table showing the cost of sprinkling which appeared on the bottom of page 949. The title of this table should read, "Sprinkling Tracks—Showing Number of Tanks of Water Used, Mileage and Direct Labor Cost, 1904-1908, inclusive." The columns of costs cover the direct labor charges only and not the entire cost of sprinkling.

TRACK SPACING AND CAR WIDTHS IN CITIES.

City and company.	Distance C. to C. of tracks.	Width of double truck cars.	Street between curbs.	Space between cars.
Boston El. Ry. Co.....	9' 8½"	8' 6"	70'	15½"
Prospect Park & Coney Island Ry. Co.	12' 0"	8' 2½"	30'	8½"
Nassau Elec. Ry. Co.....	8' 10¾"	8' 7"	60'	45½"
Phila. Rapid Transit Company.....	11' 7"	8' 6"	24'	10¾"
Rochester Ry. Co.....	9' 2¼"	8' 6"	88'	37"
Twin City Rapid Transit Company...	9' 11"	8' 2"	59'	8½"
Milwaukee Elec. Ry. & Light Co....	8' 7"	8' 2½"	35'	21"
International Railway Company.....	10' 0"	8' 6"	38'	11"
Denver City Tramway Company.....	11' 0"	8' 6"	40'	9½"
*United Railways Company of St. Louis	9' 6"	8' 6"	50'	30"
Cincinnati Traction Company.....	9' 8½"	8' 9½"	36'	12"
	9' 0½"	8' 9½"	58'	11"
	12' 0"	8' 9½"	28'	3¼"
	10' 0"	8' 2"	60'	46"
			34'	22"
	10' 2"	9' 0"	36'	14"
	9' 8½"	8' 4"	42'	16½"
	9' 2½"	8' 4"	30'	10½"

*Cars of this company that are operated single-ended—that is, turn on loops, are offset on the trucks from the center lines 2", making an added clearance between cars of 4", and making a total space between offset cars of 18".

given in this table Mr. Weston cited the practice in New York City where the standard spacing of tracks is 10 ft. ½ in. and the width of the widest cars is 8 ft. 3½ in., which leaves 21 in. between cars.

At a meeting of the board on Aug. 27, 1907, Mr. Arnold recommended that a track center spacing of 10 ft. 2 in. be adopted and that the overall width of cars be limited to 8 ft. 6 in. At a subsequent meeting this recommendation

PEORIA ELECTROLYSIS CASE

Another stage of the long-drawn-out litigation usually referred to as the "Peoria electrolysis case," but by no means the final one, was reached on June 22, when Frank L. Wean, of Chicago, as special master in chancery, filed a second report to the United States Circuit Court for the Northern District of Illinois. The complainant in this case is the Peoria Waterworks Company and the defendant is the Peoria Railway Company. The suit, which has been pending in one form or another for perhaps 15 years, arose out of the damage to the plaintiff's buried water mains alleged to be due to escaping current from the defendant's return electric circuit. The master's finding is as follows:

The evidence offered on this re-reference fails to disclose any method which will completely or substantially prevent the injury complained of and all the evidence fails to disclose the discovery, since the hearing under the previous order of reference, of any new principle or fundamental law, regarding the nature and effect of electric current, or of any new method of preventing the escape of such current different in principle from those known at the time of the former hearing. In other words, the evidence on this reference, taken as a whole, tends to confirm the findings stated in this special master's former report.

The former conclusions, which the master fails to change, were published in the *STREET RAILWAY JOURNAL* for June 22, 1901. In effect they were that the injury complained of exists; that it is permanent and continuing; that it is being caused by the defendant; that the complainant can do nothing to prevent the injury; that the defendant can prevent it by the use of the double trolley system, which, though more expensive to install, is as safe, economical and satisfactory in its operation as the single trolley system.

Objections to the master's report have been filed by the defendant's counsel, John P. Wilson, of Chicago, and I. C. Pinkney, of Peoria, who contend that many of the findings of the master are contrary to the evidence, particularly the statement that it is more difficult to prevent the escape of current since the former hearing, owing to the increase of traffic and the passage of large interurban cars. Categorically, findings as to injury to pipes, pitting and the alleged injury to the complainant's distributing system are objected to as being contrary to the greater weight of evidence.

The next step in this litigation no doubt will be a motion by the complainant's attorneys to have the master's report confirmed by the court. Undoubtedly the judge hearing that motion will take the case under advisement, and it will probably be some time before the court's decision is announced. From this decision there is, of course, opportunity for appeal by either side.

Since the announcement by the Metropolitan Street Railway Company that it would accept eight college graduates into its employ as apprentices it has received more than 500 applications. The announcement mentioned was published in the *ELECTRIC RAILWAY JOURNAL* for May 29, 1909. Some of the institutions whose graduates are represented among those from whom applications have been received and the number of applicants are as follows: Cornell University, 14; Pratt Institute, 17; Stevens Institute of Technology, 11; College of the City of New York, 7; Hebrew Institute of Technology, 5; Cooper Union, 9; International Correspondence School, 7; West Point, 2; Fordham, 3; Yale, 4; Harvard, 3; Purdue, 1; Leland Stanford, 2; Brooklyn Polytechnic, 6; Syracuse University, 9; Holy Cross, 2; Massachusetts Institute of Technology, 7, and Missouri University, 1.

DENVER CONVENTION CIRCULAR OF THE MANUFACTURERS' ASSOCIATION

George Keegan, secretary of the Manufacturers' Association, has sent out this week a circular containing advance information about the convention arrangements in Denver. The text of the circular follows:

As previously announced, the date for holding the twenty-eighth annual convention of the American Street and Interurban Railway Association at Denver, Col., has been changed from Oct. 18 to 22, inclusive, to Oct. 4 to 8, inclusive.

The Manufacturers' Association, which holds an exhibition in connection with the street railway convention, has secured for exhibit purposes the use of the Auditorium Building, located at Fourteenth, Champa and Curtis Streets. This building, together with temporary buildings that will be erected immediately adjoining the Auditorium, will provide approximately 45,000 sq. ft. of exhibit space exclusive of aisles.

The executive committee at its last meeting fixed the rate for this space at 30 cents per square foot for space in the Auditorium proper and 20 cents per square foot for exhibit space in the annex building. These figures include light, electric power, and practically all other concessions that went with the space at Atlantic City convention last October. Excellent facilities will be provided for track exhibits, which can be displayed on tracks in the street adjoining the Auditorium.

The Western Passenger Association, covering the lines between Chicago and Denver, and the Eastern Passenger Association, covering the lines between New York and Chicago, will soon announce their decision on passenger rates. The change in date made it necessary to reopen negotiations with these associations.

The matter of reduced freight rates is under consideration with excellent chances of securing exposition rates on all freight, which is full rate from initial point to Denver with free return, amounting practically to half rates.

A circular containing information regarding hotel rates is now being prepared by Secretary Swenson of the American Association and will be issued within a few days.

The exhibit committee has had plans drawn showing the layout of the exhibit space and will forward to all members within a few days all detailed information concerning exhibits, together with application blank for exhibit space. [The circular, containing a plan of the exhibit space, rates and other information, which was distributed prematurely to some members last week, contained several errors, which are corrected in part above. An accurate plan will be mailed as soon as prepared.—Eds.]

From the amount of enthusiasm displayed by the members of the American Association of the twenty-eighth annual convention promises to be one of the best attended meetings ever held and it is hoped that the members of the Manufacturers' Association will do their share to add to the success of the convention.

THE MCGRAW-HILL BOOK COMPANY

The book departments of the McGraw Publishing Company and the Hill Publishing Company have consolidated under the corporate name of the McGraw-Hill Book Company, with offices after July 1 at 239 West Thirty-ninth Street, New York. This consolidation brings together two of the most active publishers of technical books in the country. The new company takes over the book departments of both houses with a list of about 250 titles, both industrial and college text books, covering all lines of engineering. It will continue as well the retail, importing and jobbing business of the two houses.

The officers of the new company are: President, John A. Hill; vice-president, James H. McGraw; treasurer, Edward Caldwell; secretary, Martin M. Foss.

Mr. Hill is head of the Hill Publishing Company, which controls the *American Machinist*, *The Engineering and Mining Journal*, and *Power and the Engineer*. Mr. McGraw is head of the McGraw Publishing Company, which issues the *Electrical World*, *ELECTRIC RAILWAY JOURNAL* and *The Engineering Record*. Mr. Caldwell has been manager of the McGraw Book Department for several years and Mr. Foss manager of the Hill Book Department.

MEETING OF THE COMMITTEE ON EDUCATION

A meeting of the committee on education of the American Street & Interurban Railway Association was held at the offices of the association at 29 West Thirty-ninth Street, New York, on June 24. Those present were: Prof. H. H. Norris, of Cornell, chairman; Prof. D. C. Jackson, of the Massachusetts Institute of Technology; Prof. A. S. Richey, Worcester Polytechnic Institute, and R. E. Danforth. On April 10 the committee sent out a circular letter in regard to the work for the coming year, a copy of which was published in the *ELECTRIC RAILWAY JOURNAL* for May 1, 1909. This letter described the two educational plans which the committee had in mind, one for the benefit of technical graduates who desire to learn the railway business, and the other for present employees of the companies who wish to increase their knowledge of the technical side of electric railways. The replies which have been received to this letter indicate that the railway companies as a whole are very enthusiastic over both plans. The two plans decided upon at the meeting held on June 24 which were recommended to the association for adoption are similar to those outlined in the previous circular, but will embody certain changes suggested by the letters already received.

Some of the smaller companies in their replies indicated that they are uncertain whether the plan of the apprenticeship course for technical graduates could be inaugurated on their systems. The committee wishes it to be thoroughly understood, however, that no company is too small to take advantage of this plan, if it desires to do so, and will make this point clear in the next circular to be issued within a short time.

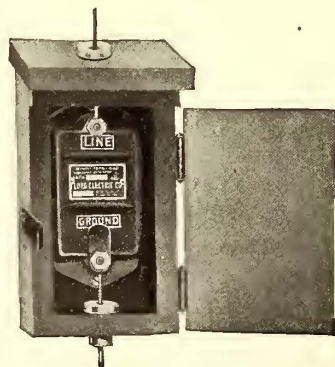
The comments made on the second plan of a correspondence course for the benefit of present employees of the companies were also enthusiastic and seemed to indicate that all of the member companies replying will take advantage of this plan. If all of the member companies of the association are equally enthusiastic there will be enough men to start a new university.

THE MULTI-VAPO-GAP LIGHTNING ARRESTER

The Garton "Multi-Vapo-Gap" lightning arrester, made by the Lord Electric Company, New York, is of the type in which natural cloud conditions are simulated by arranging for a large number of vapor gaps which will not



Car and Station
Arrester



Line Arrester

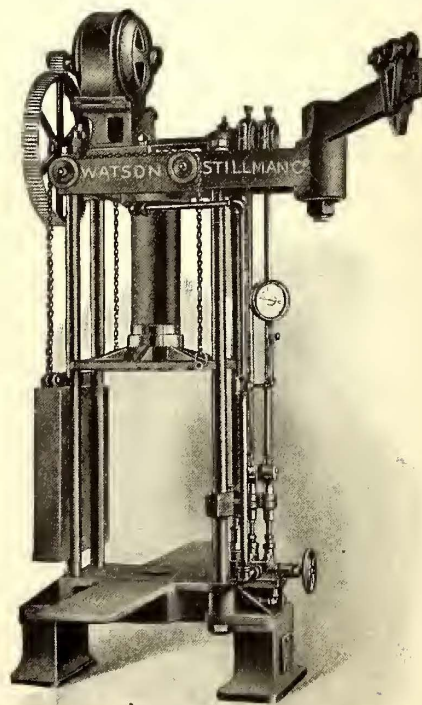
permit the passage of dynamic electricity. The body of the arrester is a highly hygroscopic mass, which holds moisture in suspense in a fixed and definite volume and maintains it in a static conductor form only. The hygroscopic mass is hermetically sealed in a porcelain housing.

It is stated by the manufacturer that the impedance of this arrester is virtually nil, because the myriads of moisture globules, though mechanically separated, are infinitely close together, due to the chemical and hygroscopic composition. The multiplicity of vapor gaps eliminates the need for an air-gap, which feature, together with the low impedance, makes it impossible for static electricity to build up on the line. The arrester is provided with a telltale, which indicates and records the passage of the discharge. This telltale can also be used to open the circuit, which is a valuable feature when testing. The maintenance of the arrester involves no trouble, as it has no moving parts, is electrically indestructible, and contains no metal aside from the terminals. The arrester is also free from all forms of carbon.

The block type of this arrester is enclosed in weather-proof wooden boxes when made for line or car use. It is recommended that for line use the arresters should be distributed five to the mile and connected with the same maker's "Hydro-Ground" grounding device, described in the *ELECTRIC RAILWAY JOURNAL* of June 19. In the case of car protection it is suggested that the arrester be connected directly to the trolley base by a separate conductor and the truck or motor body by another conductor. This will make the lightning arrester circuit on the car independent of other circuits, and establish a direct path from the trolley base to the running rails.

A REVERSED CYLINDER PRESS

The Watson-Stillman Company, New York, has just introduced a reversed cylinder forcing press, which should prove a handy tool for pressing bearings and for miscel-



Reversed Cylinder Press

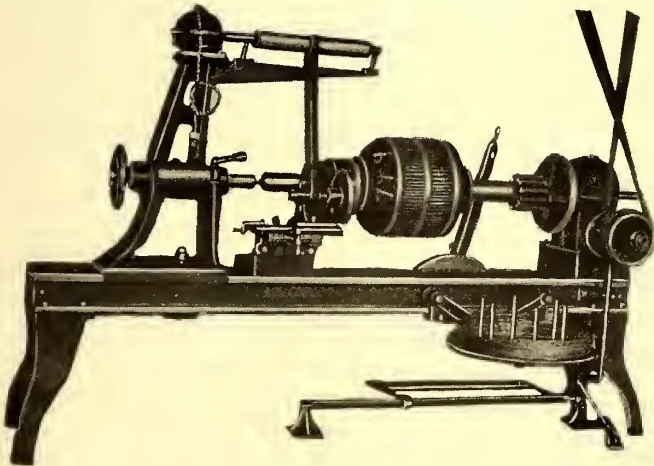
laneous work. As will be seen from the illustration, a crane bracket and beam extending from one end enables the operator to swing a heavy piece of work on to bracket shelves extending out from each side of the bottom platen. These shelves, 30 in. x 12 in., are detachable, can be lifted

off on jobs where they would be in the way, and are sufficiently strong to support any work that will go into the machine. They will be appreciated by those who have had to push castings or parts into place on the ordinary small platen. The motor, mounted upon pedestals on top of the press, drives the pump shaft through single reduction gearing. If desired, a hand or belted drive is furnished, instead of the motor. On the other end of the pump shaft are two eccentrics, each driving one of the pistons of a $\frac{3}{4}$ -in. x 2-in. twin pump, for which the pedestal legs act as reservoirs. The operating valve is of the single-screw stem type, and connected to release the pressure from the work when opened and start the ram down when closed. It will not retain the pressure unless the motor is stopped or the liquid driven through the safety valve. Other types of valves may be substituted to meet special conditions. A gage is furnished to read in tons or pounds per square inch, as desired.

COMBINATION TOOL FOR COIL AND COMMUTATOR WORK AND GRINDING

The American General Engineering Company, New York, has just perfected a unique combination tool which should find a place in many electric railway shops. In this device one foundation framing and bed is used for all kinds of coil winding, banding and heading, commutator truing and slotting, and miscellaneous grinding. A view of the machine is shown in the accompanying illustration.

A spindle at the rear of the main spindle takes care of the armature coil winding, and a spindle on the end of the live spindle takes care of the field winding. The lever



Combination Tool for Coil, Commutator and Grinding Work

attachment used in banding work for putting tension on the wire is fitted with a fiber shoe to minimize friction while there is strain on the arm. The use of this fiber shoe allows the operator to move the arm more freely.

The work on commutators from 4 in. to 20 in. in diameter is done at the other end of the machine. The feature of having the motor on top of the center gives the opportunity of tightening or loosening the belt. By means of a screw the upper arm shown can be placed in a vertical position or at an angle, so that while a commutator is being taken out or put in the lathe it will not interfere in any way with the crane above the machine.

The emery wheel spindle is on the slide at the left. By substituting for this wheel a plate with a high-speed tool attachment, any desired cut can be made on the commutator. The grinding wheel may then be used to take off

all tool marks and give a fine finish to the work. The machine has also received a commutator slotting device which will work on the same slide and drum as that used for grinding and commutator truing.

The commutator slotter and grinder are motor driven, and the winding end is belt driven through a new style friction clutch, which gives a powerful positive drive.

CONSUMPTION OF TIES

During 1908 the steam and electric railroads of the United States purchased more than 112,000,000 cross-ties, costing at the point of purchase over \$56,000,000, an average of 50 cents a tie, according to statistics just made public by the Bureau of Census in co-operation with the United States Forest Service. This was some 40,000,000 ties less than the quantity purchased in 1907, when the total was approximately 153,700,000, the highest ever recorded. The decreased purchases in 1908 were, of course, chiefly due to the business depression which affected every line of industry. This forced most of the roads to purchase only the ties which were absolutely essential for renewals, and heavily cut down the purchase for new track. In 1908 only 7,431,000 cross-ties were reported as purchased for new track as against 23,557,000 in 1907. Of the total number of ties purchased for all purposes the steam roads took approximately 94 per cent, leaving about 6 per cent for the electric roads.

It is interesting to note the wide range of woods used for cross-ties. The preliminary report by the Census Bureau lists separately 15 classes or species. Of these the oaks are now and have always been by far the most important. The oak ties amounted to more than 48,000,000, or 43 per cent of the total quantity purchased. Next to these ranked the southern yellow pines, with 21,500,000, or 19 per cent of the total. It will be seen that the oaks and southern pines combined furnished nearly three-fourths of all the ties bought by the railroad companies last year.

While the oaks, and particularly the white oaks, have always been the preferred woods for cross-ties and still form a large proportion of the total, the increasing prices demanded for satisfactory oak ties are forcing the companies to look more and more for substitutes. Many of these, when treated, give a longer service than can be secured from untreated oak ties. Among the woods which have been most largely treated so far are the yellow pines, particularly loblolly pine, Douglas fir, western pine and lodge-pole pine.

This year's statistics add to the list two kinds of cross-ties which previously had not been reported in sufficient quantity to justify listing them separately. These are gum and beech. The purchases of gum ties in 1908 exceeded 260,000, while but slightly more than 15,000 of them were reported in the previous year. Of beech ties, the purchases in 1908 amounted to nearly 193,000, against but little more than 51,000 in 1907. These are woods which are distinctly not suitable for cross-ties unless they are given preservative treatment. Their increased use, therefore, is one of the many results of the progress of wood preservation in the United States. For many years beech has been one of the principal cross-tie woods in Europe, where its value when given chemical treatment was long ago recognized. It is not uncommon for European roads to secure from 20 to 30 years' service from beech cross-ties. Untreated, they would not last long enough to warrant their use at all.

LONDON LETTER

(From Our Regular Correspondent.)

The fourteenth annual convention of the Incorporated Municipal Electrical Association was opened in Manchester by a reception and conversazione at the Town Hall by the Lord Mayor on the evening of June 21. On June 22 the presidential address was delivered by S. L. Pearce. This was followed by a paper on "Cheap Units" by A. Sinclair, Swansea, and after the discussion the members and friends were entertained at luncheon at the Town Hall by the electricity committee. In the afternoon the delegates were conducted to the generating stations. On June 23 the delegates were taken by special train to Liverpool, where the association was welcomed at St. George's Hall by Sir Charles Petrie. The following papers were read at Liverpool: "The Influence of Metallic Filament Lamps on the Electrical Industry and on Street Lighting," by E. E. Hoadley, Maidstone, and "Modern Cable Systems," by E. M. Hollingsworth, St. Helens. After luncheon the various generating stations in Liverpool were visited and the royal mail steamship *Mauretania* was inspected. The meeting on June 24 was held at the Municipal School of Technology in Manchester, and the following papers were read: "Steam Turbines from the User's Point of View," by A. S. Blackman, Sunderland, and "Notes on Condensing and Water Cooling Plants," by E. Lunn, Huddersfield. On the afternoon of June 24 the works of the British Westinghouse Company at Trafford Park were visited. June 25 was given over largely to a business session, at which a president was elected and new members admitted. On the afternoon of June 25, however, delegates and visitors were afforded an opportunity to visit the station of the Lancashire Electric Power Company, Radcliffe, and the various electrical manufacturing plants in the vicinity, and many persons availed themselves of the courtesy thus extended, to their personal profit.

The managers' section of the Municipal Tramways Association held a successful conference in Newcastle in June. Sir Joseph Ellis, chairman of the tramways committee, accorded the managers a hearty welcome. Ernest Hatton described the Newcastle Tramways in a paper, and Mr. McElroy, Manchester, read a paper on the charges for energy for traction purposes. A paper on the medical examination of motormen and conductors was read by Mr. Hamilton, Leeds. Other subjects, such as time meters, maintenance of track and the use of transfer tickets were considered in papers delivered by Mr. Mozley, Burnley; Mr. Rogerston, Halifax, and Mr. Ellis, Cardiff.

The through service of tram cars between Leeds and Bradford has now been established. It will be remembered that the two corporations have been experimenting for some time with the object of through service in view. The gage of the Leeds system is 4 ft. 8½ in., but the gage of the Bradford system is only 4 ft. More than a year ago Mr. Spencer, of the Bradford system, invented a sliding sleeve, which, when fitted to the axles, enabled cars to pass from one system to the other over a stretch of track of tapering gage, and two cars so equipped have been in operation for a year.

After various improvements a number of cars were equipped with the sliding sleeve and put into permanent operation, the Lord Mayor of Leeds driving the first decorated car over the boundary into Bradford and the Lord Mayor of Bradford driving a decorated car in the opposite direction. The fare for the entire journey is to be 6d, and, judging by the traffic for the first week, the service is going to prove successful.

At a recent meeting of the City Council of York the report of the tramways committee recommending the acceptance of the tender of Dick, Kerr & Company to construct and equip the tramway system at a cost of £78,000 was definitely adopted. The time specified in the contract for the construction is 12 months, but arrangements have been made with the contractors by which that time is to be reduced to six months. Certain amendments were moved, but finally the report was adopted as a whole, and the work will be immediately commenced. With the exception of Oxford and one or two other places, there would appear to be very little more new work of this kind to be done in England.

Mr. Mallins, the general manager of the Liverpool Tramways, is having every car on the Liverpool system disinfected twice a day. Hitherto each car has been disinfected at night, but during the hot weather Mr. Mallins proposes to have each car thoroughly disinfected in the middle of the day as well.

Mr. Mallins has each car swept carefully and the floor sprayed with a small quantity of chloride of mercury. The operation only occupies a moment or two, and as there is

no obnoxious odor, it should result in a distinct benefit to the hygiene of the city at large.

The City Council of Leeds has recently adopted the report of the sub-committee which visited the Continent to consider the trackless trolley. This report recommends that one of the systems inspected should be given a trial, and the route to Farnley has been selected for the experiment. It is, therefore, extremely probable that Leeds will show the way in England for an experiment of this nature. As the subject has received considerable attention in Great Britain during the last year the experiment will be watched with interest.

Northampton was the most recent city to send a deputation to the Continent, and it is understood that this deputation has also returned well impressed with the practicability of a trackless trolley tramway in outlying Northampton. The Edinburgh tramway committee, on the other hand, after considering a report of a deputation which it sent to the Continent to study the trackless trolley, has come to the conclusion that there are not sufficient data to warrant an expression on the subject, as the installation of the system would involve considerable increase in the cost of maintenance of roads and might prove a source of danger to the public using the highways.

The preamble of the bill of the Central London Railway, which has been applying to Parliament for an extension of its "twopenny tube" at its eastern end from the Bank to Liverpool Street, has been amended, as a much more logical terminus has been proved by the Parliamentary Committee, and it is likely that this work will be proceeded with at once. It is interesting to note also that at the inquiry the engineer of the Central London Railway gave some information about the proposed short subway to connect the Central London station at the British Museum with the Holborn station of the Great Northern, Piccadilly and Brompton tube. It is intended to have a traveling staircase to bridge the two hundred or three hundred yards between the platforms.

As stated recently, the North East London Railway has revived its scheme for constructing a tube from the Monument in the city to Waltham Abbey in the northeastern suburbs. The company was incorporated in 1905, but permission has never been granted by Parliament for financial reasons. The scheme, however, is being kept alive, and an extension of time for adequately financing the plan has been granted.

The City of Glasgow, which has always been looked up to as the representative city for municipally operated tramways, shows, during the last fiscal year, a decrease of £18,000 in the gross receipts of its tramway lines. It is argued, somewhat naturally, by other cities, that this has been caused to a certain extent by the extensive use of halfpenny fares in Glasgow. It would appear, however, that this had nothing to do with the case, and that the decrease is simply based upon the condition of poor trade in that northern city, where the shipbuilding industry in particular has been extremely slack. The effect of depression in trade on almost every tramway in Great Britain has been very pronounced during the last year, and Glasgow does not seem to have suffered much more seriously than other cities.

Andrew Nance, general manager of the Belfast Tramways, has just presented his annual report. Mr. Nance states that out of about 80 corporations 24 show an expenditure of 7d. per car mile run, the highest rate shown being 9¼d. There is a net profit, after deducting all fixed charges, of more than £37,000, and the receipts actually show an increase of £1,000 over those of the previous year, and work out at 9.12 of a penny per car mile run, which compares very favorably with preceding years.

In his Royal Institute lectures Professor Dalby has pointed out that the conversion of suburban systems to electrical working is equivalent to an increase in the size of the stations, claiming that for a journey of 100 miles, at 50 miles an hour, the steam locomotive is commercially more satisfactory, while electric traction should be used if the scheduled speed were doubled.

The London County Council has passed the estimates submitted by its highways committee for a further expenditure of £1,800,000 for further tramway developments in the current financial year. The total capital expended and authorized is now put at £12,750,000, the expenditure to March, 1909, being £9,484,000, leaving approximately £3,250,000 for future expenditure. These figures are exclusive of the price of the portion of the London United Tramways system which the Council has decided to buy, and also of the expenditure for the construction of the lines for which Parliamentary sanction is being sought. The above is the estimates of the Moderates in the Council. The only criticism offered by the Progressive party was that still more money ought to be spent and that the money ought to be spent more rapidly.

A. C. S.

News of Electric Railways

Cleveland Traction Situation

On June 21 the City Council considered the Tayler ordinance and finally voted it down. All the adherents of the Mayor voted with him to defeat the ordinance. Councilmen Homer and Walz refused to vote, stating that the Tayler ordinance had not received just consideration.

Acting under a suspension of rules, the City Council on the evening of June 24 gave Herman J. Schmidt rights on 13 routes as extensions of the Payne Avenue grant, which has not yet been voted upon by the residents of the city. The extension ordinance received the solid support of the administration Councilmen, including Mr. McLain, a Republican, but was opposed on the floor by Dr. Walz, who introduced the Tayler ordinance, and four Republicans, all of whom cast their votes against the Schmidt grant.

Councilmen Horner and Kramer attacked the ordinance on the ground that it is invalid, in that it provides for extensions of a route on which the franchise has not been approved by the people, and which is, in fact, not an ordinance until such approval is secured, once a petition is properly signed asking for a referendum vote. Councilman Walz asserted that the ordinance failed to embody the safeguards for the people that are contained in the Tayler ordinance and that it is entirely inadequate in its provisions for city supervision over service and operation. Mr. Walz pointed out the omission of many conditions that were insisted upon in any ordinance that might be passed in the interest of the Cleveland Railway, and asked why the administration granted favors in one case that were denied in another. These so-called extension grants include all but three of the main lines now occupied by the Cleveland Railway on the East Side and those on the West Side not included in the grants made to the original 3-cent companies. They include a provision to the effect that transfers shall be given to all other low-fare lines.

At a meeting of citizens of Cleveland in the library of the Chamber of Commerce Building on June 21 a committee of 100 was named to oppose the Schmidt franchises in the referendum election. Homer McDaniel, who was made chairman of the meeting, was selected as chairman of an executive committee of seven to conduct the campaign. The committee proposes to hold meetings all over the city, beginning about July 1. Chairman McDaniel spent the week beginning June 21 considering the personnel of the committee of seven that will have direct charge of the campaign against the Schmidt ordinance.

Speaking in a tent located in the heart of the original 3-cent fare district on the West Side on the evening of June 23, Mayor Johnson declared that he could prove from the figures in the receivers' hands that 3-cent fares had paid, and he challenged any one to debate the question with him. He has written Chairman McDaniel of the citizens' committee, asking that his men take part in public debates in his tent. Mr. McDaniel has replied that he cannot commit himself until his committee of seven is named and has time to consider the matter. At one of his meetings M. J. Gallagher, a member of the committee, stated that if the Mayor's challenge is refused he will resign.

I. P. Lamson, president of the Lamson & Sessions Company, has written a letter to the Chamber of Commerce, in which he asks that all business men so arrange their affairs as to be in the city on the date of the referendum election, Aug. 3, and that their vacation schedules, whether they are in favor of or opposed to the Schmidt grants, be so fixed that their employees may have an opportunity to vote.

On June 26 the city was flooded with circulars in which this question was asked: "What do you think of business houses which insist that you shall pay 5 cents carfare when you are now riding for 3 cents?" Then followed a list of firms on the West Side and on the East Side which are represented on the Chamber of Commerce committee of 100. The fact that these firms are represented on the Chamber of Commerce committee was noted again after the list of firms. The circular was concluded with this advice: "Think it over! This is considered by the merchants as an attempt by the Mayor at boycott, especially since many of the members of the citizens' committee of 100 were called up by telephone beforehand and asked if they were going to remain on the committee, and if they did not think it would hurt their business if they did." The members of the committee named in this circular and others said that the accusation that they favor a 5-cent fare is false; but that they do favor the best service that can be given for a fare that will cover the cost and yield a fair return on the investment.

Transit Affairs in New York

Application was made on June 25 to the Board of Estimate by the Public Service Commission for permission to advertise for bids for new subway routes. These new lines are, with some minor changes, those planned by the Bradley-Gaffney-Steers Company. The commission asked to be allowed to advertise for bids for construction alone, for equipment and operation in case of construction alone, and for construction, equipment and operation and also to advertise for offers for the equipment and operation of the Brooklyn loop lines and the Fourth Avenue line, which are to be constructed by the city. The Bradley-Gaffney-Steers Company has made these routes part of its proposed system and is ready to contract with the city for equipping and operating them.

Under the suggestions made by the commission in its communication to the Board of Estimate it will be possible to let contracts for building sections of the road or for the entire system as mapped out by the company. It would also be possible under this provision for the Interborough Rapid Transit Company to compete for the Lexington Avenue section alone, a route for which it is desirous of getting a franchise in order to extend the present subway up the East Side of the city. The commission declared:

"It is to be noted that in considering the proposition of 'construction alone' this may be undertaken by either municipal funds or by special assessment in whole or in part. Under the present law contracts for equipment and operation will be under the indeterminate plan as outlined above. Contracts for construction, equipment and operation also will be under the indeterminate plan, ownership of the road being vested in the city. Provision will be made for soliciting bids for and letting an entire system or any part thereof to a successful bidder with appropriate provisions in the contracts for operating the various routes in conjunction with each other and for the apportionment of charges and rentals. These are matters which it is impossible to work out at the present time, but must be developed and perfected during the preparation of the contracts. As soon as the commission is advised of your wishes in the premises the drafting of the invitations and the form of contracts can be commenced. If the commission can receive such advices at an early day the work of preparing the contracts will be undertaken."

The matter has been referred to a select committee of the board consisting of Comptroller Metz, President McGowan of the Board of Aldermen and Borough Presidents Ahearn, Coler and Haffen.

Mayor McClellan has approved the franchise of the Hudson & Manhattan Railroad passed by the Board of Estimate recently, this being the final step toward authorizing the extension of the road from Sixth Avenue and Thirty-fourth Street to the Grand Central Station. W. G. McAdoo, president of the company, has stated that work will be begun as soon as possible and that trains will be running to the Grand Central Station by 1911.

In a report submitted to Bridge Commissioner Stevenson, Assistant Engineer Lane of the department, who has charge of the traffic on the Brooklyn Bridge, says that the number of trolley cars and trucks crossing the bridge during May was greater than in any other month since it was built. The daily average of trolley cars from 5 to 6 p. m. was 324, as against 267 for 1907.

Judge Lacombe, of the United States Circuit Court, has granted the application of the receivers of the Metropolitan Street Railway to amend the original order as to their administration of the road. By the judge's ruling, the receivers will supplement their present system of accounting by making such additions or changes as may be agreed upon in writing by all parties interested and approved by the court, and all questions as to the manner and form of keeping their books, on behalf of conflicting interests, are reserved for further determination by the court.

The Public Service Commission will apply to the Board of Estimate for \$350,000 to build a new subway station on the Broadway branch near 100th Street. There is at present no station between 181st Street and Dyckman Street, and the population of the district is growing fast.

The Public Service Commission has announced an opinion by Commissioner Maltbie in which the commission disapproves the style of wheelguard in use by the Second Avenue Railroad and the Fifty-ninth Street line of the Central Park, North & East River Railroad. Commissioner Maltbie recommends that the cars be equipped with automatic trip wheelguards such as are now in use on the lines of the Third Avenue Railroad.

Association Meetings

Central Electric Railway Association, Detroit, Mich., Aug. 26.

Central Electric Accounting Conference, Indianapolis, Ind., Sept. 11.

American Street & Interurban Railway Association and affiliated associations, Denver, Col., week commencing Oct. 4.

Colorado Light, Power & Railway Association, Denver, Col., during the week of Oct. 11-16.

Municipal Ownership Defeated in San Francisco.—On page 999 of the issue of the *ELECTRIC RAILWAY JOURNAL* of May 29, 1909, mention was made of the passage in San Francisco of an ordinance to submit to the voters of the city a bond issue of \$1,950,000 to cover the cost of reconstructing the Geary Street, Park & Ocean Railroad and extending the line to the Cliff as a municipal enterprise. The question was voted upon on June 24, and the proposal was defeated. The franchise of the Geary Street, Park & Ocean Railroad expired in 1906.

Suspension of Judgment Asked in St. Louis Case.—Motions by attorneys for the United Railways, St. Louis, Mo., to transfer the Barrie case, recently affirmed by the Appellate Court, to the Supreme Court of Missouri, and for a rehearing, have been overruled by the St. Louis Court of Appeals. A motion has been made, however, for suspension of judgment pending the decision of the Missouri Supreme Court in other cases involving similar points. In the case of David Barrie against the United Railways, Judge Reynolds held the United Railways Company liable for judgments and claims against the St. Louis Transit Company, which it absorbed.

Date Set for the Opening of Lower Hudson River Tunnel.—William G. McAdoo, president of the Hudson & Manhattan Railroad, has announced that the company will formally open its tunnel between Jersey City and Cortlandt Street, New York, on July 19. Special trains for invited guests will be run at 10 a. m., and the line will be opened to the public at 3 p. m. Preparations are being made fittingly to celebrate the event in Jersey City, and a program is being arranged to include the participation of Governor Hughes of New York, Governor Fort of New Jersey, Mayor McClellan of New York, Mayor Wittmann of Jersey City, William G. McAdoo, president, and other officers of the company in the ceremonies.

Indiana Tax Board Reduces Taxable Value of Electric Railroads.—The Indiana Tax Board has notified the electric railways of the State of the assessed value of their properties for taxation. Beginning July 6, 12 days will be allowed for hearing appeals for a change or modification of the assessments. The board has assessed the electric railway property on a valuation of \$21,663,001, as against \$21,666,768 for 1908. The value of the improvements on electric railways for 1909 is estimated at \$994,189, while that for 1908 was placed at \$934,565, making a net gain in the value of improvements over 1908 of \$59,624. This includes the construction of nearly 10 miles of road by the Evansville Terminal Railway and 12 miles by the Goshen, South Bend & Chicago Railway. The following companies reported increases in mileage: Chicago, Lake Shore & South Bend Railway, 59.43 miles; Chicago, South Bend & Northern Indiana, 26.17 miles; Evansville & Southern Indiana, 4.3 miles; Indiana Union Traction Company, 2.21 miles; St. Joseph Traction Company, 1.08 miles; Terre Haute, Indianapolis & Eastern Traction Company, 1.12 miles; Indianapolis Street Railway, .41 mile.

Use of Boston Common for Subways Questioned.—A brief has been filed with the full bench of the Supreme Judicial Court of Massachusetts by the plaintiffs in the case of E. D. Codman and others against the Boston Transit Commission, relative to the use of Boston Common in connection with the construction of the Boston terminus of the Cambridge subway. It is argued that the use of the Common "impairs" its service to the inhabitants of the city and that the question is one of constitutionality. The case may ultimately go to the Supreme Court of the United States. In reply the Boston Elevated Railway has filed a brief which states that the plaintiffs cannot be heard on the question, since the Common is not their property. The City of Boston owns the Common subject to legislative control, which has often been exercised. The Common cannot be exempt from the exercise of the right of eminent domain. Land devoted to or taken from one public use may be appropriated by the Legislature for another. A brief is also filed by Corporation Counsel Babson for the Boston Transit Commission and one by Contractor McGovern, in favor of the proceedings. A feature of the case is an effort by the plaintiffs to secure the location of the

Cambridge subway terminus at Scollay Square instead of at Park Street. The full bench will review the case with the expectation of an early decision.

Electrical Engineering at Cornell University.—At Cornell University this year the degree of mechanical engineer was conferred on more than 225 candidates, including about 75 who have specialized in electrical engineering. Two years ago the electrical course was improved by the addition of a junior laboratory course. The present class is the first to graduate with this complete course, namely, eight hours of required electrical work in the junior year and 20 hours in the senior year. This complete course comprises (1) a junior laboratory course with one experiment per week throughout the year; (2) a senior laboratory course with two experiments and one recitation per week throughout the year; (3) a junior recitation course on the elements of electrical engineering with two recitations per week throughout the year; (4) a senior recitation course on the theory of electric circuits and machines with two recitations per week throughout the year, and (5) a senior problem course with two computing periods per week throughout the year. Last year these were (1) design of electrical machinery; (2) electric power generation and distribution; (3) telephone engineering; (4) wireless telegraphy, and (5) elementary and advanced electric railways.

Government Suit Against New Haven Railroad Dismissed.—On June 24 the Attorney-General of the United States directed the dismissal of the Government's suit against the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad for violating the anti-trust law. In explanation of his action the Attorney-General issued a statement in which he said: "In view of the fact that the suit of the United States now pending against the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad for a violation of the anti-trust act rests almost entirely upon a claim that these companies had already consolidated by means of stock ownership, and since the community most directly affected is the State of Massachusetts, whose laws now expressly authorize such consolidation, the Attorney-General has determined to dismiss the Government's action. In that action the further complaint was made that the New York, New Haven & Hartford Railroad had acquired a number of electric railways in Massachusetts and adjoining States, and that this was a combination in restraint of inter-State commerce. Since the Government's suit was determined upon, however, the Supreme Judicial Court of Massachusetts, in a case involving the right of the New York, New Haven & Hartford Railroad to acquire electric railways in Massachusetts, has decided that the railroad has no such power, and the New York, New Haven & Hartford Railroad has been parting with such electric railway properties. Upon this question the Attorney-General is convinced that, whatever may have been the merit of the claim when the suit was begun, there is not now in this case any such element of competition in inter-State commerce by reason of such ownership of electric railways as justifies further prosecution."

St. Louis League of Electrical Interests.—Capt. Robert McCulloch, president and general manager of the United Railways, St. Louis, Mo., was elected president of the St. Louis League of Electrical Interests at its permanent organization a few days ago and Walter Robbins, assistant general manager of the Wagner Electric Company, was chosen secretary. The executive committee is composed of S. A. Hobson, H. H. Humphrey, and F. E. Newbury. The meeting was attended by 180 representatives of electrical interests of St. Louis, including consulting engineers, public service corporations, electrical jobbers, electrical contractors and electrical manufacturers. Nine members of the St. Louis Electrical Club, which was organized 17 years ago, were made members of the new organization. They are Capt. Robert McCulloch, George Rosenthal, H. H. Humphrey, F. K. Beardsley, J. F. Gerleman, W. N. Mathews, A. S. Partridge, W. A. Layman and E. H. Abadie. Following his election as president, Capt. McCulloch announced that the hall of the United Railways, at Park and Grand Avenues would be made available as a meeting place for the club. An executive committee of five members will be appointed by President McCulloch. The objects of the new league are to encourage cooperation among electrical interests of St. Louis; to increase interest among those engaged in the commercial, legal, patent, professional and financial sides of electrical work; to establish a means by which public questions affecting the welfare of St. Louis may receive consideration by all the electrical interests of the city; to increase the recognition of the electrical industry commensurate with its importance; to form a body free from the imputation of devotion to special interests and to provide educational and social features for its members. The meeting was addressed by Capt. McCulloch, Secretary Robbins, C. A. Houts, F. N. Jewett and others.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Massachusetts.—The Massachusetts Legislature of 1909 adjourned on June 19 with the passage of about 540 acts and 145 resolves, about a score of which are of interest to electric railways. One of the most important acts passed was an amendment to the law authorizing a street railway to increase its capital stock or issue bonds. This law relaxes slightly the stringent conditions under which companies have heretofore labored in trying to raise money in Massachusetts for the reasonable and proper conduct of their affairs, and improves the possibilities in the way of financing betterments. A specific case of legislation intended to surround an operating company with easier conditions of financing is illustrated by the law passed to give the Connecticut Valley Street Railway Company the right to issue, subject to the approval of the Railroad Commission, bonds or notes payable at periods of not over 12 months for the purpose of refunding the present funded debt and paying other obligations up to the amount of \$750,000. In passing this law the Legislature thereby recognized some of the difficulties which attend the raising of funds by lines operated in thinly populated districts, and showed its willingness reasonably to encourage those in charge of the maintenance of the facilities in the region named. A law was passed to change the date when stockholders in railroads and street railways may subscribe for new stock, amending the previous law by permitting the directors to set the date at which each stockholder shall be given written notice of the amount of the increase proposed, the number of shares or fractions to which the stockholder is entitled to subscribe, the price and time limit upon the subscription.

The general law relating to the location of street railways was amended by permitting the company desiring a location to wait a maximum of 60 instead of 30 days before accepting a grant of a location or an alteration in a route already granted. The acceptance of such a location previously depended upon the vote of the president or a majority of the directors of the company. The 1909 amendment allows the acceptance to be "executed in accordance with the by-laws or a vote of the directors," giving a little broader latitude in the legality of acceptances of locations. Another section in the 1909 amendment provides that any requirement in the general laws of action to be taken or instruments to be signed by the president, directors or the majority of the directors of a street railway relative to the grants, extensions, alterations and revocations of location, abolition of grade crossings and rights in State highways shall be sufficiently and legally complied with if such action is taken by a vote, and if such instrument is executed in accordance with, and by the person or persons designated in, a vote of the directors at a meeting duly and properly held at which a quorum is present.

In connection with the determination of the taxable value of corporate franchises as legally provided for, an amendment was passed to the effect that "underground conduits, wires and pipes laid in public streets, and poles, underground conduits and pipes, together with the wires thereon or therein, laid in or erected upon private property, or in a railroad location, by any corporation except street railway companies, the value of whose poles, underground conduits and pipes, together with the wires" * * * "for the purposes of taxation, shall, like their rails and rights of way, be included in and not deducted from the value of their corporate franchises." In the case of a street railway company, whether or not chartered under the laws of Massachusetts, the tax commissioner is required to deduct from the franchise value as determined so much of the value of the company's capital stock as is proportional to the length of that part of its line that lies outside the State, if any does; and also the value of its real estate, machinery and poles, underground conduits, pipes and wires, subject to local taxation within the State. The inclusion of the poles in the items to be deducted is a definite relaxation of the burdens of taxation, so far as this particular portion of the physical plant is concerned in its relation to the company's franchise. A general law was passed authorizing all street railway, electric railroad and elevated railway companies within the State to transport military supplies over their respective lines subject to the regulation of the Railroad Commission. Another general law was passed enlarging the powers of the Railroad Commission so that if the board is of the opinion that stations or waiting rooms should be relocated it shall in writing inform the company of the improvements or changes which it considers necessary to recommend.

A number of special acts and resolves were passed, one of the most important being a resolve that the Boston Transit Commission and the Massachusetts Railroad Commission, sitting jointly, shall investigate and report to the Legislature in January, 1910, whether or not, in their opinion, it is advisable, expedient and in the public interest:

(First) To amend the Boston Elevated-West End consolidation law of 1908 by providing for a distribution of any of the assets of the West End Street Railway among its stockholders, or by changing the terms and conditions of the first and second preferred stock to be issued by the Boston Elevated Railway. (Second) To authorize the Boston Elevated Railway to acquire and hold the stock and securities of other street or electric railroads; and (third) to authorize the Boston Elevated Railway to extend its elevated structure from Sullivan Square to Medford. In connection with the proposed consolidation of the Boston Elevated and the West End systems a resolve was also passed to extend the time in which it can take place to Dec. 31, 1910.

Another matter of importance to be reported upon by the joint board at the request of the Legislature is the question of future subways, tunnels and elevated railway lines in Boston. About a dozen petitions and bills were introduced at the last session, asking for the construction of new rapid transit routes of various degrees of merit, ranging from projects which are the logical outcome of previous development to schemes of extraordinary conception and expense. All these measures were brought before the committee on metropolitan affairs and heard at greater or less length, so far as time permitted, with the outcome that the committee recommended and the General Court passed a resolve requiring an investigation and report in January, 1910, by the joint board as to the advisability of the projects. It was felt that more would be gained by studying these transit problems of Boston in a group than singly, and for this reason the Legislature also passed a resolve directing the joint board to investigate and report in January, 1910, upon the advisability of permitting the Boston & Eastern Electric Railroad to build a tunnel under Boston Harbor and certain subway lines in connection with it. A number of measures of minor import were passed, including an act to allow the Old Colony Street Railway Company to use the tracks of the Fore River Shipbuilding Company in Quincy, and an act authorizing the General Electric Company to use a portion of the tracks of the Pittsfield Electric Street Railway. The East Boston Railroad was authorized to use electricity as a motive power, if it so desires, and the term of the Boston Transit Commission was extended until July, 1911.

Among the bills which either did not pass or which were referred to the next General Court, one of the most important was the bill authorizing the New York, New Haven & Hartford Railroad to hold the stock of the Berkshire Street Railway Company. A measure which was given leave to withdraw was a bill to relieve street railways of the burdens of the so-called "excise tax" by providing that every company should be required, in lieu of any present stipulations and conditions, to keep in repair so much of the surface material of streets, highways and bridges as is included in the portion occupied by its tracks, and in unpaved streets a strip 18 in. wide on each side of the track was to have been added. Several bills relating to the Boston Elevated Railway were given leave to withdraw. One was a measure requiring the company to give night transfers on its system at Adams Square or Hanover Street, Boston, and another was a bill to provide for exits from the elevated structure at short distances apart. A third bill which failed to pass was a measure permitting the Old Colony Street Railway to lease its lines in Hyde Park and Dedham to the Boston Elevated Railway. A bill to allow the City Council of Boston to exact an excise tax as a condition upon the granting of franchises to any public or semi-public corporation was killed. The bill of the Boston, Lowell & Lawrence Electric Railroad to secure the right to build elevated and subway structures in Lowell, Lawrence, Somerville and Boston failed to pass, as did the bill to change the Boston terminus of the Cambridge subway from Park Street to Scollay Square. A bill to create a public-service commission to take over the work of the Boston Transit Commission and the temporary Metropolitan Improvements Commission was defeated. Another bill which failed was one imposing a fine or imprisonment upon any seeker for a position with a public-service corporation making false statements upon a written application. The bill of Mayor Hibbard, of Boston, providing that a street railway may be assessed three-quarters instead of half the cost of street widening in cases where the widening has been done within two years of or on account of a track location obtained there failed to pass. A bill to extend the time limit from one to two years for bringing a suit for damages in case of the death of a passenger or non-employee through the negligence of a railroad or street railway was killed. Three other bills which were short-lived required street railway companies to equip their cars with lifting jacks, fenders and hot-sand apparatus. The bill to define further the purposes of issuing stock and bonds by street railways was referred to the next Legislature.

Financial and Corporate

New York Stock and Money Market

June 29, 1909.

The recovery in the stock market, which has been in progress during the week, continued to-day and there was an increase in the volume of trading. Since the beginning of the present upward movement the majority of the list has recovered more than half of the losses sustained during the reaction of a fortnight ago. Even Amalgamated Copper, in spite of the adverse statistical position of the copper metal market, has recovered the greater part of its loss. Traction shares have been unusually active. Both issues of Interborough-Metropolitan have been traded in liberally and the preferred has recorded several points advance. Third Avenue, while it, too, has been quite active, has receded a few points on the announcement of a reorganization plan involving an assessment of \$25 per share.

The bond market continues to be strong—large issues whenever offered being quickly over-subscribed—and the money market shows no signs of stiffening. Quotations to-day were: Call, 1¼ to 2 per cent; 90 days, 2¼ to 2¾ per cent.

Other Markets

Philadelphia Rapid Transit continues to be the most active traction issue in the market of that city, but the price has been very well sustained. Union Traction has also been active with quotations unchanged.

In the Chicago market, there has been little trading in tractions. Even Kansas City Railway & Light, which has heretofore been fairly active, has been out of the market. But few lots of City Railway issues have been offered.

Massachusetts Electric shares have been practically the only tractions which have commanded any interest in the Boston market during the past week. Prices have recorded only fractional changes.

In the Baltimore market, in addition to the continued activity in United Railways bonds, there have been some transactions in the stock during the past week. The prices have ranged from 11¼ to 12¾.

Quotations of various traction securities as compared with last week follow:

	June 22.	June 29.
American Railways Company.....	445¾	445¾
Aurora, Elgin & Chicago Railroad (common).....	443	39½
Aurora, Elgin & Chicago Railroad (preferred).....	a88	a88
Boston Elevated Railway.....	128	129
Boston & Suburban Electric Companies.....	*16	*16
Boston & Suburban Electric Companies (preferred).....	*71	*71
Boston & Worcester Electric Companies (common).....	10	10
Boston & Worcester Electric Companies (preferred).....	a56	a56
Brooklyn Rapid Transit Company.....	77½	79½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	86¾	87½
Capital Traction Company, Washington.....	a134½	a135
Chicago City Railway.....	a190	a190
Chicago & Oak Park Elevated Railroad (common).....	*4	*4
Chicago & Oak Park Elevated Railroad (preferred).....	*14	*14
Chicago Railways, ptcptg, ctf. 1.....	a109	a109
Chicago Railways, ptcptg, ctf. 2.....	a36¾	a38
Chicago Railways, ptcptg, ctf. 3.....	a28	a28
Chicago Railways, ptcptg, ctf. 4s.....	a10	a10
Cleveland Electric Railway.....	*78	*78
Consolidated Traction Company of New Jersey.....	a78½	a78½
Consolidated Trac. Co. of N. J. 5 per cent bonds.....	106¼	a106½
Detroit United Railway.....	a62¾	a62
General Electric Company.....	160	161¾
Georgia Railway & Electric Company (common).....	a93	a93
Georgia Railway & Electric Company (preferred).....	88	87
Interborough-Metropolitan Company (common).....	16½	16½
Interborough-Metropolitan Company (preferred).....	45¾	50½
Interborough-Metropolitan Company (4½s).....	78¼	79½
Kansas City Railway & Light Company (common).....	a49	a49
Kansas City Railway & Light Company (preferred).....	a84¾	a84¾
Manhattan Railway.....	143¾	a147
Massachusetts Electric Companies (common).....	a12½	a13½
Massachusetts Electric Companies (preferred).....	a68	71
Metropolitan West Side, Chicago (common).....	a17	a17
Metropolitan West Side, Chicago (preferred).....	a52	a50
Metropolitan Street Railway.....	a27	a26
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	83¼	82½
Northwestern Elevated Railroad (common).....	a23	a23
Northwestern Elevated Railroad (preferred).....	a60½	a60½
Philadelphia Company, Pittsburg (common).....	a2½	a2½
Philadelphia Company, Pittsburg (preferred).....	a44	a43
Philadelphia Rapid Transit Company.....	29¼	a28½
Philadelphia Traction Company.....	91	a91½
Public Service Corporation, 5 per cent col. notes.....	a100½	a100½
Public Service Corporation, cfs.....	a80	a88½
Seattle Electric Company (common).....	*109	*112
Seattle Electric Company (preferred).....	102	*102
South Side Elevated Railroad, Chicago.....	a55½	a55½
Toledo Railways & Light Company.....	a9	a8½
Third Avenue Railroad, New York.....	26¼	21¾
Twin City Rapid Transit, Minneapolis (common).....	104¼	103½
Union Traction Company, Philadelphia.....	53½	a52½
United Railways Inv. Co., San Francisco (common).....	38¾	a39
United Railways Inv. Co., San Francisco (preferred).....	38¾	a39
United Railways Inv. Co., San Francisco (preferred).....	a62	a56½
Washington Railway & Electric Company (common).....	a43	a42½
Washington Railway & Electric Company (preferred).....	a90¾	a90¾
West End Street Railway, Boston (common).....	92	92½
West End Street Railway, Boston (preferred).....	105½	104
Westinghouse Electric & Manufacturing Company.....	83¼	85
Westinghouse Elec. & Mfg. Company (1st pref.).....	a124	121¼

aAsked.

*Last sale.

Third Avenue Railroad Submits Reorganization Plan

The committee representing the holders of bonds issued under the first consolidated mortgage of the Third Avenue Railroad, New York, dated May 15, 1900, has submitted to the Public Service Corporation of the First District of New York for consideration a plan for the reorganization of the company which provides briefly that the company shall issue immediately \$16,516,600 of refunding mortgage bonds, \$32,000,000 of adjustment mortgage 5 per cent accumulative bonds and \$20,000,000 of stock, the two main purposes being to provide upward of \$7,000,000 of new money and to give the old security holders new securities.

The plan of reorganization as filed with the commission shows that the property covered by the consolidated mortgage of the Third Avenue Railroad is to be purchased by the bondholders' committee at a foreclosure sale (unless they should decide to proceed without foreclosure and sale) and a new company is to be organized under the laws of New York, by which the following securities shall be issued when approved by the Public Service Commission: \$40,000,000 of first refunding mortgage 50-year 4 per cent gold bonds, to carry interest from July 1, 1909; \$32,000,000 accumulative adjustment mortgage gold bonds, to carry interest from July 1, 1909, and \$20,000,000 of stock, as previously mentioned.

Of the refunding bonds, which are to be redeemable at 105 per cent and accrued interest on and after July 1, 1914, on three months' notice, \$5,000,000 is to be delivered to an underwriting syndicate to be formed by the committee, and of which the members of the committee may become members; \$10,516,800 is to be issued to holders of the present consolidated bonds of the Third Avenue Railroad, being 8 per cent for unpaid interest and 20 per cent on account of principal; \$11,445,000 is to be reserved to take up the underlying bonds; \$1,000,000 is to be issued forthwith to provide for necessary extension, and \$12,038,200 is to be reserved for future extensions or improvements, under restrictions to be defined in the mortgage.

The adjustment bonds are to be cumulative and be entitled to elect a majority of directors until the full interest, including accumulations, has been received for five consecutive years, and are to be redeemable in whole, but not in part, at par and accrued interest on any interest date on three months' notice by the company. Of the total amount \$30,048,000 is to be issued to holders of the present consolidated bonds of the Third Avenue Railroad, being 80 per cent of the principal thereof; \$1,000,000 is to be delivered to the syndicate and \$952,000 is to be reserved to take care of certain issues of subsidiary companies, any balance to remain in the treasury of the new company.

The new stock amounting to \$20,000,000 is to be delivered to the syndicate and offered to the present stockholders of the company who deposit their stock and consent to this plan and pay \$25 per share, in an amount equal in each case to 125 per cent of their present holdings.

The summary and conclusion of the plan of reorganization as submitted to the Public Service Commission says:

"The present Third Avenue Railroad consolidated 4 per cent bonds will receive 8 per cent in refunding bonds of the new company for the unpaid interest and, on account of principal, 20 per cent in refunding bonds of the new company, and 80 per cent in adjustment bonds of the new company. The present stockholders will receive on the payment of \$25 per share 125 per cent of their present holdings in stock of the new company. The syndicate will receive \$5,000,000 of new bonds, \$1,000,000 of adjustment bonds and \$20,000,000 of stock, which stock it will offer to the shareholders upon payment by them of \$25 per share, and in addition provide the committee with sufficient cash to pay the reorganization expenses and the other cash requirements, making a total of \$7,500,000.

"In submitting this plan the committee has sought to make a sound and, so far as may be, permanent organization. Twice within a generation the progress of science has necessitated the entire reconstruction of the Third Avenue Railroad—first by installation of the cable system, and second by electrification, and that process may possibly hereafter be repeated. Property of this class is also specially sensitive to the exercise of taxing powers, and it may at any time be imperilled by State regulation, and, in addition, we have to face the popular delusion that while in all other departments of life the purchasing power of a nickel has during the last generation nearly been cut in two, and the price of everything proportionately raised, the people should still have transportation at prices which prevailed in 1870. These are considerations which expose street railway properties to unusual vicissitudes which demand that the fixed charges shall be as light as possible and explain the drastic character of the foregoing plan."

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Another bill of foreclosure has been filed by the bondholders of the Wisconsin division of the road, ancillary to the one filed in Milwaukee. The bills will be considered together.

Dallas (Tex.) Interurban Electric Railway.—Attorney-General Davidson, acting on behalf of the State of Texas, has filed suit in the district court at Austin against the Dallas Interurban Electric Railway for the appointment of a receiver and for the forfeiture of the charter of the company on the ground of insolvency.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe of the United States Circuit Court has denied the application of the Guaranty Trust Company, New York, for permission to appeal to the United States Supreme Court from the decree of foreclosure and sale of the Metropolitan Street Railway, made on March 18, 1909.

New Orleans Railway & Light Company, New Orleans, La.—The New Orleans Railway & Light Company has listed on the New York Stock Exchange an additional \$3,866,000 of its general mortgage 4½ per cent bonds, due 1935. This is part of an authorized issue of \$30,000,000, and a total of \$17,509,000 has now been listed on the exchange. Of the additional issue, the proceeds of \$1,532,000 have been devoted to reduction of the company's current liabilities and \$323,000 to retiring a like amount of four issues of underlying bonds. Proceeds of \$2,011,000 of the bonds were devoted to the capital expenditures of the company, which since May 1, 1906, are stated to have amounted to \$3,314,671. Some of the principal items of the latter are: Cars and their equipments, \$306,971; power stations, \$1,721,527; track extensions, \$129,596; track improvements, \$462,988, and various electric and gas construction. The balance sheet of the company as of Dec. 31, 1908, submitted to the New York Stock Exchange, shows assets of \$67,696,899 and liabilities of \$67,696,899.

Rockford & Interurban Railway, Rockford, Ill.—The Rockford & Interurban Railway, which has been taken over by the Union Railway, Gas & Electric Company, has organized as follows: H. D. Walbridge, New York, president; Emil G. Schmidt, Springfield, Ill., vice-president; T. M. Ellis, Rockford, Ill., general manager; W. H. Lemon, Springfield, Ill., secretary; W. F. Woodruff, Rockford, Ill., treasurer; H. D. Walbridge, Emil G. Schmidt, E. W. Clark, W. H. Lemon, W. Partridge and T. M. Ellis, directors.

Seattle (Wash.) Electric Company.—The directors of the Seattle Electric Company have declared a semi-annual dividend of 3 per cent on the common stock of the company, payable on July 15, 1909, to stockholders of record on July 6, 1909. This is an increase from a 5½ per cent to a 6 per cent annual dividend basis.

Taunton & Pawtucket Street Railway, Taunton, Mass.—Application has been made in the Massachusetts Superior Court for a receiver for the Taunton & Pawtucket Street Railway on a petition filed by the Federal Trust Company, Boston, trustee for \$200,000 bonds, for default of interest in January, 1909.

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—Hayden, Miller & Company, Cleveland, Ohio, offer for subscription at a price to yield more than 5.3 per cent the unsold portion of a block of \$1,000,000 of the first and refunding 5 per cent bonds of the Aurora, Elgin & Chicago Railroad, dated July 1, 1906, and due July 1, 1946, but subject to call in whole or in part at 102 and interest on or before, but not after, July 1, 1911. The par value of these bonds is \$1,000, and interest is payable January and July at the Citizens' Savings & Trust Company, Cleveland, Ohio, or the First National Bank, New York. The Northern Trust Company, Chicago, is trustee of the mortgage.

Choctaw Railway & Lighting Company, McAlester, Okla.—The Colonial Trust & Savings Bank, Chicago, offers for subscription at 93 to yield about 5½ per cent the unsold portion of \$150,000 of 5 per cent gold bonds of the Choctaw Railway & Lighting Company, dated March 2, 1908, and due March 1, 1938, but redeemable after 1913 at 105. Interest is payable in May and September at the Colonial Trust & Savings Bank, Chicago, the National City Bank, New York, and the Mercantile Trust Company, St. Louis. The McAlester Trust Company is trustee of the mortgage securing the bonds. The bonds are of the denomination of \$500 and \$1,000. A circular gives the total capital stock of the company at \$1,000,000, of which \$750,000 is common stock and \$250,000 preferred stock. There is an authorized issue of \$1,500,000 of bonds, of which \$750,000 has been issued, this including the \$150,000 now offered for subscription. The statement of earnings for the six months ending December, 1908, shows that the gross receipts of the company were \$78,613; net earnings, \$30,976; bond interest, \$18,750, leaving a surplus of \$12,226.

Traffic and Transportation

Strike in Pittsburgh

As a result of an order issued to the union employees of the Pittsburgh (Pa.) Railways Company at 11 p. m. on June 26, they refused to take out their cars on June 27, and for two days comparatively few cars were run in Pittsburgh. The men said that an agreement made with them in April, 1909, looking to the readjustment of runs and other matters had not been lived up to by the company and demanded that several employees who had recently been discharged for infraction of the company's rules should be reinstated. The company refused flatly to accede to these demands, and the position of the company in the matter is clearly indicated in the following statement which it addressed to its employees on June 26:

"Gentlemen—Referring to the present contention between you and the company, we are amazed at the stand you have taken, considering the nature of the grievances. We maintain that we have not failed to abide by the working rules of April, 1909.

"Section No. 1, regarding which you complain, reads: 'The hours of service will be made as nearly as possible equal on the basis of a maximum of 11 hours and a minimum of 8 hours, with 10 per cent leeway. In case the superintendent of transportation can arrange the schedule on the basis of a maximum of 10 hours and a minimum of 8 hours, and completing all swing runs within 14 hours, the same shall be done. On this date, April 27, 1909, there are 1165 runs, of which 213 are tripper runs of less than 8 hours. It is believed by the company that fully 50 per cent of these short tripper runs can be lengthened by extending the time for completing such runs to 16 hours and the company will use its best endeavors to so improve these runs within 30 days. All men shall have reasonable time to eat.'

"The company promised to use its best efforts to lengthen these short runs and has made considerable progress in this direction, notwithstanding the fact that additional cars have been put in service to comply with the recommendations of the State Railroad Commission for the rush hours, and to provide for the change in traffic conditions from the winter to summer schedules.

"This question of schedules is a very difficult one, as it is often impossible to lengthen one man's run without shortening the run of some other man, and since April last the superintendent of transportation personally has been most of the time engaged in working out schedules, and has also had his schedule force doubled in order to arrange the runs in such a manner that they would be pleasing to you. Your representatives have been asked for suggestions—a few of which they have given.

"There is at every barn of the company a box in which men are requested to place suggestions for the betterment of the service, and any man who is dissatisfied with his run has the privilege of suggesting a remedy, which will gladly be adopted if it does not prove detrimental to the service or an inconvenience to the public.

"As to Sunday runs, referred to in section No. 10, it is true that they are longer than week-day runs, the idea being that as it takes fewer men to operate the schedule with long runs, it is possible to allow more men to be off on Sunday.

"As to your complaints regarding the treatment of the three men: First, this is a case of 18-months' standing and had never been brought to the attention of the higher officials of the company until about two or three weeks ago. Surely the complaint could not have been so very serious or it would not have lain dormant so long a time.

"Second, this case is one in which a man lost six days as a punishment for a refusal to assist in raising a blockade which was inconveniencing the public. There is considerable evidence on both sides of this controversy, and since the man had already been reinstated it was only a question of the time he had lost. The company desired to sift the evidence to the bottom, but when pressed by the representatives of the men for an immediate decision the officials of the company could not do otherwise upon the evidence before them than uphold the division superintendent who entered the complaint. The fact that the man was from another division, and that he was unknown to the division superintendent other than by the number on his cap, would seem to be sufficient proof that the division superintendent had good reasons for reporting him, since he could not have been prejudiced in the matter.

"Third, this case is one in which a man was discharged for entering, while in company uniform, a public drinking place and drinking intoxicants in the form of beer and whisky in the presence of one of the inspectors of the

company. This discharge is covered by the following rule: 'For the betterment of the service and the safety of the public, it will from this day be the policy of this company to not retain in its employ men who use intoxicating liquors or cigarettes, or are in the habit of gambling. While it is the privilege of each individual to eat, drink and smoke what he pleases, it becomes the duty of this management to have in the service only men of sober and temperate habits, physically and mentally able to perform the duties to which they may be assigned.'

"A copy of this rule was handed or mailed to each individual motorman or conductor at the time of its adoption two years ago, the rule being adopted for the safety of the public as well as for the benefit of the men. For these reasons it is incumbent on the company that the rule be strictly enforced. The plea made as to length of service of the particular party violating the rule only intensifies the gravity of the offense.

"We feel that our action in the above case is just, and that any reasonable board of arbitration would so decide."

James D. Callery, president of the company, subsequently issued a formal statement to the press in which he said that everything had been done by the company that was possible to satisfy and conciliate the committee representing the motormen and conductors. At the conference on June 25, between the committee and the officials of the company, Mr. Callery said that the members of the committee themselves suggested and wrote out a form of arbitration to which the officials of the company willingly assented. The conference between the company and the representatives of the men was then adjourned until 9 a. m. on June 26, when the agreement was to have been signed, but the representatives of the men did not call until 7 p. m., and at that time they positively refused to arbitrate matters in accordance with the plan which they themselves had suggested at the conference on the previous day. In view of this fact, the company announced that beginning on Tuesday, June 29, it would be prepared to operate practically the full complement of cars. William O. Magee, Mayor of Pittsburgh, immediately got into touch with both the men and the company in an effort to adjust the difficulties between them, and it was announced on June 28 that at 10.30 p. m. he had succeeded in effecting a reconciliation between the company and its employees, and at 5 o'clock a. m. on June 29 the men returned to work.

By the terms of the settlement the number of "short runs" are to be reduced 50 per cent; the men withdrew their objections to emergency runs; Sunday runs are not to be longer than the weekday schedules; a motorman discharged on charges of drinking while in uniform is to be reinstated pending arbitration; a conductor suspended on charges of refusal to help remove an obstruction to traffic is to be paid in full for the time of his suspension, and a conductor who lost seniority is to be restored.

Judicial Opinion Expressed in Evansville Injunction Case

In making permanent on June 22 the temporary injunction secured by the Evansville & Southern Indiana Traction Company, Evansville, Ind., restraining its former employees from interfering with the orderly management of the company, as noted in the ELECTRIC RAILWAY JOURNAL of June 26, 1909, page 1178, C. A. De Bruler, judge of the Vanderburgh Circuit Court, discussed some very interesting points, among them the question of whether or not a man's business should be considered property, a subject which is also considered in an article by President Taft in the June issue of *McClure's Magazine*. The opinion of the judge is that the purpose of the strikers and their sympathizers is to ruin the business of the plaintiff. He said that while the several acts of the strikers and their sympathizers might singly be lawful, when taken together they are unlawful because of the end in view. The opinion may also be said to be notable because of the position which the judge assumed in saying that "the defendants are not working in the interest of any rival railroad, but are seeking, as they themselves proclaimed from the witness stand, to destroy the business of the plaintiff, which is as much property as houses or land." The opinion is concluded as follows:

"It remains to be considered whether the various acts of the defendants in inducing the public not to ride on the cars, which have been established by the testimony, and in good part admitted, and which have been very effective, are unlawful and ought to be enjoined. On this subject I cannot at all agree with authorities which seem to hold that an act lawful in itself, when considered independently and without any relation to an unlawful purpose, cannot become unlawful because of the unlawful animus which inspires it. I believe it to be true that where the object to be attained by a series of acts is distinctly unlawful, that all

such acts are themselves unlawful, although when separately considered as independent acts having no relation to the unlawful purpose they may be entirely innocent.

"Now, in this case, the purpose of the defendants in the performance of all the acts complained of, by which in various forms people are induced not to ride on the cars, is not only not denied, but is boldly, emphatically avowed. It is simply the financial ruin of the plaintiff unless the plaintiff will agree to certain conditions demanded by the defendants. That this purpose is distinctly unlawful, I cannot see how any reasonable man can doubt. This is not at all a case of legitimate competition in trade. Within certain well-defined limits a merchant may lawfully advertise that he will sell his goods at a cheaper rate than his rival in trade, and he may solicit the public by any sort of legitimate argument or persuasion not to trade with his competitor, although he may know that his efforts in this direction will result in the financial ruin of the other person. Even in this case, however, he may easily transgress the law and render himself liable to an action.

"In this case, however, there is no question of competition. The defendants are not working in the interests of any rival railroad line, but are seeking, as they themselves proclaimed from the witness stand, to destroy the business of the plaintiff, which is as much property as houses or land, in order to force the plaintiff to accept their terms of employment. It is claimed by the defendants that this is the right of free speech; in my judgment it is an utter perversion of that right. No rights are absolute, and every right, including that of free speech, must be exercised within the limits that it does injure another. I am thoroughly satisfied from the evidence, and from the avowals of the defendants themselves, that they have conspired to ruin the plaintiff's business by driving it by loss of revenue to financial ruin, without legal excuse or justification, and that every act done in furtherance of that unlawful purpose is itself unlawful because of the purpose which inspired it, although the act itself, considered independently and as unrelated to the conspiracy, might be wholly innocent and lawful.

"It must not be forgotten that the plaintiff is a public service corporation, and that it is bound by its franchise to run its cars on schedule time, and that the public ought to be allowed to travel on the cars without fear of molestation. It must be remembered also that even mere inducement or persuasion not to travel on the cars may, and usually does, convey veiled threats, or an insinuation that it is not safe to do so. For these reasons I think that justice can be accomplished in this case by overruling defendant's motion to dissolve the restraining order and sustaining the motion for a temporary injunction in accordance with the terms of the restraining order, without modification."

New Rule Adopted to Govern Excursion Rates in Indiana

William J. Wood, chairman of the Railroad Commission of Indiana, recently made the following recommendation to the commission regarding excursion rates, which was ratified by the commission on June 16:

"To the Railroad Commission of Indiana: I beg leave to report that the secretary and the tariff clerk having called to my attention certain tariffs and to what appears to be a continual violation of Subdivision C, Section 13 of the Railroad Commission Act, I called a conference of some of the carriers interested, and after being fully advised I beg leave to report that where excursion rates are made, as they are constantly made in this State, publishing rates from one point to another point in the State without protecting the same or lower rates at intermediate points, there seems to be a clear violation of Subdivision C, Section 13 of the Railroad Commission Act, which provides: 'It shall be unjust discrimination for any carrier subject hereto to charge or receive any greater compensation in the aggregate for the transportation of like kinds of property or passengers for a shorter than for a longer distance over the same line in the same direction, the shorter distance being included in the longer.'

"It will be noted that there are several provisos and exceptions, but it is clear that where excursion rates are made generally as stated above, none of them comes within these provisos or exceptions. However, as the provisions of the State giving the commission power, upon application of the carriers, to authorize such carriers to charge less for the longer than for the shorter distance, is silent with respect as to how and when such application shall be made or authority given, and since the statute gives the commission power to prescribe rules for conducting the business and proceedings of the commission, I recommend that our Rule No. 5 be amended by adding thereto the following: 'Provided that this rule (No. 5) shall not apply to

cases where the carriers desire to make excursion rates, less than regular rates, from one point to another point or points, and which are not to apply to intermediate shorter distances, but in such cases the filing of the rate sheet of such rates by the carrier with the commission shall be deemed to be an application by the carrier and authority by the commission to charge a less rate between such points for a longer than for a shorter distance, unless the commission shall give notice objecting to or prohibiting such rates."

Rule 5 as originally adopted by the commission follows:
 "A. Before hearing a petition to be allowed to charge less for the long than for short hauls as provided by the laws of Indiana, the commission will publish a notice of the pendency of the petition in some newspaper in the vicinity where the permit is to operate. Such notice will be published but a single time, not less than 10 days before the hearing. The expense of publication shall be paid by the petitioner. Any party interested in the petition may appear in person or by counsel and resist the same."

Accident Report in Pennsylvania for Quarter

The Railroad Commission of Pennsylvania has issued the following report of accidents to children on street railways in that State for the quarter ended March 31, 1909:

Age...	1 to 5		5 to 7		7 to 9		9 to 12		12 to 15		Total.
	K'd.	Inj.	K'd.	Inj.	K'd.	Inj.	K'd.	Inj.	K'd.	Inj.	
Male...	1	6	1	10	1	5	1	12	1	10	5
Female	1	4	0	3	0	2	0	2	0	2	1
Total..	2	10	1	13	1	7	1	14	1	12	6

The commission has also issued the following comparative statement of accidents for the quarter ended March 31, 1909:

	January, 1908			January, 1909		
	Killed.	Injured.	Total.	Killed.	Injured.	Total.
Employees.....	10	524	534	28	517	545
Passengers.....	2	38	40	1	63	64
Trespassers.....	26	23	49	54	58	112
Others.....	1	19	20	6	40	46

	February, 1908			February, 1909		
	Killed.	Injured.	Total.	Killed.	Injured.	Total.
Employees.....	15	574	589	14	395	409
Passengers.....	2	47	49	1	39	40
Trespassers.....	30	13	43	47	50	97
Others.....	8	23	31	5	13	18

	March, 1908			March, 1909		
	Killed.	Injured.	Total.	Killed.	Injured.	Total.
Employees.....	12	512	524	32	457	489
Passengers.....	2	38	40	3	51	54
Trespassers.....	27	33	60	43	54	97
Others.....	10	9	19	2	26	28
Total.....	145	1853	1998	236	1763	1999

Recommendations Regarding Service in Kansas City

The Public Utilities Commission of Kansas City, Mo., after carefully considering the subject of service furnished in Kansas City by the Kansas City Railway & Light Company, has issued a report, of which the following is the substance:

"First—The Kansas City Railway & Light Company has substantially complied with the request to run more cars per hour on the lines designated, but seating capacity is diminished. While the increases have not been exactly as requested, the requirement has been substantially lived up to so far as number of cars per hour is concerned, but not as to seating capacity. Carrying capacity has been decreased owing to two facts: Some of the new pay-as-you-enter cars have smaller seating capacity than the cars they replace, and trailers were practically abandoned during the cold weather and had not been resumed on May 5 and 7, the dates of tests.

"Second—The increased number of cars put on has not increased traffic congestion so as to interfere with the service.

"Third—The additional cars have improved the frequency of the service, which is now much beyond the requirements of the peace agreement.

"Fourth—It is recommended that the service be regulated by special ordinance from time to time, as with the growth of the city any ordinance will be speedily outgrown. The company has met the request for new cars and has shown a disposition to increase service when required by putting on certain cars on lines where no request was made. It should be borne in mind that in comparing the results of May, 1909, with those of August, 1908, comparison is made between a date when there was no park traffic and a date when this was at its heaviest.

"Fifth—It is recommended that the company be requested not only to continue the increased cars in use, but to further

increase seating capacity, which can best be effected by the use of trailers. It is recommended that trailers be increased on all lines where this can be done without danger to an extent of 50 per cent of cars run between the hours of 5 p. m. and 7 p. m., and 33-1-3 per cent between the hours of 6 a. m. and 8 a. m."

Accident at Wilmington.—In a collision between two cars on the Claymont line of the Wilmington (Del.) City Railway on June 24 more than 30 persons were injured.

Sunday Cars in Edmonton.—The ratepayers of Edmonton, Alberta, Canada, have voted to operate the Edmonton Radial Railway on Sunday. The line connects Edmonton and Strathcona and is a municipal undertaking.

Whistles and Arc Headlights in South Bend.—The City Council of South Bend, Ind., has passed an ordinance prohibiting the sounding of whistles on interurban cars in South Bend, and has also passed an ordinance requiring electric railways operating in South Bend to dim the arc headlights of their cars within the city.

Accidents in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company reports that out of 120,000 passengers carried in Philadelphia in the quarter ended March 31, 1909, only one was killed and 116 hurt. Carrying about half as many passengers as all the traction companies of the State, only 21 per cent of the fatalities of all kinds occurred on the lines of the Philadelphia Rapid Transit Company—eight out of a total of 37. Of the total of 763 injured on all lines, 230 accidents occurred on the lines of the Philadelphia Rapid Transit Company.

Harrisburg Company Answers Request for Fare Reduction.—In answer to the petition of residents of Rockville, Lucknow and Feldheim for a reduction of fare on the Fort Hunter line of the Central Pennsylvania Traction Company from 10 cents to 5 cents, the officials of the company state that the line has never been self-sustaining; that the company has not paid its stockholders dividends for years, and point to the returns annually made to the city by the company on the basis of 3 per cent of the gross receipts, which showed a decrease from \$17,568.15 in 1907 to \$17,307.59 in 1908.

Warning Against Accident Faker.—B. B. Davis, secretary of the American Street & Interurban Railway Claim Agents' Association, has warned all claim agents to watch for George Ferkel, 35 years old, a tinner by occupation, who claims Salem, W. Va., as his home. Ferkel is said to have collected \$20 from the Cincinnati Traction Company on June 5, alleging injury to an old hernia due to sudden starting of a car. On June 21 he made a similar claim against the East St. Louis & Suburban Railway. He was arrested and placed in jail in East St. Louis, charged with attempting to obtain money under false pretenses.

Indiana Commission Recommends Posting of Red Cross Rules.—The Railroad Commission of Indiana has requested that the placards of the American Red Cross Society which contain rules to be observed to avoid accidents be posted in all steam railroad and electric railway waiting rooms in Indiana. The rules of the society follow: "Never cross a railroad at grade crossing before making sure that no trains are approaching. Never stand on the platform of a car which is in motion. Never jump from a car which is in motion. Never cross a track in front of a standing train before making sure that there is no danger from some other train, or cause. Never disregard the cautionary rules for safety posted at stations, crossings, etc. Never forget that carelessness on your part concerning these precautions endangers your own life and the happiness and welfare of those near and dear to you."

Instructing Chicago Trainmen in the Law of Negligence.—An important step in the education of trainmen has been taken by the Chicago (Ill.) Railways in issuing a primer which gives the gist of a wide variety of court decisions relating to the law of negligence in street railway cases. This book is the work of Twyman O. Abbott, who has succeeded in presenting the subject in 115 paragraphs, most of which contain only from 50 to 75 words. The primer has been distributed to all the conductors and motormen of the company and is also given to students for car positions. Among the subjects treated are the following: Negligence in Law; Contributory Negligence; Gross Negligence; Proximate Cause; Right to Use of Highway; Distinction Between Car and Other Vehicles; Rights of Public on Highway; Effect of Failure to Keep Sharp Lookout; Duty to Sound Warnings Not Affected by Custom; Improper Starting and Stopping of Cars; Overloading and Overcrowding; Newsboys; Transfer; and Rights of Children on the Highway.

Adoption of Standard Classification of Accounts Ordered in Vermont.—As the result of the hearing before the Pub-

lic Service Commission of Vermont at Montpelier on May 28 to permit the electric railways of the State to show cause why a general order should not be issued by the commission to take effect July 1, 1909, requiring the electric railways in Vermont to adopt the uniform system of accounts prescribed by the Interstate Commerce Commission on June 1, 1908, the Public Service Commission of Vermont issued the following order under date of June 16, 1909: "Beginning with July 1, 1909, and thereafter until further order of this commission, each of the corporations operating electric railways within this State is hereby ordered to adopt and use the uniform system of accounts prescribed for electric railways by the Interstate Commerce Commission on June 1, 1908, and which is fully described in the classifications then issued by said commission, which are described in the notice above recited, and a copy of which has been furnished by this commission to each of said corporations."

Hearing on Methuen Fares.—The Massachusetts Railroad Commission gave a hearing on June 25 on the petition of the Selectmen of Methuen asking for a reduction in the fare from 10 cents to 5 cents on the Lawrence-Dracut line of the Boston & Northern Street Railway between the Broadway-Essex Street transfer station in Lawrence and the Methuen-Dracut town line. Selectmen Rushton, Harris and Hardy represented the town and Bentley W. Warren the company. The principal issue was the existence of a fare limit at the entrance of the company's private right-of-way about 7000 ft. east of the Methuen-Dracut line. The petitioners contended that the limit should be extended to the above municipal line. Mr. Warren stated that the company cannot afford to carry passengers any further on the Methuen-Dracut line for 5 cents than at present, as the fare covers a ride of about 4.25 miles, a rate of 1.25 cents per mile. The issue is simply the charging of a fare sufficient to pay all the costs of operation and a reasonable return on the investment. The district between the Dracut-Methuen line and the beginning of the private right-of-way east of it is populated mainly by campers who, as a rule, live in the territory only in the summer. If the fare were reduced the tendency would be to cut the fare between Lowell and Lawrence from 15 cents to 10 cents, cutting down the revenue 50 per cent. The 15-cent fare between Lowell and Lawrence applies to any part of each city in relation to the other. The petitioners desire to cut out a complete fare zone in the through service. Chairman Hall stated that in this case the issue is the reasonableness of the fare with the whole traveling public's interests in mind, taking into account the influence of the disputed zone in the through fare between Lowell and Lawrence. The commission has taken the case under advisement.

"Look Out for the Little Ones."—Under this heading the United Railways & Electric Company, Baltimore, Md., is running accident bulletin No. 11 in the daily newspapers in Baltimore. The bulletin follows: "Modern conditions and the great growth in population of the city make quick communication between the suburbs and the various sections of the city essential and it is the business of a rapid transit company to supply this need. Last year the street cars of Baltimore carried approximately 550,000 people and traveled about 75,000 miles a day through the city and suburbs, and it is evident that it is impossible to avoid some accidents in transporting so many people such a distance through crowded thoroughfares. Accidents are bound to happen, as the price modern civilization pays for rapid transit, but especially in hot weather, when the streets are crowded, there are more apt to occur those very distressing accidents to young, thoughtless children, who run suddenly on the track, and it is the purpose of this bulletin to try to point out some way of avoiding this particular kind of accident. We want to do all we can to lessen the danger of injury to people on the street, and we feel that the best results can only be obtained by hearty cooperation on the part of Baltimore fathers and mothers with our efforts to avoid accidents of a kind so distressing to everybody, and we think that the following suggestions, if followed, will have a very good effect: (1) Teach the children to have a healthy fear of the car tracks and always to avoid them. (2) Whenever possible see that some older member of the family has a watchful eye on them. (3) As a sure preventive, have your children play on streets where there are no car tracks. There are plenty of such streets and they furnish an infinitely safer playground. Our motormen are not heartless machines on the front platforms, but are for the most part married men, with children of their own, and they all exert every effort to avoid injury; what we ask of the Baltimore parents is to cooperate with us in attempting to avoid accidents, and to use all the care possible beforehand in order to prevent something that would be a cause of regret to all concerned."

Personal Mention

Mr. Joseph Pequegnat has been elected secretary of the Guelph (Ont.) Radial Railway to succeed Mr. Robert Simpson.

Mr. John A. Rivers has been appointed superintendent of the Los Angeles & Mt. Washington Incline Railway, Los Angeles, Cal.

Mr. Charles F. Whitlock has been appointed auditor of the Johnson City (Tenn.) Traction Company to succeed Mr. Virgil Slaughter.

Mr. Raymond E. Preble has been elected treasurer of the Salisbury & Spencer Railway, Salisbury, Mich., to succeed Mr. Dwight Smith.

Mr. D. G. Trayers has been elected president of the Norwood, Canton & Sharon Street Railway, Sharon, Mass., to succeed Mr. William O. Faxon.

Mr. A. K. MacCarthy has been appointed general manager and purchasing agent of the Levis County Railway, Levis, Que., to succeed Mr. H. H. Morse.

Mr. Byron Trimble has been elected secretary of the Pittsburgh, McKeesport & Greensburg Railway, Greensburg, Pa., to succeed Mr. C. W. Scheck.

Mr. Harlan Sperry has been appointed chief engineer of the Warren, Cortland & Jefferson Traction Company, Cortland, N. Y., to succeed Mr. George H. Switzer.

Mr. D. J. Collins has been elected secretary of the Roanoke Railway & Electric Company, Roanoke, Va., to succeed Mr. F. H. Shelton, who retains the office of treasurer.

Mr. N. C. Richards has been appointed general manager of the Yakima Valley Transportation Company, North Yakima, Wash., to succeed Mr. George S. Rankin, resigned.

Mr. A. A. Crawford has been appointed chief engineer, electrical engineer and master mechanic of the Youngstown & Ohio River Railroad, Leetonia, Ohio, to succeed Mr. A. McManemy as engineer and Mr. Sidney Selby as master mechanic.

Mr. John Rock, Jr., has been elected secretary of the Grafton (W. Va.) Street Railway to succeed Mr. T. A. Devensy, and Mr. L. C. Loudon has been appointed master mechanic of the company to succeed Mr. J. W. King.

Mr. D. F. McGee has been elected secretary of the Astoria (Ore.) Electric Company, and Mr. A. E. Smith has been elected treasurer of the company to succeed Mr. C. N. Huggins, who formerly acted as secretary and treasurer.

Mr. I. L. Oppenheimer, superintendent of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio, has been appointed general superintendent of the Lexington & Interurban Railway, Lexington, Ky., to succeed to the duties performed by Mr. John B. Crawford as general manager of that company.

Mr. A. A. Churchill has been appointed master mechanic of the Jersey Central Traction Company, Keyport, N. J., to succeed Mr. A. S. Flatland, who resigned some time ago. Mr. Churchill was connected with the Salem Light & Traction Company, Salem, Ore., for a number of years and later was connected with the Oregon Water Power & Railway Company, Portland, Ore.

Mr. W. R. Putnam has been appointed superintendent and park manager of the Menominee & Marinette Light & Traction Company, Marinette, Wis. Mr. Putnam was graduated from the University of Minnesota in 1897. After two years of banking experience, he accepted a position as manager of the Red Wing Gas & Electric Company, Red Wing, Minn., and remained with this company and its successors, the Red Wing Gas, Light & Power Company, from May 1, 1899, until recently, when he accepted the appointment of superintendent of the Menominee & Marinette Light & Traction Company, in charge of its gas, electric and street railway departments.

Mr. James B. Noyes has been appointed a member of the Boston Transit Commission by Mayor Hibbard, of Boston, to fill the vacancy caused by the death of Thomas J. Gargan. Mr. Noyes is about 40 years of age. He was born in Canton, Mass., and was educated at the Canton High School, Chauncy Hall School and Harvard. He served four years as secretary to Congressman Elijah A. Morse, and for a short time was connected with the Boston Herald. For a number of years he has been a member of the firm of Curtis & Cameron, publishers of the Copley prints. On March 18, 1908, Mr. Noyes was appointed by Mayor Hibbard to succeed Mr. Charles Logue as a Schoolhouse Commissioner.

Mr. John Harrington, whose appointment as superintendent of Division 7 of the Boston (Mass.) Elevated Railway

was noted on page 1180 of the *ELECTRIC RAILWAY JOURNAL* of June 26, 1909, to succeed John J. Horgan, deceased, has been connected with the Boston Elevated Railway and the West End Street Railway, Boston, since 1886, in which year he entered the employ of the latter company as a conductor. In 1893 Mr. Harrington was appointed starter at the North Cambridge station, and in 1895 he was made chief inspector of the Cambridge division, a position which in rank is next to that of superintendent. Mr. Harrington, although he has been connected with the company nearly 25 years, is only 44 years old.

Mr. F. M. Lott has been appointed inspector of the rolling stock for the Twin City Rapid Transit Company, Minneapolis, Minn. Mr. Lott has for many years been connected with the street car and the electric railway industries. He entered the employ of the electrical department of the J. G. Brill Company in 1892 and remained with that company until 1898, when he was appointed to take charge of the electrical department of the Jackson & Sharp Car Company, Wilmington, Del. When the Jackson & Sharp Car Company and American Car & Foundry Company were consolidated in 1901 Mr. Lott re-entered the employ of J. G. Brill Company as assistant to Mr. T. D. Shipper, electrical engineer of the company. In 1905 Mr. Lott was appointed chief wireman of the southern division of the Public Service Corporation at Camden, N. J., but resigned from this company in 1908 to become master mechanic of the Green Bay (Wis.) Traction Company.

Mr. John B. Crawford, general manager of the Lexington & Interurban Railway, Lexington, Ky., has been appointed general superintendent of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind. Mr. Crawford was general manager of the Lexington & Interurban Railway for a year and a half, and before that was superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company. He is 33 years of age and has been connected with railway work for about 15 years. Mr. Crawford's first street railway work was in Hartford, Conn., in connection with the electrification of the Hartford Street Railway. Subsequently he took the electrical course in the testing department of the General Electric Company and then entered the power field as assistant superintendent of the Conductor Power Company, which was engaged in constructing a transmission line for power and lighting service on the Pacific Coast at the time Mr. Crawford entered its employ. Returning to the East, Mr. Crawford accepted the position of general superintendent of the Groton & Stonington Street Railroad, New London, Conn., from which he resigned to become connected with the Fort Wayne & Wabash Valley Traction Company.

Mr. B. R. Stephens, who recently resigned as general traffic manager of the Illinois Traction System, Champaign, Ill., was tendered a banquet by 45 members of the traffic department of the company at the Leland Hotel, Springfield, Ill., on the evening of June 24, and was presented a loving cup as a memento from his associates. Among those present were the following: Mr. William B. McKinley, Champaign; Mr. A. S. Hagen, Lincoln; Mr. C. M. Otwelland and Mr. F. H. Colver, Carlinville; Mr. F. H. Richmond, Mr. J. S. Wellman; Mr. B. E. Tabler, Mr. K. J. McCorkle and Mr. S. McFarland, East St. Louis; Mr. Fred Swanson, Champaign; Mr. E. Williamson, Auburn; Mr. A. R. Drennan and Mr. F. B. Hawse, Bloomington; Mr. E. E. Hoyt, Clinton; Mr. C. C. Hurin, Decatur; Mr. R. S. Drum, Girard; Mr. H. F. Leverenz, Staunton; Mr. S. K. Holland and Mr. John Cady, Peoria, and Mr. S. J. Kelly, Mr. V. C. Gourley, Mr. H. H. Hanselman, Mr. C. H. Castle, Mr. A. R. Willard, Mr. E. Edward McKee, Mr. A. F. McCoy, Mr. B. R. Ongley, Mr. G. F. Ostermeier, Mr. Elliott Reddick, Mr. J. H. Ryan, Mr. R. R. Scott, Mr. G. J. Stelte, Mr. J. D. White, Mr. R. E. Wright, Mr. J. Williamson, Mr. R. Williamson, Mr. F. E. Webster, Mr. T. T. Thompson and Mr. M. W. Thompson, Springfield, and Mr. B. R. Stephens, the guest of honor.

Mr. W. E. Barlow was recently appointed master mechanic of the Easton (Pa.) Transit Company to succeed Mr. Charles F. Roberts. Mr. Barlow was born at Galion, Ohio, Oct. 22, 1873, and attended the public school there until January, 1888, when his parents moved to Philadelphia. He then entered the Philadelphia Manual Training School and was graduated from that institution in 1892. In 1894 he was graduated from the Philadelphia College of Pharmacy and in March, 1896, was graduated from the electrical department of the Drexel Institute of Science. He entered the employ of the Philadelphia & West Chester Traction Company on April 1, 1896, as the electrician in charge of cars and lines, and was later promoted to master mechanic and in 1898 was appointed assistant superintendent of the company. In February, 1900, Mr. Barlow accepted the position of general superintendent and master mechanic of the Lewiston & Reedsville Electric Railway, Lewiston,

Pa., but resigned from that company on July 1, 1903, on account of ill health. He was employed from 1903 to 1905 in the line and cable department of the Philadelphia Rapid Transit Company under Mr. F. H. Lincoln. For a year Mr. Barlow was associated with his brother, Dr. Lewis E. Barlow, as a druggist, and from 1906 until quite recently he had charge of the electrical construction for the Keller-Pike Company, electrical engineers and contractors, Philadelphia.

OBITUARY

James B. McCance, treasurer of the Southern Michigan Railway, South Bend, Ind., is dead. Mr. McCance became connected with the Southern Michigan Railway at the time of the reorganization of the Northern Indiana Railway in 1899, and served at first as head of the clerical forces of the two companies. A year later he was made auditor and treasurer of the companies and retained these positions until the separation of the two companies in January, 1907, when he was appointed treasurer of the Southern Michigan Railway. Mr. McCance was born in Pittsburgh, Pa., in 1867.

Patrick H. Dolan, superintendent of the Pittsfield (Mass.) Electric Street Railway, and a director of that company and also a director of the Berkshire Loan & Trust Company, Pittsfield, died at the home of his brother, Mr. Peter C. Dolan, president of the Pittsfield Electric Street Railway, on June 25. Mr. Dolan was born in Ireland, but was educated in the public schools of Simsbury, Conn., where his parents removed. When a very young man he took a position in a fuse factory in Simsbury and was employed there until he was 19 years of age. With his brother, Mr. Peter C. Dolan, Patrick H. Dolan then went to New Britain, where the two brothers bought the Bassett House and the livery stable run in connection with that hotel. They rented horses to the New Britain Street Railway and when that company failed they purchased the road and equipped it with electricity. In 1893 they sold the property and disposed of their other interests in New Britain. Subsequently, they purchased the controlling interest in the Pittsfield Street Railway, which at the time was a horse line about 2½ miles long. This road they reorganized and extended, and now there are about 21 miles of track.

Charles C. Reynolds, general manager of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., died at his home in Indianapolis on June 26 from a stroke of paralysis which was followed by pneumonia. Mr. Reynolds was born in Vernon, Ind., on May 1, 1859. He left school at the age of 16 and entered railroad service as a telegraph operator on the St. Louis division of the Chicago, Cincinnati, Cleveland & St. Louis Railroad. Subsequently, he was appointed train dispatcher of this company and later was made trainmaster of the St. Louis division. In January, 1890, Mr. Reynolds resigned from the Chicago, Cincinnati, Cleveland & St. Louis Railroad to become superintendent of the Erie Railroad, a position which he held for 12 years. Mr. Reynolds' first experience in electric railway work was as manager of the Illinois Valley Traction Company. His record of a little more than a year with this company secured for him the appointment of general manager of the Indianapolis & Northwestern Traction Company, Lebanon, Ind., which had just completed a line between Indianapolis and Lafayette. Mr. Reynolds remained with this company as manager until 1906, when it and five other lines were merged as the Terre Haute, Indianapolis & Eastern Traction Company, with Mr. Reynolds as manager. Mr. Reynolds' electric railway and steam railroad connections brought him into close touch with business interests in Indiana and the Central West, and he was held in high esteem by his business associates and by many with whom he came into contact only casually in performing his duties. He is survived by a widow and six children.

The New Hampshire Electric Railways, Haverhill, Mass., which took over the Haverhill & Amesbury Street Railway on June 1, 1909, voluntarily increased the wages of the employees of the Haverhill & Amesbury division of the New Hampshire Electric Railways on July 1, 1909, from 20 cents and 22 cents an hour to the following scale to make the rate conform with that on other divisions of the system: Class No. 1, men who have been in the service of the company less than one year, 20 cents per hour; class No. 2, men who have been in the service of the company one year and less than two years, 21 cents per hour; class No. 3, men who have been in the service of the company two years and less than four years, 22 cents per hour; class No. 4, men who have been in the service of the company four years and less than seven years, 23 cents per hour; class No. 5, men who have been in the service of the company seven years and less than ten years, 24 cents per hour; class No. 6, men who have been in the service of the company ten years and over, 25 cents per hour.

Construction News

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

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

RECENT INCORPORATIONS

Suburban Railway, Phoenix, Ariz.—Incorporated to build an electric railway in Phoenix. Headquarters, Phoenix. Capital stock, \$500,000. Directors: C. B. King, B. A. Fowler, J. W. Dorris, Geo. M. Halm and E. J. Bennitt. [E. R. J., May 8, '09.]

Gainesville Railway & Power Company, Gainesville, Ga.—Application has been made for articles of incorporation for this company, which recently purchased the property of the Gainesville Electric Railway. The street railway in Gainesville consists of about 8 miles of track. Headquarters, Gainesville. Capital stock, \$150,000. Incorporators: A. G. Sharp, Atlanta; W. A. Carlisle, W. H. Slack, H. H. Dean, J. W. Smith, Z. T. Castleberry, Gainesville.

***Chicago, Aurora & DeKalb Railroad, Aurora, Ill.**—Incorporated to build an electric railway from Aurora to DeKalb. Headquarters, Aurora. Capital stock, \$950,000. Incorporators: J. H. Bliss, Sugar Grove; F. W. Ravlin, Kaneville; E. L. Lyon, F. M. Killian and J. C. Murphy, Aurora.

***DeKalb & Western Railway, DeKalb, Ill.**—Incorporated to build an electric railway from Chicago to Rock Island. Capital stock, \$25,000. Incorporators: Newton Taylor, Elgin; J. F. Pearce, L. D. Grier, Frederick Kregel and Osman F. Cole, Chicago.

***Cincinnati, Louisville & Indianapolis Electric Railroad, Aurora, Ind.**—Incorporated to build street and interurban railways in and between Greendale, Lawrenceburg, Aurora, Risen Sun, Patriot, Florence, Markland, Vevay, Lamb, Brooksbury, Kent, Blocher, Madison and Scottsburg. Principal office, Aurora. Capital stock, \$100,000. Incorporators: Ames B. Shuts, John C. Hooven, C. E. Hooven, W. B. Mayo and Wilbur Hargitt.

***Kentucky Electric Railway, Providence, Ky.**—Incorporated to build an electric railway from Dawson Springs to Providence, 20 miles. Headquarters, Providence. Capital stock, \$10,000. Incorporators: Ben Sisk, Silent Run; B. H. Roney, J. T. Edwards, M. E. Edwards, S. Hicks, W. G. Roney and M. G. Roney.

***Independence, Siletz & Pacific Railway, Salem, Ore.**—Incorporated to build an electric railway from Simpson through Siletz Indian Reservation to the coast. Capital stock, \$500,000. Incorporators: O. M. Taylor, D. N. Sears and H. Hirschberg.

***Rochester & Mars Street Railway, Butler, Pa.**—Application has been made for a charter for this company to build a street railway from the Baltimore & Ohio depot at Mars to Rochester, a distance of 23 miles. At Mars connection will be made with the Pittsburgh & Butler Street Railway; at Ogle, 2 miles west of Mars, with the Pittsburgh, Harmony, Butler & New Castle Railway, and at Rochester with the Beaver Valley Traction Company. The final survey has been completed, rights of way and franchises have been obtained and construction contracts will be let soon after the charter is issued in July. Incorporators: J. H. Barrett, president and chief engineer; W. H. Biggs, treasurer, D. R. Torrence, secretary; David Hunter, Jr., and J. G. Downie.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has applied to the City Council for a franchise to operate a street railway on Sixth Street between Olive Street and Figueroa Street.

Bloomington, Ill.—The City Council has granted to the Illinois Traction System, Champaign, a 20-year franchise to operate its cars over the lines of the city.

Peoria, Ill.—The City Council has granted to the Peoria Railway Terminal Company a 40-year franchise to build a street railway on Washington Street. The franchise provides that work must be started within 30 days after it is accepted. [E. R. J., May 22, '09.]

Petersburg, Ill.—The Springfield, Beardstown & Quincy Interurban Railway has been granted a 50-year franchise by the City Council. The right of way from Springfield to Petersburg has been secured. [E. R. J., Feb. 13, '09.]

New Orleans, La.—An ordinance has been introduced in the City Council directing the Comptroller to advertise for the sale in block, at public auction at the City Hall, to the highest bidder, a 50-year franchise to construct a double-track street railway on Adams Avenue from Julia Street to Orleans Boulevard, thence along the right of way of the

old Spanish Fort Railroad to Spanish Fort. The franchise provides that the bidder shall commence construction within 90 days after the contract for the franchise is signed, and that at least one track shall be completed within one year.

Gardnerville, Nev.—The Board of County Commissioners has granted to H. H. Springmeyer and A. Jensen a franchise to build a street railway from the terminus of the Carson Valley branch of the Virginia & Truckee Railroad to Gardnerville, a distance of 1 mile.

Morristown, N. J.—Application has been made to the Board of Freeholders by the Morris County Traction Company for a two-year extension of its franchise to complete the double tracking of its railway between Millburn and Maplewood. [E. R. J., June 19, '09.]

Ronkonkoma, N. Y.—The Town Board has granted a franchise to the South Shore Traction Company, Patchogue, to construct an electric railway from Ronkonkoma through Setauket, Stony Brook, Lake Grove to Port Jefferson.

Norwood, Ohio.—The Southwestern Ohio Traction Company, Cincinnati, has applied to the City Council for a franchise to operate an elevated and street railway in Norwood. The ordinance was referred to the Streets and Grades and Street and Steam Railways Committee. John E. Bleekman, president. [E. R. J., May 29, '09.]

***Kennewick, Wash.**—Application for a franchise has been made to the City Council by C. A. Lundy, S. C. Emmons and G. F. Richardson, Kennewick, to build an electric railway from Kennewick through Horse Heaven to the Kennewick Highlands.

TRACK AND ROADWAY

***Vilonia, Ark.**—It is reported that J. N. Simpson and G. Bush are planning to build an electric railway from Conway through Vilonia to Beebe, 14 miles.

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded the contract for the grading of the Fourth Avenue west extension of its line from Granville Street to the west city limits, to T. R. Nickson & Company.

Monterey & Del Monte Heights Railway, Monterey, Cal.—F. M. Fairchild, 1707½ Oak Street, San Francisco, general manager, writes that this company, which is to connect Monterey and Seaside with an electric railway 5 miles in length, will start construction about July 15. The supplies are now being purchased. The company will do its own construction, except to build the 1200-ft. bridge across Lake Del Rey. Three cars will be operated and power will be purchased. Capital stock authorized, \$100,000; issued, \$25,000. Officers: H. R. O'Bryan, Monterey, president; G. W. Phelps, Pacific Building, San Francisco, vice-president; S. W. Mask, Monterey, secretary; A. G. Metz, Monterey, treasurer. [E. R. J., May 29, '09.]

United Railroads, San Francisco, Cal.—This company proposes to build an extension on Cortland Avenue and through the Bernal Heights district from Mission to Folsom Streets, about 1 mile in length.

Lewiston (Idaho) Terminal Company.—It is said that this company has begun laying tracks in Lewiston for an electric railway. The line will be 1 mile in length and will be used as a terminal for other lines entering Lewiston. The track, which is being installed by the Warren Construction Company, will be laid with 90-lb. rails. [E. R. J., May 8, '09.]

Belleville, Ill.—It is stated that subscriptions to the amount of \$30,000 have been secured by E. L. Thomas and D. C. Thomas, promoters of the proposed electric railway between Belleville and Mascoutah. A company to be known as the Belleville-Mascoutah Traction Company will be incorporated and preliminary arrangements will be made at once, preparatory to beginning construction. [E. R. J., May 29, '09.]

DeKalb-Midland Railway, Chicago, Ill.—John W. McQueen, secretary, advises that this company will commence construction in about 30 days on its proposed electric railway between DeKalb, Elva, Waterman, Somonauk and Sandwick, 28 miles. Franchises from DeKalb, Sandwick, Somonauk and Waterman are for 50 years, with freight-carrying privileges. It has not yet been decided whether the company will generate or purchase power to operate the proposed railway. Capital stock, \$150,000; issued, \$100,000. Principal office, 134 Monroe Street, Chicago. Officers: John F. Pearce, Chicago, president; W. G. Wilcox, vice-president; John W. McQueen, Elgin, secretary; Herbert J. Burdick, Y. M. C. A. Building, Elgin, treasurer; O. F. Cole, 131 La Salle Street, Chicago, chief engineer. [E. R. J., April 17, '09.]

Bluffton, Geneva & Celina Traction Company, Bluffton, Ind.—L. C. Justus announces that this company will start,

within a few days, construction on its proposed railway between Bluffton, Ind., and Celina, Ohio. Work will be started simultaneously at both ends of the route and it is expected to be completed within a year. [E. R. J., May 22, '09.]

***Fort Wayne, Ind.**—It is stated that the surveys for the proposed electric railway from Fort Wayne to Bryan, Ohio, 41 miles, have been completed and that much of the right of way has been secured. Plans are under way for organizing a company to build the line. Edgar A. Tennis, Fort Wayne, promoter.

Louisville & Northern Railway & Lighting Company, New Albany, Ind.—It is stated that this company will soon build a branch from Scottsburg to Madison, Ind., where it will connect with another railway to Vevay, Aurora, Lawrenceburg, Ind., and Cincinnati, Ohio.

Valparaiso & Northern Railway, Valparaiso, Ind.—This company has increased its capital stock to \$250,000. It proposes to construct an interurban railway to connect Valparaiso, Chesterton and Gary. Lewis E. Woodward, secretary. [E. R. J., Oct. 3, '08.]

Des Moines, Winterset & Creston Electric Railway, Des Moines, Ia.—It is reported that the company has let the contract for the building of its proposed electric railway between Creston and Des Moines to Judd & Ross. [E. R. J., May 1, '09.]

Wichita Railroad & Light Company, Wichita, Kan.—This company writes that it expects to build 4 miles of railway in Wichita. W. R. Morrison, general superintendent.

Lexington & Interurban Railway, Lexington, Ky.—This company has awarded the contract for grading its extension from Lexington to Nicholasville, 12 miles, to J. W. Oliver, Knoxville, Tenn. The contract amounts to approximately \$150,000, and will require excavation and fill of about 100,000 yds. of earth. The work must be completed by Nov. 15.

Kentucky & Ohio River Interurban Railroad, Paducah, Ky.—This company, which projected an interurban electric railway from Paducah to Cairo, Ill., is now contemplating an extension in Henderson, Ky., and a line to Memphis, Tenn. At a meeting of the directors recently, it was decided to reorganize in July and incorporate for \$5,000,000. The company eventually intends to cross the river at Henderson and make connections with railroads at Evansville, Ind. The company has in object freight business more than passenger traffic. The Street gasoline motor car will be used. [E. R. J., May 22, '09.]

Boston & Northern Street Railway, Boston, Mass.—This company has awarded to Michael McDonald, Boston, the contract for all the work up to the sub-grading preparatory for track laying on its proposed extension from Stoneham to Spot Pond.

United Railways & Electric Company, Baltimore, Md.—This company has closed a contract with the Lorain Steel Company, Ohio, for the electric welding with steel bars of 5000 rail joints. The work has already started and considerable has been accomplished.

Kansas City & Southeastern Traction Company, Kansas City, Mo.—The survey of the electric railway which this company proposes to build from Kansas City to Jefferson City has been completed as far as Lone Jack. About half a mile of rock work, preliminary to track-laying, has been done near Raytown and also near Little Blue station. It is expected that the railway will be built ultimately to Jefferson City. Chas. A. S. Sims, president. [E. R. J., March 6, '09.]

Lehigh Valley Transit Company, Allentown, Pa.—At a meeting of the directors of this company arrangements were made to spend \$1,000,000 for improving its railway system in Allentown. R. P. Stevens, president, was authorized to order equipment for the proposed belt line requested by the City Council, on which construction has been started.

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—It is stated that this company will soon begin the construction of its 3-mile railway from Duquesne to Dravosburg. Officers: Fred W. Scott, Duquesne, president; J. C. Cato, Aliquippa, vice-president; T. F. Van Kirk, Coropolis, secretary, and A. J. Krill, Aliquippa, treasurer. [E. R. J., May 22, '09.]

Philadelphia Suburban Traction Company, Philadelphia, Pa.—W. J. Cooley advises that this company has been formed for the purpose of building a broad-gage electric railway from Hatboro, through Davisville, to Southampton, 3½ miles. It has not yet been decided when construction will be started. Capital stock, authorized, \$25,000; issued, \$7,000. Headquarters, 1328 Chestnut Street, Philadelphia. Officers: W. E. Watts, Williamstown, N. J., president; John L. Grogan, Philadelphia, vice-president; W. J. Cooley,

Philadelphia, secretary; H. C. Case, Newton, treasurer; J. E. Bonnell, Philadelphia, general manager; W. A. Merrick, Newton, chief engineer. [E. R. J., June 19, '09.]

Mountain Railway, Chattanooga, Tenn.—This company is having surveys and plans prepared by the Cushman-Fairleigh Engineering Company, Chattanooga, for building an incline railway from the property of M. H. Ward at Mountain Junction to a point near the Lookout Mountain House. D. J. Duncan, Chattanooga, is the promoter. [E. R. J., March 27, '09.]

Columbia & Walla Walla Traction Company, Dayton, Wash.—Two surveying parties will be put in the field within a few weeks by this company to relocate the route and set grade stakes for its proposed electric railway from Dayton to Wallula. One of the engineering corps will commence work near Dayton and the other near Walla Walla. The old survey made three years ago by the company will be changed materially. It is said that 5000 hp is available at the site of the power plant on the Tukanon River. Announcement is made that before the expiration of the 90 days' option limit offered by the company, the entire interests of the old company will be turned over to new promoters. Two months of the option remain, but the transfer will be made as soon as M. S. Parker, Spokane, who, with E. M. Symonds, is in charge of the preliminary work now being done at the power site of the Tukanon, at Dayton, Waitsburg and Walla Walla, has completed it. [E. R. J., April 10, '09.]

Connell Northern Railway, Tacoma, Wash.—H. C. Nutt writes that this company has been organized for the purpose of building a steam railroad between Connell and Adrian, and will be owned and operated by the Northern Pacific Railway. [E. R. J., June 19, '09.]

Vancouver (Wash.) Traction Company.—Arrangements have been made with this company to extend its electric railway to Orchards, a bonus of \$10,000 having been practically raised by the citizens, and work will begin at once. An extension to La Center is also to be built but action on it has not reached definite form as to actual construction.

Washington-Oregon Traction Company, Walla Walla, Wash.—This company proposes to build an electric railway from Walla Walla, Wash., to Pendleton, Ore., a distance of 50 miles. It will run through Vinson, Weston, Athena and Adams. The average grade between Walla Walla and Pendleton is a little less than 2 per cent. The maximum curves will be of 10 deg. There will be a 300-ft. bridge over Umatilla River, a 200-ft. bridge over Walla Walla River and a few shorter spans over smaller streams. The land has been surveyed from Walla Walla to Pendleton and is being surveyed for an extension from Pendleton to Umatilla, a distance of 45 miles. Grading will be begun in September, 1909. A hydro-electric power plant will be constructed. W. S. Mathias, general manager of the company, 607 East Main Street, Walla Walla, Wash., to whom the ELECTRIC RAILWAY JOURNAL is indebted for the above information, also writes that the company is now prepared to receive bids for the following material: 5500 tons 70-lb. steel rails, 940 tons 60-lb. steel rails, spikes, angle bars, locknuts, bolts, switches, frogs and cross-rail bonds, 145,000 cross ties, 75 miles wire fencing, 55 miles overhead trolley wire, 50 miles 4 2/0 feeders, 50 miles transmission line, 50 miles telephone wire, 4000 ft. 24-in. tile, 1200 ft. 36-in. tile, 10 flat cars, 1 work car, 1 steam locomotive (oil burner preferred), poles for 60 miles of road. [E. R. J., June 19, '09.]

Bay Shore Street Railway, Green Bay, Wis.—This company has completed its railway to Bay View. Fred A. Rahr and Frank E. Murphy are said to be interested in this company. [E. R. J., Dec. 19, '08.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company has announced that it has completed surveys for its line and that construction work will be begun within the next three months. The general engineering and provisions, such as overhead or third-rail construction, kind and voltage of current to be used are now under consideration. The company will build an electric railway in a general northwesterly direction from Milwaukee to Beaver Dam, Wis., having a total length of main line and branch of approximately 68 miles. It will pass through the villages and towns of Butler, Templeton, Sussex, Merton, North Lake, Alderley, Neosho, Hustisford and Juneau. A branch line extending in a southern direction through Pewaukee to Waukesha, will connect with the main line at Sussex. A general contract for the construction of this railway has been awarded to the Chapman Company, Chicago, Ill. Val Zimmerman, Jr., president. Headquarters, Majestic Building, Milwaukee. C. A. Chapman, Inc., 204 Dearborn Street, Chicago, Ill., engineer.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has opened its extension

from Milwaukee to Waterford, 29 miles southwest of Milwaukee.

SHOPS AND BUILDINGS

Connecticut Company, Willimantic, Conn.—This company has prepared plans for a new car house which it proposes to build at a point between Willimantic and South Coventry. The structure will be 120 ft. x 35 ft. The basement will be especially fitted up for the accommodation of the employees. [E. R. J., June 26, '09.]

POWER HOUSES AND SUBSTATIONS

City & Suburban Railway, Brunswick, Ga.—The contracts for engines and generators of the power house of this company have been awarded to the Allis-Chalmers Company, Milwaukee, Wis. The Westinghouse Electric Company, Pittsburgh, Pa., will supply all other equipment. The power house has been completed and the boilers are in place.

Columbus (Ga.) Railroad.—This company has ordered the Stone & Webster Engineering Corporation to carry out reconstruction on the city mills plant, to provide a station capacity of 600-kw, 2300-volt, alternating current and 200-kw railway direct current. The work will include the replacing of two wheels and installation of a new 2-phase alternator with auxiliaries.

Savannah Electric Company, Savannah, Ga.—This company has contracted with the Stone & Webster Engineering Corporation for the installation of a new 1000-kw turbine and auxiliaries in the Indian Street station.

Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.—This company is having plans for extensive additions to its power plant drawn by H. M. Byllesby & Company, Chicago, Ill. The boiler room of the station will be completely remodeled and boilers having a capacity of 1400 hp will be installed. These boilers will probably be equipped with automatic stokers and the necessary pumps and other fittings will also be needed. It is probable also that a coal and ash-handling apparatus will be built. A new steel stack, 10 ft. inside diameter, will be built. The plans also provide for the addition of three 2000-kw turbo-generators in the engine room. The present engine-room equipment consists of a 1500-kw Allis-Chalmers turbo-generator, an 800-hp Fulton engine driving a Bullock generator, and a 400-hp Buckeye engine driving a Westinghouse generator. William G. Dows, president and general manager.

Lexington & Interurban Railways, Lexington, Ky.—It is stated that this company expects to soon begin the construction of a power house at Valley View. The plant is expected to cost approximately \$250,000.

Interborough Rapid Transit Company, New York, N. Y.—This company has contracted with the Westinghouse Electric & Manufacturing Company for the building of 2 3000-kw, 3-phase rotary converters, and 16 1100-kva single-phase transformers. It is stated that one of these sets is for substation No. 6 and the other for substation No. 7.

Western Ohio Railway, Lima, Ohio.—This company has purchased recently one 1000-kw Westinghouse low-pressure turbine.

Philadelphia Rapid Transit Company, Philadelphia, Pa.—This company will make improvements to its power station at Thirty-third Street and Market Street which will involve an outlay of \$225,000. Beside other equipment a 6000-kw Westinghouse exhaust steam turbine will be installed in the station. An extension will be made to the power house on North Delaware Avenue. This improvement will cost, it is estimated, \$100,000.

Memphis (Tenn.) Street Railway.—This company is considering the building of an extension to its power house and installation of an engine, generators, etc.

Washington-Oregon Traction Company, Walla Walla, Wash.—W. S. Matthias, general manager of this company, whose address is 607 East Main Street, Walla Walla, Wash., has written the *ELECTRIC RAILWAY JOURNAL* that the Washington-Oregon Traction Company, which proposes to build an electric railway between Walla Walla and Pendleton, Ore., as noted on page 57 of this issue of the *ELECTRIC RAILWAY JOURNAL*, is in the market for the following apparatus: Steel pipe (quantity and dimensions not given), 3 2400 hp impulse water wheels, 3 1200-kw, 3-phase, 00-cycle volt generators with exciters, 9 400-kw raising transformers, switch-board lightning arresters, 20 miles of transmission line, 3 200-kw transformers, 1 300-kw transformer and all other necessary equipment.

Kenosha (Wis.) Electric Railway.—This company advises that it expects to build a powerhouse 50 ft. x 35 ft. It has recently purchased 1 300-kw Allis-Chalmers turbo-generator, 1 200-kw Westinghouse motor generator, 3 125-kva Westinghouse transformers and 180 metallic-flame arc lamps.

Manufactures & Supplies

ROLLING STOCK

Cheyenne (Wyo.) Electric Railway is having one city car built by the Danville Car Company.

Texarkana Gas & Electric Company, Texarkana, Tex., is in the market for three new single-truck cars.

Ralston Electric Railway & Power Company, Ralston, Neb., has purchased one second-hand 20-ft. motor car.

Pittsburgh (Pa.) Railways has ordered two baggage and express cars from the G. C. Kuhlman Car Company.

William B. Michel, 140 Cedar Street, New York, is in the market for 40 4-yd. two-way dump cars, narrow gauge.

Argenta (Ark.) Street Railway has purchased one second-hand car from the Little Rock Railway & Electric Company.

Sioux Falls (S. D.) Traction System has purchased one 18-ft. motor car from the Dornier Railway Equipment Company, Chicago.

Cairo & St. Louis Railway, Cairo, Ill., a road under construction has placed an order for three cars with the Danville Car Company.

United Railways & Electric Company, Baltimore, Md., contrary to the previous report in the *ELECTRIC RAILWAY JOURNAL*, will not purchase any new rolling stock.

New York, New Haven & Hartford Railroad, New Haven, Conn., has ordered two electric freight locomotives from the Westinghouse Electric & Manufacturing Company.

Kanauga Traction Company, Gallipolis, Ohio, has purchased three 21-ft. motor cars and two open trailers from the Dornier Railway Equipment Company, Chicago.

Colfax Springs (Iowa) Railway has purchased one 20-ft car mounted on Brill 21-E trucks and equipped with Westinghouse No. 49 motors from the Dornier Railway Equipment Company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has ordered 10 city cars from the Cincinnati Car Company. This order was reported in the *ELECTRIC RAILWAY JOURNAL* of May 22, 1909.

Cienfuegos, Palmira & Cruces Railroad, Cienfuegos, Cuba, is in the market for two new 30-passenger gasoline motor cars and four second-hand flat cars for construction purposes. This equipment will be purchased by T. N. Motley & Company, 50 Church Street, New York.

Wheeling (W. Va.) Traction Company advises that it has so drawn the specifications for the eight cars mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 29, 1909, that in case it decides to adopt the pay-as-you-enter system the new rolling stock can be readily converted at little expense.

Washington-Oregon Traction Company, Walla Walla, Wash., a proposed road, contemplates purchasing four passenger motor cars, two trailers, two 50-ton electric locomotives and 100 box cars for service when its line is completed. It is also in the market for 10-flat and one work car besides an oil-burning locomotive for construction purposes.

Long Island Railroad, Long Island City, N. Y., has ordered 120 all-steel motor and trail cars for service between Long Island City and the Pennsylvania terminal, New York, under the East River, from the American Car & Foundry Company. Mention of the contemplated purchase of these cars was made in the *ELECTRIC RAILWAY JOURNAL* of April 10, 1909.

Boston & Northern Street Railway, Boston, Mass., has ordered one Barber car of the latest improved type from the Barber Car Company, York, Pa. The company has also ordered type O-50 trucks from the Standard Motor Truck Company, Pittsburgh, Pa., for the 42 cars purchased from the Laconia Car Company, as mentioned in the *ELECTRIC RAILWAY JOURNAL* of June 26, 1909.

Gallatin Valley Electric Railway, Bozeman, Mont., has purchased through Westinghouse, Church, Kerr & Company a double-truck semi-convertible passenger, baggage and smoking car for Sept. 1, 1909, delivery. The car will be 51 ft. 2 in. over vestibules and have a body length of 41 ft. 8 in. Westinghouse air brakes, Brill folding vestibule doors and mutually operating sliding doors were specified. Other details are: Curtain Supply Company curtain fixtures, Dedenda gongs, Peacock brakes, four Westinghouse 307 motors, Nichols-Intern sanders, Brill seats and Brill No. 27-E-2 trucks.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, has purchased three 56-ft. interurban passenger cars, one 56-ft. parlor car and three 50-ft. express cars, all of

which will be mounted on Baldwin class 84-30 trucks. The cars will be finished in mahogany, full empire ceiling, Hale & Kilburn No. 110-CE and No. 199-EE seats upholstered in plush and leather, inlaid linoleum floors, Edwards sash fixtures and Pantasote curtains. The parlor car will have a lavatory in addition to the toilet room. Westinghouse No. 112 motors and air brakes were also specified. Mention of this contemplated purchase was made in the *ELECTRIC RAILWAY JOURNAL* of April 17, 1909.

Pittsburgh & Kansas City Railway, Pittsburgh, Kans., has drawn up the following specifications for the 4 closed cars reported in the *ELECTRIC RAILWAY JOURNAL* of May 15, 1909, as having been ordered from the American Car Company:

Weight	18,000 lb.	Curtain fix....	Curtain S. Co.
Length of body.....	28 ft.	Curtain material...	Pantasote
Length over vestibule,	40 ft.	Gongs	Deleda
Width over sills..	7 ft. 11 in.	Hand brakes	Brill
Width at belt.....	8 ft. 4 in.	Heaters	Consolidated
Body	wood	Journal boxes	Brill
Underframe	wood	Seating material	
Air brakes ..	Westinghouse	Rattan and mahogany	
Couplers.....	Van Dorn	Trucks, type, Brill No. 27-G1	

Interborough Rapid Transit Company, New York, has ordered 100 additional all-steel cars, making a total of 350 for subway and elevated service. The equipment was divided between the General Electric Company and Westinghouse Electric & Manufacturing Company. It has contracted with the General Electric Company for 380 200-hp motors for the equipment of 190 new steel cars for the subway; also for 190 control equipments for the same cars. In addition, the General Electric Company will supply 40 equipments of control for elevated motor cars, 60 trailer equipments for the subway and 40 trailer equipments for the elevated. The Interborough Company also bought from the Westinghouse Electric & Manufacturing Company 120 125-hp motors for the equipment of 60 elevated cars and 20 equipments of control for these cars.

TRADE NOTES

Simmern Automatic Railway Signal Company, Los Angeles, Cal., has removed its offices from Los Angeles, Cal., and is now located at 1109 Crocker Building, San Francisco.

Standard Underground Cable Company, Pittsburgh, Pa., announces that its San Francisco office address is now in the First National Bank Building.

A. Bement, Chicago, Ill., consulting engineer, has secured the services of R. L. Baker, who was recently connected with the department of experimental engineering of the University of Wisconsin.

McKeen Motor Car Company, Omaha, Neb., has received orders from the following steam railroads for gasoline motor cars: St. Joseph & Grand Island Railroad, Bellingham Bay & British Columbia Railroad and the Erie Railroad.

Frank Ridlon Company, Boston, Mass., furnished the lighting equipment, consisting of one 100-kw d.c. and one 125-hp a.c. motor, together with the wiring, lamps, fixtures and decorative effects, for the production of "Joan of Arc" given in the Harvard Stadium June 22 by Maude Adams.

Stover Motor Car Corporation, Philadelphia, Pa., has been organized with headquarters at 1201 Harrison Building, Philadelphia, with a capital of \$200,000 to take over the Stover Motor Car Company, Freeport, Ill. The company will have factories at Wilmington, Del., and Freeport, Ill.

Western Electric Company, New York, has recently appointed J. A. Currie as its representative in the railroad department in the Middle West, with headquarters at the company's factory in Cleveland, 2163 East Thirty-ninth Street. Mr. Currie has been connected with electric railway interests for a number of years, attending to the construction and purchasing end and has a wide acquaintance among railway managers.

Rooke Automatic Register Company, Providence, R. I., has equipped with its registers all the double-deck gasoline busses which the Fifth Avenue Coach Company, New York, is now operating over the Queensboro Bridge between Manhattan and Queens. These vehicles are similar to those in use on Fifth Avenue, New York, on which the Rooke system has been employed for nearly two years with complete satisfaction.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis., announces that it has purchased the plant, business and patents of the J. L. Schureman Company, Chicago, Ill. The manufacture of Schureman controlling apparatus will be continued, and all agreements and contracts made by the J. L. Schureman Company will be carried out by its successor. The services of S. M. McFedries, general manager of the Schureman Company, have been retained by the

Cutler-Hammer Manufacturing Company, and he will remain in active charge of the manufacture and sale of Schureman apparatus. J. L. Schureman retires from the business. Until further notice customers of the Schureman Company should direct orders and inquiries to the old address, J. L. Schureman Company, 70 West Jackson Boulevard, Chicago.

ADVERTISING LITERATURE

Buckeye Engine Company, Salem, Ohio, has issued a new booklet on its electric blue-printing machine.

Griffin Car Wheel Company, Chicago, Ill., has printed a folder showing various sections, profiles and sizes of its chilled-iron car wheels.

Carnegie Steel Company, Pittsburgh, Pa., has just prepared a pamphlet on steel wheels giving specifications, profiles and tables of diameters and circumferences.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has sent out a new price list on radial, thrust and adapter bearings. On a number of sizes there have been substantial reductions in price made.

Peter Smith Heating Company, Detroit, Mich., has brought out an illustrated catalog on its hot-water heating system for electric railway cars. Many types are illustrated for both city and interurban service.

British Thomson-Houston Company, Ltd., Rugby, England, has issued a new catalog describing Curtis exhaust and mixed pressure turbo-generators. These turbines are of the horizontal type and are built in all sizes from 200 kw upward.

Warren Webster & Company, Camden, N. J., have issued Part VIII of their general catalog of steam specialties in which are described several systems of steam heating, feed-water heaters, steam separators and numerous smaller specialties.

Dearborn Drug & Chemical Works, Chicago, Ill., have published a small pamphlet entitled, "Lubrication vs. Friction," in which the process of manufacture and testing of the high-grade oils and lubricants made and sold by this company is described.

J. P. Devine Company, Buffalo, N. Y., has printed a pamphlet describing the Passburg vacuum drying and impregnating method for field and armature coils and transformers. It has also printed a catalog on the apparatus required for this work.

General Electric Company, Schenectady, N. Y., has just issued the following bulletins: No. 4664 on direct-connected, engine-driven railway generators, from 5 for 550 volts to 600 volts; No. 4666, type "H" transformers; No. 4668, on the GE-216-A railway motor; No. 4670, gaskets and bell mouths for conduit wiring.

Ohio Brass Company, Mansfield, Ohio, has printed some circulars of information on the Tomlinson automatic radial car coupler, type A, form 5, size No. 1. This coupler has been designed to meet the demand for a smaller and less expensive device than the type A, form 2, No. 2, for city work where the loads are not excessive. The new coupler is recommended for all city work where trailers are hauled and is suitable for the most severe curves and grades. The head of this coupler differs from type A, No. 2, in being smaller and lighter and also in having somewhat shallower serrations and a wide, flat face. The object in having a wide, flat face is to permit intercoupling with other types. The coupler head and draft gear are combined into one unit, the head being cast with a long stem into which the tail-piece is fastened. The coupler is made in one length only, namely, 4 ft. 6 in. from the face of the hook to the center of the tail pin hole.

NEW PUBLICATION

Trolley Wayfinder. Boston, Mass.: The New England Street Railway Club, 1909; the New England News Company, Boston, wholesale agents. Illustrated. Price, 10 cents.

The New England Street Railway Club has issued its official street railway guide for 1909, a most complete directory of trolley tours throughout New England. Some 21 trips from Boston are given, as are also innumerable trips between places of historic and scenic interest throughout New England generally. An alphabetical list of towns directs the user to tables for specific instruction as to route, rate of fare and distance between towns. Twenty-one railways publish maps of their entire lines, and many others publish maps pointing out the chief attractions of their roads. The Trolley Wayfinder is well established, and on account of the care exercised in its preparation has increased from year to year in popularity until it has come to be looked upon by many trolley tourists in New England as indispensable.

TABLE OF MONTHLY EARNINGS

Notice:—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement, "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. *Including Taxes. †Deficit. ‡Taxes and Insurance.

Table with columns: COMPANY, Period, Gross Income, Operating Expenses, Gross Income Less Operating Expenses, Deductions from Income, Net Income. Rows include companies like AKRON, O., ATLANTA, GA., BELLINGHAM, WASH., BINGHAMTON, N.Y., CHAMPAIGN, ILL., CHARLESTON, S. C., CLEVELAND, O., DALLAS, TEX., DULUTH, MINN., EAST ST. LOUIS, ILL., EL PASO, TEX., FAIRMONT, W. VA., FT. WAYNE, IND., FORT WORTH, TEX., GALVESTON, TEX., GRAND RAPIDS, MICH., HARRISBURG, PA., HOUGHTON, MICH., JACKSONVILLE, FLA., KANSAS CITY, MO., LEXINGTON, KY., MILWAUKEE, WIS., MILWAUKEE LT., HT. & TRAC. CO., MONTREAL, CAN., NORFOLK, VA., OKLAHOMA, OKLA., PADUCAH, KY., PENSACOLA, FLA., PHILADELPHIA, PA., PLYMOUTH, MASS., PORTLAND, ORE., ST. JOSEPH, MO., ST. LOUIS, MO., SAN FRANCISCO, CAL., SAVANNAH, GA., SEATTLE, WASH., SPRINGFIELD, ILL., TACOMA, WASH., TAMPA, FLA., TOLEDO, O.