Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIV. NEW YORK, SATURDAY, DECEMBER 11, 1909 No. 23

PUBLISHED WEEKLY BY THE

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

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

TERMS OF SUBSCRIPTION:

For 52 weekly issues and also for special daily convention issues published from time to time in New York City or elsewhere:

United States, Cuba and Mexico.....per year, $3.00

Dominion of Canada.....per year, 4.50

Other Foreign Countries within the Postal Union.....per year, 6.00

25 shillings. 25 marks. 31 francs.

Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. No copies of issues prior to January, 1908, are kept on sale, except in bound volumes.

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

Of this issue of the ELECTRIC RAILWAY JOURNAL *9000 copies are printed.*

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CONTENTS.

Changes in Mountain Divisions Possible Through Electricity

One of the points brought out by Dr. Hutchinson in his Institute paper last month was that the limiting length of railroad tunnels, so far as operating conditions are concerned, is greatly increased by the use of electricity, and that it is about as easy to operate a tunnel 12 miles in length as one of 1 mile. The conditions in the Great Northern tunnel under steam traction were graphically described by the speaker, and as every one knows who has traveled through long tunnels behind a steam locomotive, when the tunnel is more than, say, 3 miles in length, and often when the distance is less, the atmospheric conditions in the train are uncomfortable, to say the least. Besides increasing the possible length of tunnel, electric locomotives and the multiple-unit system change for the better the limiting grade and possible length of train, so that for a mountain road built for the use of electric locomotives the cost of track location should be greatly reduced over that of a line designed for steam operation. No one can cross any of the long mountain passes in the Alleghanies or Rockies without being impressed with the inevitable deficiencies of the steam locomotive for such service, and the pronounced advantages of the electric locomotive, especially in localities where water-power for generating electricity is available.

A Novel Employees' Committee

In dealing with a large but widely separated body of men, such as is employed in the service of an urban transportation company, it is seldom possible for the management to learn directly of all the little individual grievances, or, on the other hand, to get the benefit of suggestions from the men for improvements in the service which might promote the comfort and convenience of travel. The general officers cannot spare the time to listen to every man with an idea or a kick, and the men themselves hesitate a long time before going to the office voluntarily; yet it is of great value to receive suggestions from the men and to smooth out their petty troubles before they are magnified into a spirit of general discontent. The channel through which both complaints and suggestions are heard by the general superintendent of the Hudson & Manhattan Railroad is a committee of employees from each branch of the service, who are selected not by the men themselves but by the trainmaster. It is an honor to serve on this committee, the appointments being made each month from among the men having the best records. When the committee meets each week with the general superintendent and his assistants, grievances are as carefully considered as are suggestions for betterments in the service. The informal nature of the

meetings induces the employees to state their complaints without reserve, and if there are good reasons why the conditions objected to cannot be modified they are fully explained. The suggestions for improvements received at these meetings are frequently very valuable. The members of the committee are in close daily contact with the traveling public, and they hear many comments of dissatisfied passengers which would reach the management in no other way. It is an interesting fact concerning these conferences with the committee of employees that the suggestions for improvements has far outnumbered the grievances presented. The method used on the Hudson & Manhattan Railroad is not unlike the practice on the street railway system of Berlin, Germany. In the latter case the men themselves select a committee, appropriately called "trusted men" (Vertrauensmaenner), which is also the company's medium for the voluntary explanation of changes in operation.

Retiring Old Cars from Service

Worn and obsolete cars must inevitably be replaced by new and modern equipments, and the plan followed by a large Eastern street railway system of retiring old cars according to a fixed program covering a number of years has many advantages. This company, like many other large city systems, was formed by the consolidation of a number of smaller properties, each of which contributed its share of more or less antiquated rolling stock. Shortly after the new company took charge, a survey was made of all the cars then owned and their general condition, suitability for the present and future service and probable life was determined. From these data a program of retirements was drawn up which will extend through 1914. At the end of the period all the old cars will have been replaced by new cars, and then it is planned to prepare a new program of the same kind to cover succeeding years. The old cars were divided into classes, and plans were made to withdraw a certain number of cars from each class during each year. The selection of the specific cars to be retired is left to the discretion of the master mechanic, who bases his decision on the condition of the cars as they come into the shop for repairs. Those cars in each class which are in the worst condition are the first to go, but the total number to be retired is made up at the end of the year, regardless of their condition, good or bad. Along with this program of renewals the company has adhered closely to a uniform yearly increase in its total equipment to meet the needs of a steady growth in traffic. This systematic planning has enabled the company to meet the expense for new cars largely out of its earnings from year to year without carrying an undue burden in any one year. It has saved in expenditures for maintenance of old cars by serving as an accurate guide as to how much could be profitably spent in painting or repairing cars destined to be withdrawn from service within a year or two. The company has been able to foresee its requirements for car storage far into the future, to buy property and design new car houses just sufficient to meet its present needs and capable of being enlarged as the number of cars is increased. A new shop is now being planned, based on an accurate knowledge of the future rolling stock to be cared for. These advantages should commend the idea to other managements facing a similar problem.

The Proposed Ohio Interurban Rules

The Ohio Railroad Commission, on the recommendation of a committee of electric railway managers, has expressed its approval of a code of operating rules for the interurban roads of that State which departs from the standard code of the American Street & Interurban Railway Association in a number of important details of practice. As stated editorially in this paper last week in discussing this subject, radical changes in the standard code should not be made by the authorities of any State except for overpowering reasons, and the changes recommended by the Ohio Railroad Commission must be backed up by very strong arguments in their favor in order to justify what is practically repudiation of the association's long-continued effort to bring about uniformity in this regard. Elsewhere in this issue will be found a signed statement by John C. Sullivan for the railroad commission and Frank A. Davis for the committee of railway managers, outlining the reasons which influenced the commission to make the changes which it has approved. The reasons given were not urged upon the committee on interurban rules prior to the convention in Denver, when the standard code was adopted by the American Association, nor were they voiced by any of the Ohio delegates in the meeting at which the code was discussed and voted upon. They do not prove convincingly that the procedure given in the standard code is fundamentally wrong in theory or impossible to carry out in practice. For each reason advanced in favor of the changes there are one or more equally good, or better, reasons for retaining the wording of the rules as they appear in the standard code.

The change in Rule 103 is defended on the ground that the signal of three bells to back a car when standing conforms to a long-established steam railroad practice. It may be interesting to point out that in the code of rules presented at the 1908 convention, rule 103 was precisely the same as that which the Ohio Railroad Commission has now adopted. The attention of the rules committee of the American Association, shortly after the 1908 convention, was called to at least one fatal accident due primarily to the practice of using three bells as a signal to back. The committee, therefore, changed the signal to four bells in order to eliminate the possibility of a similar accident occurring. Furthermore, by this change the committee made the signals between a conductor and motorman correspond to those in the standard code of city rules, and also made Rules 103 and 104 harmonious. In Rule 104 the signal of four bells from the motorman to the conductor is the signal to back, and must be answered by the conductor before the train is started. Inasmuch as the interurban cars operate generally over city tracks, it is better practice to harmonize the interurban rules with the city rules than with steam railroad practice.

The change in Rule 110, to quote the words of one manager in commenting on these rules, consists in "the substitution of a practice in marker signals which was discarded years ago by most interurban roads, and for which was substituted the standard practice of the steam roads." No provision is made in the revised rule for extinguishing the red lights on the rear of the train when it has cleared the main track. When approaching a passing siding, the mo-

torman of a superior train must either be prepared to stop or else take the chance of finding the inferior train on the main track. He has no means of knowing from the marker lamps displayed whether or not the train is clear of the main track. This practice, we believe, will be condemned by many railway managers. It is defended on the ground that there is not sufficient clearance at the sides of interurban cars to permit the use of lamps which will display lights to the front, side and rear. This ignores the fundamental principle involved of displaying confusing signals on a car which is clear of the main track.

The commission does not approve of Rule 128 as it appears in the standard code, the objection being that it requires too much work on the part of the conductor. This rule has been in use on a number of interurban roads for a long time. No better safeguard could be provided against that common cause of serious accidents, "running past a meeting point." Rule 323 makes motormen and conductors jointly responsible for the safe operation of their trains. It is, therefore, the conductor's duty, as much as the motorman's, to see that no meeting or reporting point is passed, and it is more important to make sure that he does this than that he collects every fare.

The commission has eliminated Rule 203-a and Rules 203 and 230 have been modified accordingly. No railway manager will deny that there are times when it is absolutely necessary to get cars over the road in emergencies when every means of communication between the crew of one car and the dispatcher or the crews of other cars has failed. Rule 203-a outlines a method which, if rigidly adhered to, should be safe to use. If no such rule is provided, one of two things must occur; either the road must be tied up indefinitely or the men will follow a procedure of their own creation. The second course is vicious, and yet it is encouraged by the railway company which thus evades responsibility. It is argued that it would be unwise to send one of the crew ahead with a flag, and thus leave to the other member of the crew the entire responsibility for protecting the passengers and also the rear of the car. The protection of a train by torpedoes in such a case is provided for in Rule 101, and it rarely would be necessary for both members of the train crew to leave their car for any length of time. We believe that Rule 203-a, or a similar rule definitely stating a safe procedure, is both desirable and essential.

The change in Rule 210 is a reversion to the principle, but not to the practice, of the American Railway Association's standard code of rules, which requires a time interval of five minutes instead of two minutes. The principal objection to the use of a time interval on an electric road is the fact that agents and operators who can note the passing time of trains are on duty only at a few stations. The crews of following trains must depend for the most part on the exact observance of schedule times by the trains ahead, while the space interval is frequently estimated by combining distance and speed into terms of time. Still a rule fixing a minimum distance between trains is based on the only correct thing, that trains cannot collide if they are separated by space.

Changes in Rules 212 and 213 are not discussed by Messrs. Sullivan and Davis. They have been omitted entirely, and the commission thus places the responsibility on each company operating in the State of formulating its own rules covering the operation of trains in case of failure of the telephone lines. If the committee on interurban rules was not able to draft a rule which would be satisfactory, it is reasonable to suppose that individual managers, if left to their own resources, will make rules which certainly will be no better than those in the standard code, and may be positively dangerous. The action taken on these two rules is destructive, and not constructive in any sense.

It is to be hoped that these changes in the standard code will not be issued by the commission as final without a rehearing. The promulgation of the Ohio rules in their present form would be detrimental to the interests of the interurban roads in that State and of the industry as a whole. Finally, we have no doubt that the committee on interurban rules of the American Association, if requested, would be willing and glad to take up the entire subject of the wording and procedure in the standard code with the commission, if this testimony was necessary, in order to show the inadvisability of adopting the proposed code.

Training Motormen in the Hudson Tunnels

The selection and training of motormen to operate a fast and frequent service such as that given by the Hudson & Manhattan Railroad in the North River tubes requires special precautions. An interesting feature of the employment methods of this company, which are described elsewhere in this issue, is the establishment of an intermediate grade in which all candidates for the position of motorman must serve for a considerable period of time before being placed in charge of regular trains. This grade, which is that of switchman, corresponds in some respects to that of fireman on the steam roads. It provides a means of training the men in every phase of their future duties much more thoroughly than would be possible by a short course of instruction in the shops or schoolroom and no danger to passengers is incurred through trusting an inexperienced man with the operation of a regular train even under the guidance of an instructor. While serving as a switchman the new man has an opportunity of learning first hand the operation and construction of the equipment, how to locate and find trouble, the meaning of signal indications and the actual "feeling" of a car or train in motion. In the meanwhile he is earning a living wage and doing necessary work incident to the operation of the regular trains. Only the best men are willing to undertake a switchman's work as a step toward promotion to the coveted position of motorman. Another meritorious feature of the plan is that the list of extra motormen is kept down to a minimum since there are always available switchmen who are qualified to operate trains when required in emergencies. A significant feature of this company's employment practice is the fact that it prefers to engage as motormen men who have held similar positions on high-speed electric railways or who have been employed on steam railroads. Many railways pursue the opposite policy, on the supposition that it is easier to train men who enter the service without preconceived operating notions; but the tunnel company evidently believes that the veteran railroad man's sense of responsibility outweighs the disadvantages of working under new rules.

TRACK AND LINE IMPROVEMENTS OF THE CONEY ISLAND & BROOKLYN RAILROAD COMPANY

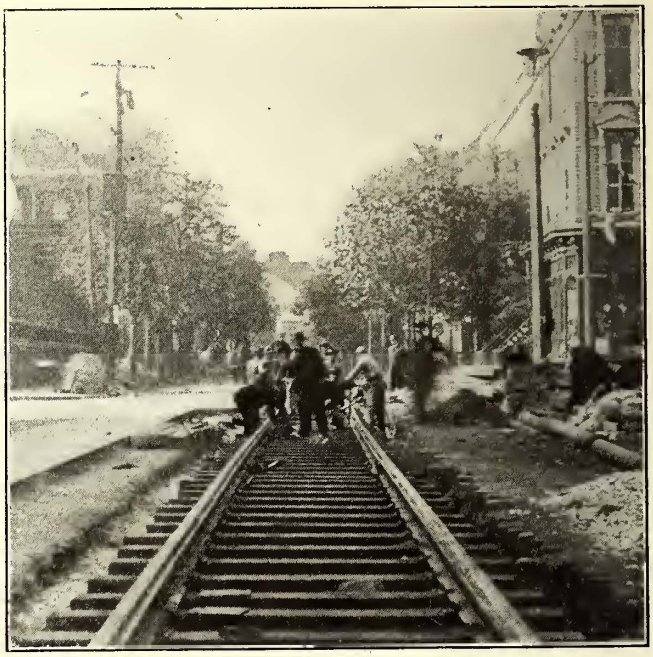
As a part of its general rehabilitation work during the past year, the Coney Island & Brooklyn Railroad has made extensive improvements in the track and line departments. The new work and the broader reconstruction have been done by Ford, Bacon & Davis, as consulting and contracting engineers, while the general overhauling has been in the hands of E. L. Matthews, the company's superintendent of roadways, and P. J. Murphy, lately superintendent of power stations. All work was subject to the approval of S. W. Huff, president and manager of the Coney Island & Brooklyn Railroad. The roadway contract of the engineering firm mentioned covered a double-track section 1100 ft. long on Smith Street from Fulton Street to Atlantic Avenue and a section 5500 ft. long on DeKalb Avenue from Reid to Wyckoff Avenues. The Smith Street work called for the use of the original rails with additional joints and tie-rods, laid on new foundation, prepared before the repaving of this thoroughfare by the city. Most of the DeKalb Avenue work (3300 ft.), however, was for entirely new construction and so gave the engineers an opportunity to apply improved methods which could serve as standards in the future.

The most striking feature of the DeKalb Avenue installation was the design of the new 102-lb. girder rail shown in one of the accompanying drawings. This rail was designed after conference with R. W. Creuzbaur, consulting engineer to the president of the Borough of Brooklyn. It will be observed that the height of this rail is only 7 in.; the width of the head, 2½ in., and the depth of the groove, 1¼ in. The short lip is designed to give the same bearing for paving blocks as rails with longer lips and yet expose a smaller steel surface to street wear. Some long-lipped

Coney Island & Brooklyn Track Improvements—Roller in Use on Sub-Grade

rails, for instance, expose 5 in. to 5½ in. of steel in the street. This new rail section is rolled both by the Lorain Steel Company and the Pennsylvania Steel Company.

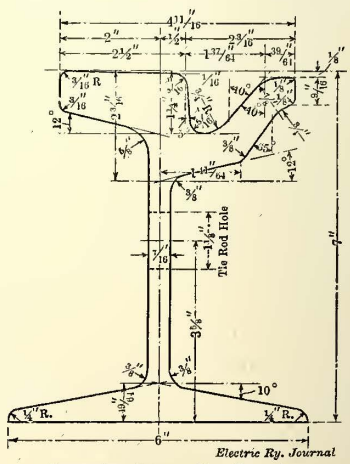
The new track is fitted with eight-hole Continuous joints and double-bonded with a combination No. 0000 plug and soldered bond specially designed by the engineers and made by the Lord Electric Company. The joints were drilled ⅛ in. small, the holes being reamed in position for the driving in of 1⅛-in. diameter turned bolts. The ties, which are spaced 2 ft. 3 in. centers, are 6 in. x 8 in. face and 7 ft. 6 in. long. They are of long-leaf yellow pine and were creosoted with 12 lb. of oil per cubic foot. It is expected that the treated ties will last from 20 to 25 years, especially in view of the employment of screw spikes and ⅜-in. tie plates.



Coney Island & Brooklyn Track Improvements—Tie-Plate Construction at DeKalb and Evergreen Avenues

The spike holes were bored before the ties were creosoted, and for convenience in installation, the tie-plates and four of the six spikes were put in at the track yard.

The cross-section on page 1177 illustrates the details of the track foundations, while the appearance of the work at various stages is shown in several half-tones. One of the latter is of particular interest as it shows the track completed on one side, different foundation layers on the other side and the 10-ton steam roller, which was used to roll the subgrade as well as the ballast. Considerable economy was effected in the repaving of the DeKalb Avenue work by splitting and dressing the old granite blocks which had been worn down on the top surface. The joints between the blocks were filled with cement grout. All of the special work is of the hard steel center type made by the Wharton and Lorain companies.



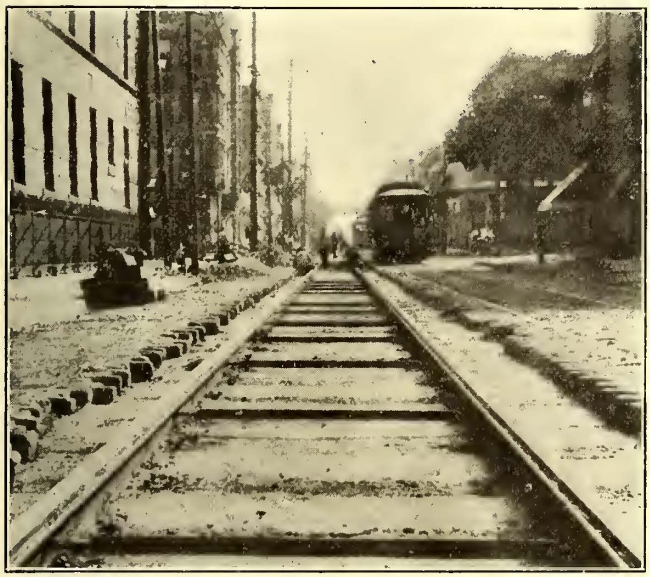
Standard 102-lb. Section

The general overhauling carried out directly by the railway company during the fiscal year 1908-1909 may be summarized as follows: 2752 rail joints were repaired and resurfaced, which if contiguous would represent 7.82 miles of track overhauled; track was resurfaced and tie rods installed for a distance equal to 5.45 miles; 2527 joints were bonded, which if contiguous would represent 7.18 miles;

jumper cables were installed around 33 pieces of special work; 230 pieces of rail were cut in where joints were so bad as to make it necessary to cut out the joint entirely and substitute a piece of new rail. All special work of the system as a whole was gone over thoroughly, renewed where necessary and put in good operating condition.

LINE IMPROVEMENTS

Coincident with the track improvements, the company



Coney Island & Brooklyn Track Improvements—Construction at DeKalb and Hamburg Avenues

began the thorough overhauling of its overhead lines, including the placing of feeders underground in certain districts. In all 15.16 miles of trolley wire or about 32½ per cent of the entire system were renewed with phono-electric wire, which is expected to wear from five to six years and have less breaks than hard-drawn copper. The sections renewed were made up of the following lengths and wire gages: 2.44 miles with No. 0; 11.62 miles of No. 00, replacing No. 0; 1.10 miles of No. 0000, replacing No. 0. A large portion of the span wires was found badly rusted, thus requiring the installation of 15.23 miles of 5/16-in. galvanized iron wire. Practically all of the overhead special work and about 75 per cent of the wood strain and other insulators were renewed, largely with General Electric equipment. Other improvements during the fiscal year were the installation of 45 new iron and 37 new wooden poles and the renewal of over 10 per cent of the underground lead-covered cables.

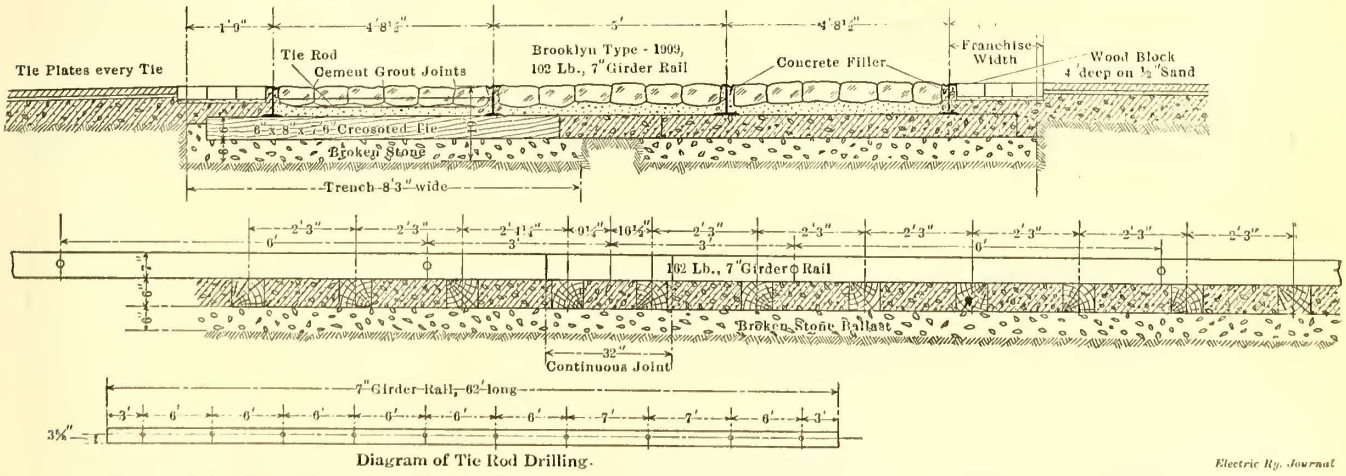
THE WIESENTAL SINGLE-PHASE RAILWAY IN BADEN, GERMANY

The Wiesental Railway, owned by the Grand Duchy of Baden, Germany, has recently been electrified for 10,000-volt, 15-cycle, single-phase operation. The main line extends from Basel to Schopfheim, 13.4 miles, with branches at Säckingen and Zell, which are respectively 25.6 miles and 17.8 miles from Basel. A significant feature in connection with the choice of the voltage and frequency is the fact that the current is purchased from a hydroelectric plant at 6800 volts, 50 cycles. The overhead work is of the Siemens-Schuckert multiple catenary type, with 240-ft. span.

Twelve through trains, 51 local passenger trains and 15 to 21 freight trains are operated daily. As all cars are of the standard steam design, only electric locomotives are used. The 10 machines which the Siemens-Schuckert Company is building are intended to haul both passenger and freight trains. The maximum weight of a standard passenger train (exclusive of the locomotive) is 230 metric tons, and of freight trains 500 metric tons. The average grade on the line is 0.57 per cent and the highest 1 per cent. The locomotives will have five axles, of which two are free and the other three are driven from two series motors mounted in the upper part of the locomotive. Each motor will have a continuous rating of 390 hp, an hour rating of 525 hp and a maximum output of 800 hp at 300 volts.

At first, the converter station in Basel will have two converter sets, each consisting of a 2100-kva (continuous rating), single-phase generator coupled to a polyphase asynchronous motor and a d.c. machine. The latter is in circuit with a storage battery. When the load on the line is heavy, the d.c. machine will act as a motor and deliver the necessary additional power to run the single-phase generator; on light loads it will become a d.c. generator and charge the battery, thus securing the same desirable equalization of loads as on a purely direct-current line.

The narrow-gage electric railway between Glion and Montreux, in Switzerland, has recently been extended and equipped with electric locomotives of a novel type, as they are of 220 hp on a road with a gage of only 31½ in. The



Coney Island & Brooklyn Track Improvements—Longitudinal and Cross Sections of Standard Track

motors, of which there are two to each locomotive, have necessarily to be mounted on the locomotive frame, and are connected by double reduction gearing and then by crank rods to the driving wheels. Electrically, the motors are always in series. The line is operated by 600-volt direct current.

COMPARISON OF OPERATION OF THE NEW YORK AND PARIS SUBWAY SYSTEMS

BY ROBERT H. WHITTEN, LIBRARIAN-STATISTICIAN, NEW YORK PUBLIC SERVICE COMMISSION, FIRST DISTRICT

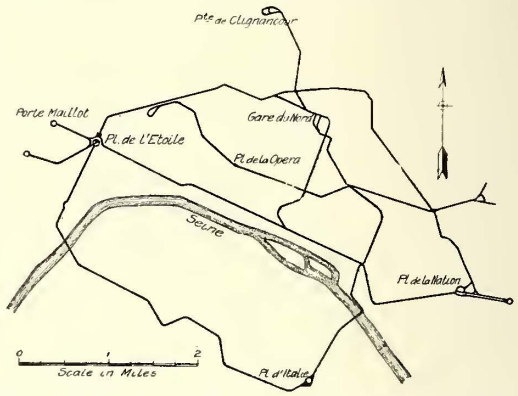
While the Paris and New York subway systems have a sufficient similarity to make comparison of their operations practicable they have enough points of divergence to make the results of the comparison especially instructive. The statistics used are for the year ending June 30, 1908, in the case of the New York subway, and for the year ending Dec. 31, 1908, for the Paris subway.

Both the Paris and the New York subways have been built and are owned by the city and leased for a term of years to an operating company. Both subways are mainly of the "shallow" rather than the tunnel type, running as near the surface as the topography of the district and other difficulties render practicable. The length of the two systems in miles of single track operated was in 1908 very nearly equal. The Paris system, however, forms a network of lines covering a district having a radius of three or four miles from the business or traffic center. The New York system has a single main stem terminating in two long forks at the upper end and extending 14 miles from the Brooklyn Bridge or chief traffic center. The New York subway has four tracks permitting of both express and local service for 6½ miles through the most congested district. The Paris subway is two-track throughout and has no express service. The number of passengers carried is greater in Paris than in New York, both as to total and as to number per mile of track and per car-mile. The congestion of traffic is, however, much less in Paris than in New York, owing to the more advantageous distribution of traffic, both as to time and as to direction and the shorter average length of ride.

AREA AND POPULATION

The Paris metropolitan district had in 1908 an estimated population of 3,960,000 as compared with 4,340,000 for New York City. The district served by the Paris subway, however, is that of the municipality proper or the portion of the city within the walls. The district served by the New York subway is assumed to be the boroughs of Manhattan and the Bronx. The local traffic on the subway in the borough of Brooklyn was so slight for the year under consideration that it may be disregarded.

The population of the district served by the subway system was 2,570,000 for New York subway and 2,790,000 for Paris. Paris is roughly circular in shape, its boundary wall forms roughly a circle having a 3-mile radius and a center that coincides with the center of the business district. The area of the city proper is 31 square miles. Outside of the city boundary wall there is a large population that should be considered a part of the Paris metropolitan district. Greater Paris may be said to cover the entire department of the Seine, which has an area of 185 square miles. The area of New York City is 327 square miles, and that of Manhattan and the Bronx, the district served by the subway, 62 square miles. The population of the district served by the Paris subway is more than twice as dense as that of the district served by the New York subway. Manhattan and the Bronx have a population of 41,400 per square mile, while the city of Paris has a population of 90,000 per square mile.

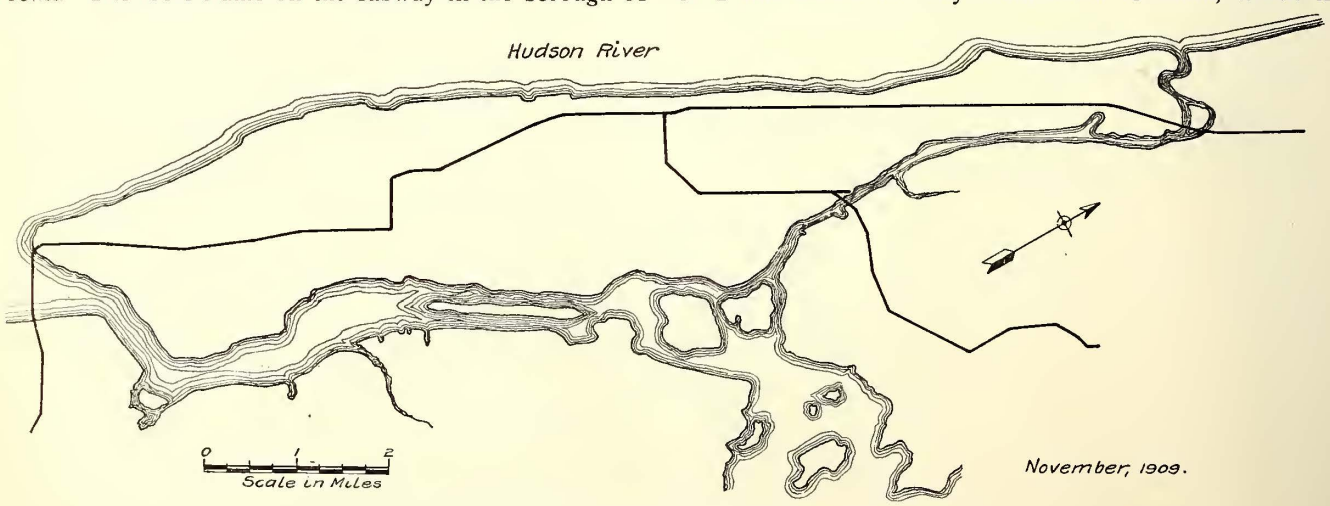


Paris and New York Subways—Map of Paris System

COMPETING LINES

In New York the subway must compete for public favor with an extensive system of surface and elevated lines. In Paris there are no elevated lines and the surface lines are undeveloped.

Most of the surface franchises in Paris expire in 1910 and the reorganization and development of the system have been long delayed through failure to reach an agreement as to the extension of the franchises. The omnibuses and cabs, however, carry a large traffic. The subway system when completed will be in the hands of a single company (Chemin de fer Metropolitain de Paris), with the exception of a line across the city from north to south, which is being constructed by an independent company. The two companies are, however, required to grant free transfers at intersecting points.



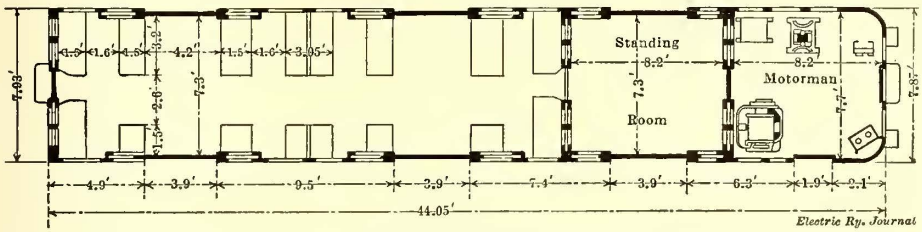
Paris and New York Subways—Map of New York System

LINES AND ROUTES

At the end of 1908 31 miles of double-track line of the Paris subway system were in operation. The system is

divided into five separate operating lines, the longest of which is a semi-circular line 9 1/3 miles in length and the shortest 3½ miles. Another line, semi-circular in form, is 7½ miles in length, and another, running straight across the city, 6½ miles.

Each line is independent and self-contained. The trains run back and forth from one end of the line to the other, usually turning at each end by means of a short loop.



Paris and New York Subways—Plan of New Type Paris Motor Car Seating 25 and Having 45 Standing Places

The New York subway had a total length in June, 1908, of 24.6 miles. For the transportation of passengers two tracks are used from the Atlantic Avenue station in Brooklyn to the Brooklyn Bridge; four tracks from the Brooklyn Bridge to Ninety-sixth Street; two tracks from Ninety-sixth Street to 180th Street on the Lenox Avenue line and two tracks from Ninety-sixth Street to 242d Street on the Broadway line. In addition, a third track is operated on the Broadway line between 103d Street and 137th Street.

This makes a total of 64.6 miles of single track in New York used for transporting passengers. This total does not include sidings, turnouts or tracks used for car storage only. The total length of track operated for the Paris subway was 62.2 miles. In both cases, however, a portion of this track was completed and put in operation within the year. A better basis of comparison is therefore found in the average miles of single track operated during the year, which is 61.4 miles for New York and 60.3 miles for Paris.

The accompanying cuts show on the same scale the two systems as operated in 1908. In Paris, in addition to the lines shown, the lines now under construction and those definitely agreed on form a complete network within a very small area as compared with the New York system.

TRAINS

On the Paris subway the trains do not run between 1 a. m. and 5:30 a. m. During 1908 the least headway during rush hours was 2 minutes and 33 seconds on line No. 3. The greatest headway on any of the five lines in operation was 7½ minutes during the period of least traffic from 8 p. m. to 1 a. m. As shown by the comparative chart the New York schedule for express trains on the four-track portion of the line called for a train headway of two minutes and under during rush hours and for a four-minute headway in the late evening hours.

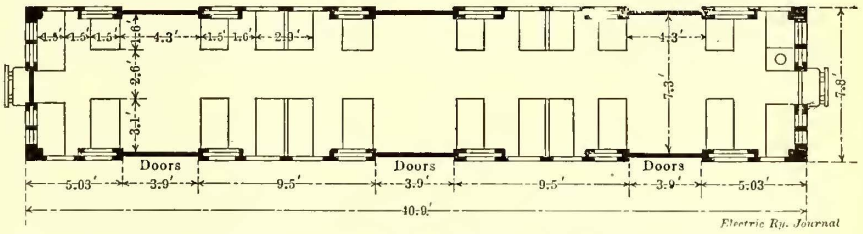
The Paris subway station platforms are 246 ft. long and the maximum length of trains as prescribed by the Government is 236 ft. In New York the station platforms are 350 ft. in length, except at exclusively local stations where they are 200 ft. Eight-car trains 411 ft. in length are operated on the express tracks and five-car trains 257 ft. in length on the local tracks.

SPEED

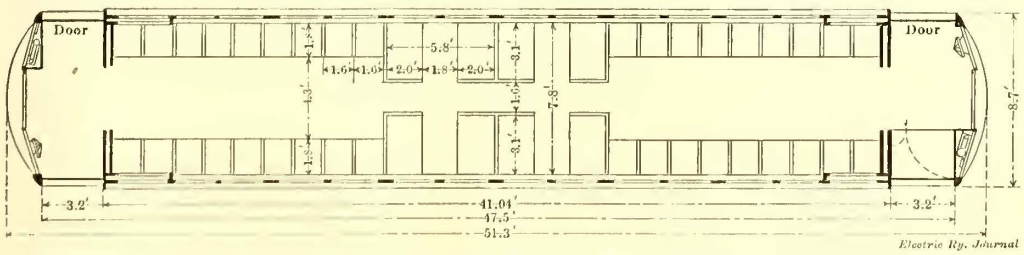
The average schedule speed on the Paris subway is about 12 m.p.h. The maximum speed allowed under the police ordinance is 21.7 m.p.h. The average schedule speed on the New York subway for both express and local trains was a little more than 18 m.p.h. The average schedule speed of express trains between Brooklyn Bridge and Ninety-sixth Street was about 24 m.p.h., and for the entire route traveled by the express train about 20 m.p.h. The average speed of local trains for the entire route was a little more than 15 m.p.h. The maximum speed was about 40 m.p.h.

It is thus seen that the average schedule speed on the Paris subway was about half that of the express trains on the New York subway between Brooklyn Bridge and Ninety-sixth Street, and about two-thirds of that of the average schedule speed of all trains operated on the New York subway. The value of the greater speed attained by the New York system can scarcely be overestimated. From the public viewpoint, fare and speed are the two prime considerations with regard to any transit system. The relative importance to the public of speed and rate of fare has never been studied statistically. It seems probable however, that a decrease of 50 per cent in time required for transportation is at least as important as a 50 per cent decrease in rate of fare.

From the public viewpoint the greatest benefit of rapid and cheap transportation comes from the spreading out of population and the consequent relief of congested sections. Land values and rents in outlying districts can be, and often are, fixed at such a rate as to induce people to settle, regardless of a higher fare charged for transportation. It is not nearly so feasible, however, to so reduce land values and rents in an outlying district as to make it attractive for residence if the time



Paris and New York Subways—Plan of New Type Paris Trailer Car Seating 37 and Having 45 Standing Places



Paris and New York Subways—Plan of New York Motor Car Seating 52 and Carrying at Times a Total of 170 Passengers. Seating Arrangement and Dimensions the Same for Trailer Cars

required for transportation exceeds 40 to 50 minutes. People cannot afford the time, regardless of whatever inducements may be offered in the way of rent. The spread of the population of the various cities over a wider and wider area has been produced chiefly by the greater and greater speed attained by their transit systems. By doubling the radius of a circle its area is quadrupled, and by doubling the speed of city transit the area available for settlement is increased fourfold.

In attaining a high rate of speed the distance between stations or the number of stops is of prime importance. On the Paris subway the average distance between stations is 1640 ft. and all the trains stop at all the stations. On the New York subway the average distance between stations is 2280 ft., while on the express tracks between Brooklyn Bridge and Ninety-sixth Street the average distance between the stations is about 1¼ miles.

FARES

The concession granted the Paris company fixes the following rates of fare: First-class, 25 centimes (4.8 cents); second-class, 15 centimes (2.9 cents); round-trip tickets, second-class, good for return at any time on day of purchase are sold up to 9 o'clock in the morning for 20 centimes (3.8 cents). Pupils of the communal schools of the city of Paris are transported for 5 centimes when traveling in groups accompanied by a teacher. For a single fare the passenger has a right to travel from any one point on the entire system to any other point. Free transfers are allowed at all crossings and junctions. The average fare received was 2.7 cents.

On the New York subway there is a uniform fare of 5 cents with the exception of a comparatively small number of joint fares of 8 cents from which the subway's portion is 4 cents. The average receipts from fares per passenger for the year ending June 30, 1908, was 4.99 cents. Cost of subway construction and equipment was one-half greater in New York than in Paris, as explained later. We would therefore look for a similar difference in the charge for transportation. On this basis a fare of 2.7 cents in Paris would be the equivalent of a 4-cent fare in New York. While the fare in New York is 5 cents the average length of ride per passenger is from 2 to 2½ times that in Paris. Allowing for difference in purchasing power of money as indicated by cost of construction and equipment and for difference in length of average ride for a single fare, the charge per mile for subway transportation is 1½ to 2 times as great in Paris as in New York.

CARS

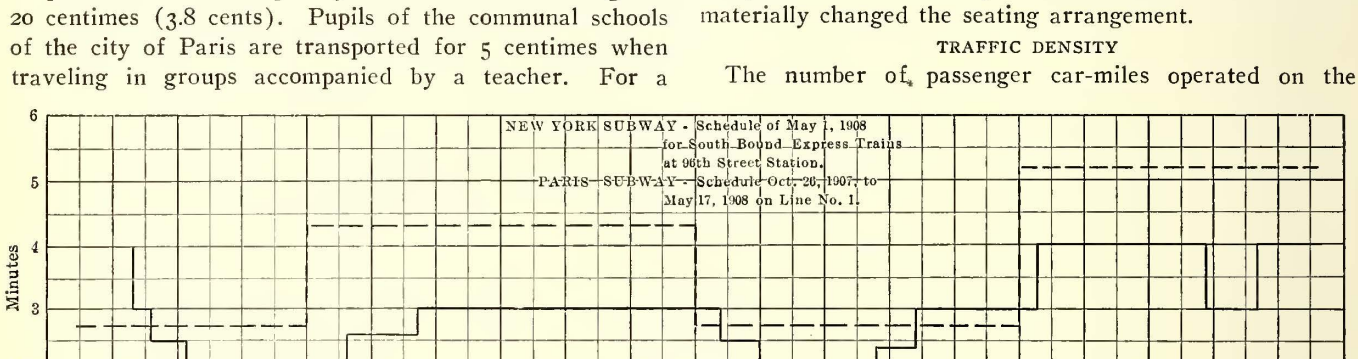
In Paris the maximum capacity of each type of car is determined by the Government. Government regulations contemplate that each passenger, whether standing or sitting, shall have a minimum floor area about 1½ ft. x 2 ft., or 3 sq. ft. This allowance, together with necessary allowance for exits and fixtures, gives in practice one passenger place for approximately each 3½ sq. ft. of floor area. Various types of cars are in use in Paris, from the small, old type motor car, with 20 seats and 15 standing places, to the modern second-class trailer car, with 37 seats and 45 standing places. A large proportion of the cars have 26 seats and 30 standing places. For all cars in use in 1908 the average number of seats was 28 and the average number of passenger places (seats and standing room) was 64. The Government regulations limiting the standing load are not always enforced.

Of the New York cars in use in 1908, 800 had 52 seats each and 37 had 48 seats each. The New York cars are longer and broader than even the largest of the Paris cars. Allowing the same floor area per passenger as is allowed by Government regulation in Paris, the New York car would have a total passenger capacity of 103. Often 150 and sometimes 170 passengers crowd into a New York car. This discussion has reference to the New York car in use in 1908. The recent adoption of the center side door has materially changed the seating arrangement.

TRAFFIC DENSITY

The number of passenger car-miles operated on the New York subway was 44,000,000 or 710,000 per mile of single track. On the Paris subway 34,600,000 passenger car miles were operated, an average of 570,000 per mile of single track. (See Table I.) A comparison on the basis of car-miles is, however, rather misleading. The New York subway car has an average of a little less than 52 seats while the cars used in the Paris subway have from 20 to 37 seats; the average for all cars in use being 28. A better basis on which to compare the service rendered by the two systems is therefore the number of seat-miles instead of car-miles. But the seating arrangements of the New York and Paris cars differ materially and, moreover, in neither city is the capacity of a car measured in practice by the number of seats provided.

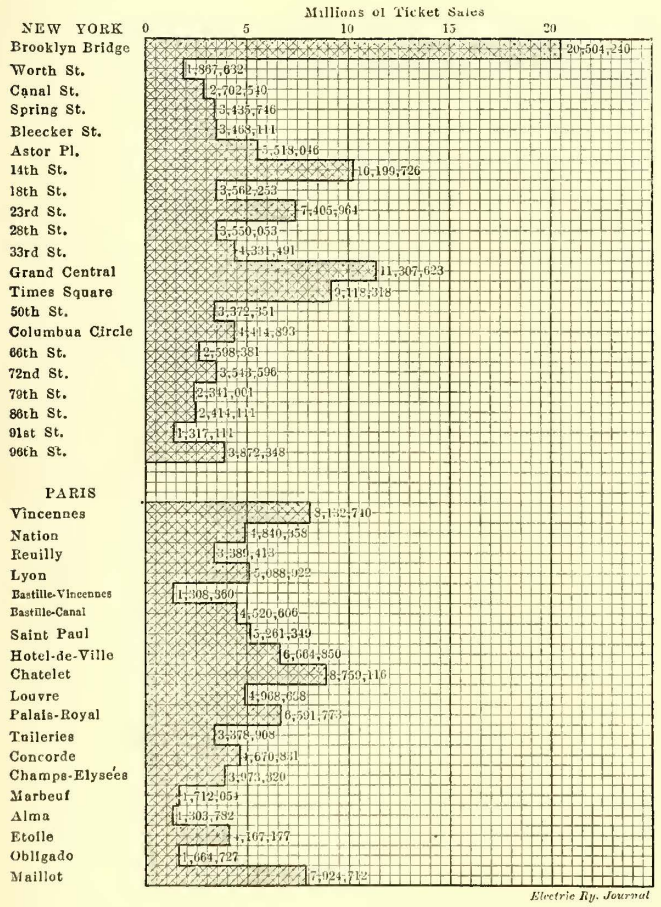
In Paris the number of "standing places" in each car is fixed by the Government and the number of seats plus "standing places" is the capacity of the car. The average number of places per car is 64. There is no limit to the standing load in New York, but allowing the same amount of floor space per passenger as in Paris the capacity of a New York subway car would be 103. In comparing the service rendered by the two systems the number of "passenger place miles" is preferable to either car-miles or seat-miles. While 103 passengers may or may not be a reason-



Solid Line Shows New York Headway; Dotted Line Shows Paris Headway.

Paris and New York Subways—Comparison of Train Headway

able load for a New York car, for comparison with Paris 103 places per car should be used in figuring the number of "passenger place miles" operated. The New York subway operated 4.5 billion passenger place miles while the Paris subway operated but 2.2 billion passenger place miles. The number of passenger place miles per mile of track was 73,000,000 for the New York system and 36,000,000 for the Paris system. Nevertheless, the New York subway carried only 200,000,000 passengers as against 282,000,000 carried by the Paris subway. The Paris subway carried 4,600,000 passengers per mile of single track as against 3,200,000 on the New York subway. The Paris subway carried .127 passenger per passenger place mile operated while the New York subway carried only 044. Every passenger place mile operated on the Paris subway served 2.9 times as many persons as on the New York subway.



Paris and New York Subways—Comparison of Yearly Ticket Sales on 6 1-2-Mile Stretch of Greatest Density

This result is doubtless due to a number of causes including better distribution of traffic throughout the hours of the day, currents of traffic moving in both directions during rush hours and a shorter average ride per passenger.

1. *Better distribution of traffic in Paris throughout the hours of the day.* As will be seen from the comparative chart showing a car schedule on the New York and Paris subways, the peak of the load is not so marked in the case of the Paris subway. The rush hours extend over a somewhat longer period and the difference between the rush hour schedule and that for other hours of the day is not quite so great as in New York.

2. *Currents of traffic in Paris moving in both directions during the rush hours.* Most of the Paris subway lines are planned so as to run from one residence district through the commercial or traffic center and out into another residence district on the other side of the city. In this way the mileage of empty cars is reduced. During the morning rush hour the trains have a load not only to but into and through the congested district. Returning from the other end of the route they again have a load into and through the congested district. Instead of running empty for one-half of their round trip mileage the trains have a load for perhaps two-thirds of their round trip mileage.

Through operation:

Loaded. ——— Empty. .....

Congested district.

..... Empty. ——— Loaded.

Lines terminating at center:

Loaded. ——— Empty. .....

Congested district.

..... Empty. ——— Loaded.

The New York subway, with the opening of the Brooklyn extension, also runs into and through the congested district, though it does not secure the maximum advantage of such operation by extending into the residence district on the other side.

3. *Shorter average ride per passenger in Paris.* On the New York subway the longest possible ride is from Atlantic Avenue in Brooklyn to 242d Street, a distance of 17½ miles. On the Paris subway the longest continuous ride without change of route is about 9 1/3 miles and this is upon a semi-circular route upon which no one would probably desire to travel the full distance. The longest direct route is 6½ miles. Even when the entire Paris system is complete the passenger in traveling from any one part of the system to any other part will not go more than 7 or 8 miles. The terminus of no line is more than 3 or 4 miles from the business or traffic center. Even for the comparatively long homeward and workward rides, therefore, the average length of ride must be under 2½ miles. In New York the average length of ride on northbound trains during the homeward rush hour is estimated at 5 miles to 5½ miles. In addition, the Paris system is so planned as to secure a very large local or short haul traffic throughout the day. It furnishes a convenient means of transportation from one part of the congested district to another, thus serving the demand for rapid transit to satisfy business and commercial needs. The New York subway also secures a large short haul traffic, especially between Brooklyn Bridge and Forty-second Street. An important factor in increasing the average ride in New York is the greater speed of the trains. The length of ride tends to increase with the speed attained. People will not travel far on a horse-car line, they will go much further on an electric surface line, still further on a 12-m.p.h. rapid transit line and further still on a 20 to 24-m.p.h. express service such as is maintained on the New York subway.

It has been noted that every passenger place mile operated on the Paris subway served 2.9 times as many persons as on the New York subway. This is equivalent to an increase of 190 per cent in transportation facilities per passenger in New York as compared with Paris. It is clear that this great difference cannot be due solely to the first two causes above mentioned, *i. e.*, better distribution of traffic throughout the hours of the day and currents of traffic moving in both directions during rush hours. While it is conceivable that these causes might be sufficient under certain circumstances to produce a difference of 100 per cent in transportation facilities required, it

seems that under the known conditions 50 per cent would be a liberal allowance for increase in facilities due to these two causes. This would leave 140 per cent to be accounted for by shorter average ride per passenger, which would mean that the average ride in New York was 2.4 times as long as the average ride in Paris. We have seen above some reason for thinking that the average ride in New York was at least two times that of the average ride in Paris.

Table I.—Traffic Density.

	New York subway. Year ending June 30, 1908.	Paris subway. Year ending Dec. 31, 1908.
Passenger cars	837	951
Average seats per car	52	28
Total number of seats	43,524	27,579
Average passenger places per car	103	64
Total number of passenger places	82,211	60,751
Passenger car-miles	44,005,213	34,629,014
Per mile of line (aver. operated)	1,910,777	1,147,986
Per mile of single track (av. oper.)	716,697	573,993
Per fare passenger	.2195	.1226
Seat miles	2,288,271,000	959,612,000
Per mile of line (aver. operated)	99,360,000	31,812,000
Per mile of single track (av. oper.)	37,268,000	15,906,000
Per fare passenger	11.41	3.397
Passenger place miles	4,532,536,000	2,216,256,000
Per mile of line (aver. operated)	196,810,000	73,471,000
Per mile of single track (av. oper.)	73,819,000	36,735,000
Per fare passenger	22.61	7.84
Fare passengers	200,439,776	282,427,235
Per mile of line (aver. operated)	8,703,420	9,362,752
Per mile of single track (av. oper.)	3,264,491	4,681,376
Per car-mile	4.555	8.15
Per seat-mile	.0875	.293
Per passenger-place-mile	.044	.127

Ticket Sales

A comparison of ticket sales on the most congested portions of the New York and Paris subways shows a greater average per mile of line in New York than in Paris (17,053,000 and 13,587,000). However, the New York line is four-track while the Paris line is two-track and the ticket sales in Paris per mile of single track (7,793,000) exceed those of new York (4,263,000) by more than 50 per cent. This result seems strange to anyone who has seen the two systems and noted the longer and more frequent trains and greater crowding on the New York system. Comparative ticket sales show the comparative amount of traffic originating in the districts compared, but taken alone give little indication of actual density of cars or passengers. On two lines with the same average of ticket sales the comparative traffic density will depend on the distribution of sales as to time and direction of travel and even more markedly on the average length of ride. A line with the same average of ticket sales per mile, but with double the average length of ride will have double the traffic density. For the portions of route in question, the comparative density of traffic in New York is also increased by the fact that this four-track portion forms a funnel through which flows not only the traffic entering at its own stations but a large proportion of all traffic entering at all other stations on the entire system. In December, 1908, the schedule of line No. 1 on the Paris subway called for 607 trains daily in each direction, thus placing at the disposition of the public 228,500 places. At the same time the schedule on the four-track portion of the New York subway called for 5281 cars daily in each direction. Counting 103 passenger places to the car this gives 1,087,000 passenger places per day.

In the comparison of yearly ticket sales on the two systems, shown in an accompanying illustration, the actual number of ticket sales on line No. 1 of the Paris subway has been increased by the estimated number of round-trip tickets sold, based on the percentage of round-trip tickets for the entire system. This increase has been apportioned among the middle stations of the line, Saint-Paul to Champs-Elysees. As the round-trip tickets are only sold before 9 a. m., it is assumed that they are used to go to the central business district and that stations in that district should be credited with the return half of the ticket. The number of tickets sold at Etoile, Chatelet, Bastile and Nation includes the tickets sold for the intersecting lines of the system as well as those sold for use on line No. 1. This error is offset by the fact that the figures for the Brooklyn Bridge and Ninety-sixth Street stations on the New York subway include sales in both directions, and by the further fact that on the Paris subway many round-trip tickets are purchased on other lines to reach stations on line No. 1 and that, therefore, the return half of the ticket is not properly credited to line No. 1.

Revenue from Transportation

The New York subway's revenue from transportation amounted to $10,000,000 while that of the Paris subway was but $7,700,000. The earnings per mile of single track were $163,000 for the New York subway and $127,000 for the Paris subway. In spite of the great difference in average fare on the two systems, the earnings per car-mile were substantially the same and the earnings per passenger place mile were 0.34 cent in the case of the Paris subway as against 0.22 cent in the case of the New York subway. The much lower fare charged on the Paris subway was much more than made up by a more advantageous distribution of traffic and by shorter average rides per passenger. (See Table II.)

Apportionment of Gross Revenue

The gross revenue received from operation in New York amounted to $166,000 per mile of single track operated as against $130,000 for Paris. (See Table III.) Of the gross revenue of the New York subway 43 per cent was used for operating expenses while in the case of the Paris subway but 38½ per cent was required for operating expenses. Operating expenses amounted to $72,000 per mile of single track in the case of the New York subway as against $50,000 for the Paris subway. Operating expenses per passenger place mile were 0.13 cent for Paris as against only 0.09 cent for New York. That operating expenses per passenger place mile should be 40 per cent greater in Paris than in New York is rather surprising. Cost of both subway construction and equipment was almost one-half greater in New York than in Paris. A somewhat similar result would be expected in operating expense per passenger place mile. The actual result is doubtless partially explained by the larger car and train units used in New York, thus requiring a smaller expenditure for wages of motormen, conductors and guards. Labor expense in New York is also reduced by the greater average speed of the trains. Two trains running at an average speed of 18 m.p.h. will do the work of three trains running at an average speed of 12 m.p.h. Under these conditions two cars and two train crews do the work of three cars and three train crews. The Paris company's labor expense was also greatly increased by franchise requirements for the insurance and pensioning of employees. Moreover, operating expenses per passenger place mile decrease somewhat with the number of passenger place miles operated (See B. J. Arnold's report on the

Table II.—Revenue from Transportation.

	New York, Year ending June 30, 1908.	Paris, Year ending Dec. 31, 1908.
Earnings from transportation	$10,020,538	$7,708,390
Per mile of line (average operated)	435,108	255,583
Per mile of single track (aver. operated)	163,200	127,770
Per passenger, cents	4.996	2.729
Per car-mile, cents	22.77	22.26
Per seat-mile, cents	.437	.767
Per passenger-place-mile, cents	.221	.347

Return on the Investment in the Subway) and as the number of passenger place miles operated was very much greater in New York than in Paris the relative cost per passenger place mile would be less for New York. Difference in cost of power, however, accounts for the larger share of the difference in total cost of operating a passenger place mile. Cost of power per passenger place mile amounts to 0.022 cent in New York and 0.043 cent in Paris, a difference of .021 cent. The difference in total operating cost of a passenger place mile is 0.039 cent, so that difference in cost of power alone accounts for 54 per cent of this difference. The fewer train stops in New York would account for a portion of the lower power cost. In Paris, moreover, the company purchases a portion of its power, and thus pays a profit to the producer.

But although the operating expense per passenger place mile was 0.13 cent for Paris as compared with 0.09 cent for New York the operating expense per fare passenger was twice as great in New York as in Paris, being 2.2 cents for New York and 1.07 cents for Paris. As this difference cannot be due to increased cost of operating a passenger place mile it must be due to the greater number of passenger place miles that must be operated to secure one fare passenger. There were 22.6 passenger place miles per fare passenger in New York and but 7.8 in Paris.

As to taxes the New York subway fared much better than the Paris subway. The New York company paid but $900 per mile of single track as against $4,300 per mile for the Paris subway. The taxes of the New York subway were but 0.58 per cent of its gross revenue, while in the case of the Paris subway taxes were 3.34 per cent. The New York company paid 19 per cent of its gross receipts to the city in the form of a rental for the use of the subway while the Paris company paid 32 per cent of its gross receipts to the city for this purpose. Although the cost of the subway to the city was $830,000 per mile of single track in New York and only $590,000 in Paris, the New York company pays but $32,000 per mile as rental while the Paris company pays $42,000 per mile. After deducting operating expenses, taxes and rental, the New York company has available for interest, dividends and reserves 36.8 per cent of its gross revenue, or $61,000 per mile of single track while the Paris company has but 25.3 per cent of its gross revenue and $33,000 per mile of single track. Owing to lower tax and rental payments the New York company, with an operating expense ratio exceeding that of the Paris subway by 4½ points, has a ratio of net earnings available for interest, dividends and reserves 11½ points in excess of that of the Paris company. The net earnings per passenger place mile operated were nearly the same for both systems, but the net earnings per fare passenger were 2.7 times as great in New York as in Paris.

It has been predicted by some critics of the Paris system that as the subway mileage increased the profits from operation would decrease. Thus far this prediction has not been verified. The net profits per mile of line operated show an almost continuous upward trend. There was a decline in 1906 and 1907, but the net profits per mile of line in 1908 are greater than for any previous year.

COST OF SUBWAY CONSTRUCTION AND EQUIPMENT

The total cost of the New York subway and its equipment has been estimated at $87,938,000. This amount is made up of $51,290,000 actually paid by the city for the construction of the subway and of $36,648,000 that the company reports that it has expended for both equipment and construction. The cost to the company includes an item of $10,048000 that the company claims to have spent on the construction of the subway from Brooklyn Bridge to Atlantic Avenue, Brooklyn, in excess of the amount paid by the city for this work. The cost of construction paid by the city, $51,290,000, does not include an item of $6,225,000 claimed by the construction company and now the subject of arbitration proceedings. (See Table IV.)

The total cost of the construction and equipment of the Paris subway is estimated at $62,252,000. This amount is made up of $25,552,000 which the company states that it has expended for equipment and construction and of the estimated cost of construction paid by the city of $36,700,000. This latter estimate is based on the estimated cost of the completed subway system including portions as yet unconstructed as made by the city authorities in 1907. In New York the total estimated cost of construction and equipment per mile of single track used in operation is $1,432,000, while for Paris it is $1,000,000. The cost of construction paid by the city is $835,000 per mile of single track in New York and $590,000 in Paris. The reported cost of equipment and of construction paid by the company is $596,000 per mile of single track in New York and $410,000 in Paris.

The relative proportion of the total cost paid by the city and the company, respectively, is almost identical for both cities. Construction paid by the city and equipment or construction paid by the company do not, however, represent the same things in both cities. In New York the cost of equipment or construction paid by the company includes, as stated, an item of $10,048,000 for the work of subway construction proper. Deducting this amount from the cost of equipment and adding it to the cost of construction, we have for the New York subway a cost of construction of $61,338,000 and a cost of equipment amounting to $26,600,000 or $999,000 per mile for construction and $433,000 for equipment. While in New York the cost of subway tracks was included in the original contract and paid for by the city, in Paris the tracks were considered a part of the equipment and were paid for by the company. In Paris also, the station entrances, ticket booths and, in fact, the

TABLE III.—GROSS REVENUE FROM OPERATION AND ITS APPORTIONMENT.

Gross revenue from operation:	Amount.	Per cent of gross revenue from operation. Per cent.	Per mile of single track operated. Dollars.	Per passenger car-mile. Cents.	Per passenger place-mile. Cents.	Per fare passenger. Cents.
New York subway	$10,253,337	100	166,992	23.3	.226	5.11
Paris subway	7,847,954	100	130,083	22.66	.354	2.77
Operating expenses (taxes excepted):						
New York subway	4,423,313	43.14	72,040	10.05	.097	2.20
Paris subway	3,035,797	38.68	50,319	8.76	.136	1.07
Taxes:						
New York subway	59,540	.58	969	.13	.001	.02
Paris subway	262,141	3.34	4,345	.75	.011	.09
Rental to city for use of subway:						
New York subway	1,991,984	19.42	32,442	4.52	.043	.99
Paris subway	2,560,854	32.63	42,447	7.39	.116	.90
Net earnings, less taxes and rental:						
New York subway	3,778,498	36.85	61,539	8.58	.083	1.88
Paris subway	1,989,161	25.34	32,971	5.74	.089	.70

entire station with the exception of the platform was constructed at the expense of the company. For purposes of comparison, therefore, the cost of tracks and stations has been deducted from the cost of equipment as reported by the Paris Company and added to cost of construction. This gives for the Paris subway a total cost of construction of $42,100,000, or $676,000 per mile of single track and a cost of equipment of $20,152,000 or $324,000 per mile of single track.

The relative cost of construction and equipment estimated on this basis remains nearly equal for the two systems. In New York the estimated cost of construction is about 69 per cent of the total cost of construction and equipment, while in Paris it is about 67 per cent. The average cost per mile in New York is reduced by the fact that some 5 miles of elevated line are included. There are also in the Paris system numerous short stretches of elevated road or viaduct, but these are built on such an expensive plan as to increase rather than reduce the average cost per mile. The cost of equipment in Paris is somewhat reduced by the fact that the operating company buys a portion of the electric power used. The cost of power plant and substations is reported as $11,600,000 for New York and $5,200,271 for Paris. Information is not available as to the amount of power purchased by the Paris company.

RATE OF RETURN ON INVESTMENT

For the year ending June 30, 1908, the net earnings of the New York subway after deducting taxes, amounted to 6.9 per cent on the total estimated investment of both the city and the operating company. The net earnings, after deducting taxes and the rental paid by the operating company to the city amounted to 10.8 per cent on the company's reported investment for equipment and for construction. The subway considered as an economic undertaking earned about 7 per cent on the capital invested. The operating company earned about 11 per cent upon its reported investment. This result was obtained in spite of the fact that the year ending June 30, 1908, was one of general economic depression. In this estimate no allowance has been made for depreciation. For the year ending Dec. 31, 1908, the Paris subway earned 7½ per cent on the total estimated cost of construction and equipment, and the operating company earned 8 per cent on its reported investment for equipment and construction. A portion of the total mileage of both the New York and Paris systems was not operated for the entire year. In estimating return on investment, therefore, such proportion of the entire cost of construction and equipment was taken as the average length of track operated during the year bore to the total length of track at the end of the year.

The Paris Company has issued $14,475,000 shares and $9,167,000 bonds, making a total capitalization of $23,642,000. One-half of the bonds paid 3½ per cent interest and the other half paid 4 per cent. A first dividend of 3 per cent was paid on the entire capital with the exception of 6030 shares that have been amortized. A second dividend of 5 per cent was paid on the entire capital, including the shares that have been amortized. These amortized shares are called "actions de jouissance," and apparently participate until the end of the lease in all dividends declared in excess of 3 per cent. The company paid $80,582 into its legal reserve fund as required by law, or 5 per cent on its net profits. The company used $200,720 of its profits to amortize shares. It also devoted $57,900 to the amortization of its bonds. It paid a bonus of $72,385 to the managing officers and directors, equivalent to 8 per cent on certain excess net profits. The company also devoted $193,000 to a fund for the benefit of the employees of the company.

The Interborough Rapid Transit Company had a capital of $70,000,000; $35,000,000 in shares on which 9 per cent dividends were paid and $35,000,000 in short-time bonds on which 5 and 6 per cent interest was paid. As this capital represents property and numerous interests in addition to property used in the operation of the subway, it is impossible to compare it with the capitalization of the Paris company.

ADVANTAGES OF THE PARIS SUBWAY SYSTEM

(1) The average fare is 2.7 cents as compared with 5 cents on the New York system. A minimum fare of 1.9 cents is charged for certain hours during the day.

(2) The Paris system offers universal transfers over a complicated net-work of lines.

(3) The net-work of subways will form when completed a comprehensive system of rapid transit for the entire municipality. A passenger may travel by it from any quarter of the city proper to any other quarter. A person may enter any subway station with the assurance that for a single fare he can be transported to within walking distance of whatever place he may wish to go within the walls of the city. This is a great convenience to the public and greatly increases subway travel.

Table IV.—Total Cost of Subway and Apportionment between City and Company, and between Construction and Equipment, 1908

	New York subway			Paris subway		
	Amount.	Per mile of single track.	Per cent of total cost.	Amount.	Per mile of single track.	Per cent of total cost.
Total cost of subway and equipment	$87,938,000	$1,432,000	100	$62,252,000	$1,000,000	100
Cost of construction paid by city	51,290,000	835,000	58.3	36,700,000	590,000	59
Cost of equipment and construction paid by company	36,648,000	596,000	41.7	25,552,000	410,000	41
Total cost of construction	61,338,000	999,000	69.8	42,100,000	676,000	67.6
Total cost of equipment	26,600,000	433,000	30.2	20,152,000	324,000	32.4

ADVANTAGES OF NEW YORK SUBWAY SYSTEM

(1) While the fare charged is much higher the average and possible ride is much longer in New York than in Paris. Allowing for difference in purchasing power of money as indicated by cost of construction and equipment and for difference in length of average ride the charge per mile for subway transportation is 1½ to 2 times as great in Paris as in New York.

(2) The lines extend far into the undeveloped areas. They extend 14 miles from the traffic center as compared with 3 or 4 miles in the case of the Paris subways. They have aided immensely in securing a better distribution of the population.

(3) The combination of express and local service is of great convenience and value. The average speed including stops, on the Paris subway is about 12 miles per hour, while on the express tracks of the New York subway between Brooklyn Bridge and Ninety-sixth Street the schedule speed, including stops, is about 24 miles per hour, and the average speed for both express and local trains for the entire system is about 18 miles per hour. A saving in time of urban transportation is at least as important as a decrease in the amount of fare charged.

EMPLOYMENT METHODS OF THE HUDSON & MANHATTAN RAILROAD

When the Jersey City and Cortlandt Street river tunnels of the Hudson & Manhattan Railroad were put in operation it was necessary within a short period nearly to quadruple the force of men originally employed in the train service of the uptown tunnels. As the traffic of the entire system has increased rapidly since through operation was begun, it has been necessary to continue to employ and break in large numbers of new men each month. At the present time about 20 applicants for positions in the train service are accepted each week. The selection and training of such a large body of men for employment in a service requiring trains carrying very heavy traffic to be run close together at high speed must be conducted with great care and thoroughness. The methods of this company, therefore, present a number of interesting features.

APPLICATION FOR EMPLOYMENT

Applications for employment in train, station or platform service are received in person at the trainmaster's office on Christopher Street, New York, Thursday of each week at 11 a. m. After filling out an application blank in duplicate, a new man is interrogated by the trainmaster, who makes a point of ascertaining fully the applicant's past record, his experience in railway work, his mental qualifications and his apparent physical fitness. The trainmaster sizes up each man and makes a notation on the application blank in cipher, indicating his decision, as unfit, doubtful or acceptable. Those who are considered by the trainmaster as unfit are rejected at once, but doubtful or acceptable candidates are ordered to report to the office of the general superintendent, in the Hudson Terminal Buildings, on the following morning at 11 o'clock. One copy of the application blank is retained in the trainmaster's office, and the second copy, with the trainmaster's notation of acceptable or doubtful, is sent to the general superintendent's office early Friday morning.

Applicants who have wholly or partially satisfied the trainmaster are examined singly by the general superintendent, who goes over their record of previous employment carefully and pays particular attention to the man's appearance, manner and attitude toward his prospective position. The general superintendent reserves the right to reject summarily any applicant for any cause without stating his reasons. If he is satisfied he indorses the application blank and orders the new man to report to the company surgeon for physical examination, and later to the trainmaster for assignment to practice work. Ticket agents are referred to a surety company for examination and preparation of a suitable indemnity bond.

REQUIREMENTS OF EMPLOYEES

Employees in all branches of the service must be over 21 years and under 45 years of age, able to read and write the English language. They must be in full possession of every faculty, sound in every member, in good health, and able to pass a searching physical examination. It is held to be essential for the good of the service that they be familiar with the streets, transit facilities and points of interest in New York City, and with the steam railroad terminals, ferries and surface car lines in Jersey City and Hoboken. The physical examination, which is made by the company's surgeon without charge to the new employees, includes tests for acuteness of vision and hearing and color sense. The standard of acuteness of vision is 20:20 in both eyes, and the surgeon will not pass any candidate with a vision of 20:30 or worse in one or both eyes. Applicants who have only slight defects in hearing or vision are referred back to the general superintendent for a final decision based on their other qualifications.

APPLICATION BLANK

The application blank contains 19 questions which must be answered, spaces for the names of three references to whom the applicant refers for information regarding his character, habits and associations, and space for entering a complete detailed record of previous employment for 10 years previously. Among the questions to be answered are the following: "Are there any unsatisfied judgments against you?" "Have you ever been arrested or accused in a civil or criminal court of any infraction of the law?" "Are you engaged in any outside business producing income other than your salary?"

In one corner of the blank are spaces for entering a record of identification, including age, height, weight, color of eyes and hair, moustache, complexion and other characteristics. On the back of the blank is printed an agreement of employment binding the applicant to familiarize himself with and to obey the rules of the company and any future amendments thereto. This agreement, which is brief, concludes with two following clauses which are in effect a release of liability to the company for failure to observe due caution while at work:

I hereby acknowledge that I have been informed of the character of the employment I am about to undertake, and the duties connected therewith; that I have been notified that it is of a hazardous nature; that there are structures and obstructions now located, and others may be constructed from time to time which will endanger my life and limb; that there is not sufficient clearance between cars and the sides of tunnels, platforms and benches for a man to stand in safety, and that there are safety ladders along the sides of tunnels which are provided for persons to use while trains are passing.

I hereby accept notice from said railroad company that there is a third-rail along its tracks which is charged with electric current, and that it is dangerous to life and limb to come in contact therewith in any manner whatsoever.

INVESTIGATING REFERENCES

The Hudson & Manhattan Railroad prefers for its train service, and especially for the position of motorman, men who have had previous experience, either on steam railroads or high-speed electric railroads. A large proportion of its men have been recruited from the steam railroad service, as the character of the work, the hours of labor, rate of pay and liberal treatment by the company attract good men from this source. Numerous applications are also received from men formerly employed on the elevated and subway lines, both in New York and Brooklyn. The employment office of the company is in close touch with the employment offices of all the steam railroads entering Jersey City, and also those of the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. If a new man states on his application blank that he has ever been employed by any of these companies the telephone is used to get an immediate verbal report on his previous record. Letters are also sent to all previous employers and character references living out of the city. Personal investigations are seldom made, as unless a man has a good and well-authenticated previous record he is rejected without further delay.

PRELIMINARY TRAINING

After passing the physical examination all train service recruits report to the trainmaster for instructions as to their duties and responsibilities. They then receive a copy of the rules and a badge, and are assigned for duty under the

direction of an experienced guard. All new men must begin work as guards, and after a few days of breaking in, followed by an examination on the rules by the trainmaster, are given places on the middle cars of the morning and evening rush-hour trains. The conductor in charge of the train rides on the front car and an experienced guard is always placed on the rear car. Guards are urged to qualify for promotion as quickly as possible after entering the service. A guard may qualify for advancement to the grade of conductor or to the position of switchman, leading to the position of motorman. After qualifying as a conductor a guard is given one of the regular conductor's runs on Sundays and at other times when regular conductors are off duty. As the men having regular runs are all off one day each week, the qualified conductors have frequent opportunities of serving in the higher grade for short periods, thus becoming familiar wih tthe duties of conductors before being promoted to the position. When a vacancy occurs in the grade of conductor the senior qualified conductor is eligible for promotion.

TRAINING OF MOTORMEN

Men who enter the service with the intention of becoming motormen must begin as guards, no matter what their previous experience has been. When they have demonstrated their knowledge of the duties of this grade and have had time to learn the road thoroughly, they are transferred to the grade of switchman. A number of men are required in this grade to make up and switch trains in the yards and to cut out or add cars during the rush hours. These men must be able to operate single cars or trains, make couplings, disconnect brake hose and train line jumpers, do light emergency repair work, such as replacing brake shoes and tightening brakes, and in general know the construction and operation of all the details of the car equipment. On entering this grade the new man is given a thorough instruction in the operation of all the electrical and brake apparatus on the cars by the motor inspector who has charge of the instruction room which has been fitted up in the basement of the Terminal Buildings. This car is fitted with complete air brake and electrical equipments and is mounted so high above the floor that the prospective motorman can see the apparatus from below. The man is then sent out as a helper to an experienced switchman, who teaches him the actual operation of cars about the yards.

When the first switchman is satisfied that his helper is competent to work alone the new man is turned over as a helper to a second experienced switchman, and finally to a third switchman. These three men are held responsible for the efficiency of the student, and until they are satisfied as to his ability to run a car and do any other work likely to be required of him he must continue to work as a helper.

All motormen are promoted from the switchmen in the order of their seniority. As in the case of promotion from guard, all switchmen are urged by the company to qualify as motormen by taking the necessary examination as quickly as possible. Switchmen who have qualified as motormen, but have not been advanced to that grade, are called on to operate trains in the absence of regular motormen, who are all given one day off each week. The extra list of regular motormen is thus kept down to a very small number of men. In promoting from switchman to motorman the candidate is required to pass a very thorough oral examination on the rules and his knowledge of the equipment by the trainmaster, motor inspector and superintendent of car equipment. It is the intention in the future to require all motormen to have served at least one year as a switchman. This rule, of course, has been waived during the past few months while it was necessary to train a large number of men to operate the increased train service required by the opening of the downtown tunnels. Conductors may become motormen by starting as switchmen in the same manner as guards who have risen to the grade of conductor.

COURTESY OF TRAINMEN

Courteous treatment of the patrons of the road is insisted upon. The ability to smile and keep smiling when answering questions or attending to any other duty is considered a requisite in every employee who comes in contact with the public. This point is driven home on all occasions by the general officers. The general superintendent makes frequent use of the bulletin board to impress the men with the importance of courtesy. One of the letters to employees is reprinted here:

Hudson & Manhattan Railroad Company
New York, Nov. 9, '09.

To All Employees:

Every day I have patrons of our road tell me what a splendid lot of men you are, and I can assure you that I believe it, and am proud of it.

I regret that I also have some complaints, which are properly made, that some of our men are not as courteous as they might be.

Did you ever stop to think that a guard is constantly observed by the people in two cars? If this guard is happy, courteous and pleasant, they go away with a good impression of the road; if he is surly, they are generally surly to him, he is constantly in trouble and the day seems very long.

A railroad must be run, not to suit the employees or the management, but its patrons. You have the opportunity of building an asset that will be worth a great deal to the road in time to come.

The interests of the road and men are identical. If the road is a paying one and makes money, it can afford to pay you good wages, but if it is not making money, where is the money for you coming from?

Remember that a single discourteous act may drive away patrons and make enemies for a corporation which needs all the friends it can get.

Strive at all times to make friends for yourself and the road, and you can rest assured you will find the days shorter and your troubles less.

E. T. Munger,
General Superintendent.

COMPLAINTS AND SUGGESTIONS

The company has inaugurated a unique plan of receiving complaints and suggestions from its employees. At the beginning of each month the trainmaster selects one motorman, one conductor and one station agent to act as a committee of the men to receive complaints and suggestions for the betterment of the service. The names of these men are posted on the bulletin board and all employees are requested to present to some member of the committee any grievances or ideas which he may have. These men serve for one month, and are not eligible to serve again on the committee for another year. On Thursday of each week this committee meets with the general superintendent, the trainmaster and the motor inspector in the general offices, and the members present any matters which have been brought to their notice by other employees or any points which they have themselves noted. The conference is informal, and a full discussion is allowed on each point raised. Just grievances are remedied at once, and explanations are given for refusing any unreasonable demands. The members of the committee draw full pay for the time spent at these conferences, and they consider it an honor to serve their fellow-employees in this manner.

INSTALLATION OF WATER BACKS AT ANDERSON PLANT OF INDIANA UNION TRACTION COMPANY

The Indiana Union Traction Company is installing water backs in the furnaces of the Anderson (Ind.) power station, which supplies power for a large part of its interurban railway system. The new water backs will serve to raise the efficiency of the furnaces by stopping the leakage of air around the ends of the chain grates and by retarding the dumping of the coal and ashes until the maximum amount of heat has been obtained from them.

Chain grates are used under each boiler, and these are set in the usual manner, which provides for an air space about 8 in. wide at the rear end of the grates. This space is necessary for the discharge of the ashes into the pits below. In those boiler settings without water backs there has been a considerable leakage of air from the ash pit up between the end of the grate and the back wall of the fire-box. After a study of fuel-burning conditions by G. H. Kelsay, superintendent of power, it was decided to put a water back in each boiler so that the economy of the furnaces might be increased. The work of installing these backs is now under way, and Mr. Kelsay says that considerable improvement in firing is noted on those boilers now equipped.

The water backs as installed consist of a section of 4-in. extra heavy pipe extending across the width of the grates and about 8 in. from their rear ends. The pipe is supported so that its lower side is 3½ in. above the tops of the grates and the center of the pipe is about 10 in. from the rear fire-box wall. A row of fire bricks is placed, one end of the bricks resting on the water back and the other end set in the firewall. This row of bricks prevents the passage of any air from the ashpit up behind the water back to the flues. The narrow space below the water back permits the ashes to fall over the ends of the grates in the usual way, but retards the movement of the unconsumed fuel, so that coking takes place in front of the water back, and the body of the fire tends to pile up on the brick shelf above the water back, rather than fall through. This body of ashes and coke, in connection with the narrow discharge space for the grates, effectually serves to prevent the leakage of air, and thus assists in raising the temperature of the furnaces.

The 4-in. extra heavy pipe which forms the shell of the water back carries within it a 1-in. wrought-iron pipe, through which the cold water is introduced. This intake pipe extends the full length of the water back, so that the cold water empties into the shell at the opposite end from the discharge point. A steady flow of water is maintained at such a rate that the temperature of the discharge is just below the boiling point. The discharge is open to the air to permit easy inspection of the flow. A header under the boiler-house floor collects the hot water discharged from the water backs in the several boilers and carries it to the hot well, from whence it is fed to a feed-water heater, or to the supply tank outside the building. A new hot well has recently been built and a new motor-operated feed pump installed. This pump, taking its suction direct from the well, is piped to discharge normally to the heater, but there is a check valve in the connection between the pump and the heater, so that the excess water automatically is turned to the large supply tank.

Two McDonough automatic regulators have recently been installed for controlling the speed of the stoker engines and the stack draft according to the steam pressure. There are two stacks and two subdivisions in the regulator governing each half of the plant. Electric lamps placed in the engine and boiler rooms operate in connection with the regulator and indicate whether the stack dampers are open or closed.

PRELIMINARIES IN THE ORGANIZATION OF AN ELECTRIC RAILWAY COMPANY

J. W. Billingsley, manager of the Fred A. Jones Company, of New Orleans, recently presented a paper before the Louisiana Engineering Society on interurban railway development in the South, and, among other points, gave some interesting suggestions on the preliminary organization of electric railway companies. The speaker said that the poor financial condition of many interurban electric railways was due in some cases to poor judgment in location or construction, or to unfortunate management, but in most instances to lack of sufficient traffic to justify their construction. It is owing to these failures that bond houses require a report on a new proposition of this kind to be prepared in a thoroughly business-like manner. The following is an abstract of Mr. Billingsley's remarks upon the preliminaries requisite in the organization of an electric railway company:

The usual method of procedure in building an interurban railway is for the local people who are interested in its construction to form an association and put up sufficient money, first, to make a preliminary report, and, second, if that is available, to make surveys, financial and engineering reports, properly to present the proposition to the outside investor. As a rule, this association provides sufficient money for securing rights-of-way and of defraying the general expenses attendant upon the underwriting of the bonds. The bond underwriters usually require that at least 20 per cent to 25 per cent of the money required for construction be secured from stock subscription, usually placed locally, and that all or part of the money so obtained shall be spent on construction work before any is advanced by the bond underwriters. After the latter have been called for, say, about 20 per cent of their underwriting, it is generally possible to secure a loan on the bond underwriting to carry on the work to completion. Of course, in some instances the money for construction is furnished directly by private interests, and the line is built without stock subscription or underwriting. In this case the financing is much simplified.

As the outside investor, usually a bondholder, must be assured of a safe return on his investment within a period of, say, at least one year after commencement of operation. The vital point to determine in considering an interurban railway is, first: How much will the property earn and how soon? The reports necessary for properly considering this question are:

(1) The preliminary report.

(2) The engineering, financial and statistical reports.

Engineers, in making preliminary reports on interurban railways, often make the mistake of giving undue importance to the item of cost of construction and to the physical feature of the line. The object of the preliminary report is to satisfy the promoters and other parties interested that the interurban will be a paying proposition. Hence only those matters should be considered that will affect to a considerable degree the question of net earnings. The object of the preliminary report should be to gather sufficient data as regards existing and probable traffic conditions between

the termini of the road and to prepare construction and operating estimates, in sufficient detail only, to ascertain whether or not the net earnings will be enough to justify the making of surveys and of the financial and engineering reports proper. It is interesting to note that a difference in estimates of cost of construction of $100,000 would make a difference in the net earnings of approximately, say, $5,000, whereas a difference of only about $8,000 in an estimate of gross earnings would change the net earnings by practically the same amount. Hence it is evident that a report of this character should deal more particularly with the estimate of revenue than with the detail cost of construction.

It is of value in a report of this character to check up estimates by comparing the proposed line with other lines operating under as nearly similar conditions as possible, but too much reliance should not be placed on such a check unless the lines are located in the same section of the country and serve similar traffic conditions. For instance, the travel in a somewhat undeveloped country which is rapidly growing is in some cases 40 per cent to 50 per cent greater per capita than in old and more settled communities. This is true, for instance, in Texas and Oklahoma. Erroneous conclusions may also be reached by estimating earnings on a basis of so much tributary population per mile of track. Examination of 10 interurban lines at random in the Middle West shows earnings ranging from $2.30 per capita up to $11 per capita, so it is evident that an erroneous result might be reached by using such a method alone in estimating gross receipts. As this question of estimating gross earnings is by far the most difficult and important part of a report of this character, it is necessary to study very carefully the local conditions, such as the habits and occupations of the people. This can be done by counting passengers handled by parallel steam lines, wagon and pedestrian traffic, and estimating the express business. Each local condition must be studied.

If the preliminary report should be favorable, the next step is to make surveys of the right-of-way that will be required and detail estimates showing the cost of construction and cost of operation. A statistical report should then be prepared, showing in detail the business conditions in the tributary territory, the data and information being supplemented by photographs.

In discussing location Mr. Billingsley said that the interurban railway should be built as far as possible on private right-of-way and should have a short entrance into the termini of the line. Although it is generally desirable to reach the heart of the terminal cities, it is not always necessary to do so in the small intermediate towns. If the center of some of the smaller intermediate towns can be reached only by a slow trip through the main street, it is usually better to build through the edge of the town instead. People in a small town are willing to go to more inconvenience to get to an interurban waiting station than they would be in a larger city, especially where the main station of the competing steam line is located close to the heart of the city. It is more easy in the Middle West and Southwest to secure private rights-of-way than in the hilly and built-up sections in the Eastern States, where, as a consequence, many of the interurban lines follow the highways to avoid heavy cuts and fills and the expense of obtaining private right-of-way. The result is a line with a crooked alignment, slower speed, and more risk of accidents. An interurban road should be located on private right-of-way as much as possible.

HEARING ON VALUATION OF THE CONEY ISLAND & BROOKLYN RAILROAD

Frank R. Ford, of Ford, Bacon & Davis, was the sole witness at the hearing before the New York Public Service Commission, First District, on Dec. 2 in the case involving the valuation of the Coney Island & Brooklyn Railroad.

In response to a question from William N. Dykman, of counsel for the company, it was stated by Mr. Ford that the cost of operation as measured in percentage of gross earnings had increased from 1900 to 1908. An exhibit presented by Mr. Ford gave the figures submitted by him on this subject in the case concerning through routes and joint rates between the Metropolitan Street Railway and the Central Park, North & East River Railroad of New York, as published in the Electric Railway Journal of Oct. 24, 1908, page 1252, with the addition, however, of the data for 1908.

Mr. Dykman asked Mr. Ford to give his opinion as to the manner in which the tendency of net earnings to decrease should be considered in a rate-making case like that involved in the hearing. Mr. Ford thought that in a rate-making case any tendency of a business to become less profitable should be considered if the rate was to last any appreciable length of time. The gross earnings of the company were decreasing in this case and the properties were subject to the same tendency toward increasing operating expenses as the companies indicated in the statement, namely, the roads in Chicago, Philadelphia, St. Louis, Boston and Brooklyn; consequently the tendency of the net earnings would be to decrease. The statement and an accompanying illustrated diagram showed that the tendency toward decreasing net earnings was apparently slightly interrupted in 1908. It was of interest to show that this was the effect of the panic in business conditions, as all of the companies economized wherever possible, especially in maintenance expenditures, and a slightly larger showing was thus made possible.

The tendency of street railway rides was to increase in distance, Mr. Ford declared. It was a matter of common knowledge that as the city increased in size and area, the length of ride increased. An increase in the length of ride per passenger meant more car service for the same fare; that is, it increased the proportion of gross earnings required for operating expenses.

It was testified by the witness that in order to determine what was called the reproduction value of real estate there should be added to the cost of acquiring the property overhead charges for brokerage, title insurance, legal expenses and other charges of that character. Five per cent should be added to cover these charges for real estate used for car house, power house, etc., but the right of way should have added to it a contiguity factor, which Mr. Ford thought should be one and one-half times the sales value.

Testifying in relation to the exclusion by Bion J. Arnold of an allowance of 10 per cent for contractor's profit on rolling stock, Mr. Ford expressed the opinion that this should have been included for the following reasons:

1. While the company would usually buy the rolling stock direct from a number of manufacturers, it is sometimes included in the general contract.
2. If the completely equipped car is bought from the car builder he would charge the company a contractor's profit on all articles not manufactured by him.
3. If the company buys direct there are always various charges of handling and assembling and risk which would otherwise be borne by a general contractor which should be allowed for.
4. In the case of the cost of the Chicago street railways

reconstruction, as agreed to by the city in accordance with the terms of the traction settlement ordinances, under which Mr. Arnold is chief engineer, 10 per cent contractor's profit is allowed on actual cost of rolling stock, such actual cost including all of the company's overhead charges of engineering, incidentals and administration.

Mr. Dykman asked whether, in Mr. Ford's opinion, a charge for depreciation should be made against the reproduction value in a rate case. The witness thought that the present value, meaning the depreciated value of the physical property, had no place in a rate case. The original cash investment upon which a reasonable return should be allowed was never fully represented in the value of physical property after the first car began to operate. The physical properties of the average street railway would represent from about 60 per cent of first cost to 100 per cent for a new road. It had been stated that a reserve fund should represent the amount of depreciation, but with a newly constructed property it was usually impossible to provide this even at high rates of fare.

The Coney Island company paid no dividends during the first 18 years as a horse system and in some years it did not earn bond interest. Although the rate of fare from New York to Coney Island was from 20 to 26 cents, the ability to provide a fund for physical depreciation did not exist. From the standpoint of service to the public the authority of the commission could compel proper maintenance and renewals in the more prosperous later period, even when no physical depreciation fund had been accumulated. This was one of the responsibilities of stockholders and bondholders which had been exhibited strikingly in the last two years in the case of this company and those in Manhattan.

In 1907 the stockholders of the Coney Island & Brooklyn company had to raise $1,000,000 cash for additions and improvements by increasing the stock 50 per cent and since Feb. 1, 1907, they had had to forego dividends on the $3,000,000 of outstanding stock for the purpose of returning all the net earnings to the property. If the stockholders must now be penalized for the depreciation which was present in every operating property and their right to a return limited by the principal value of the property less physical depreciation, the power to give proper service and provide for the upkeep was taken away together with a large part of the original cash investment.

Mr. Ford testified that in his opinion the items of obsolescence, inadequacy and age could not be separated from normal wear. He would not care to testify on the subject of depreciation without having it recorded that this question should not be concerned in a rate case. The witness thought the cost of reproduction new was the proper basis if a physical valuation was used for figuring the return. It was the valuation upon which a newly constructed line would have to earn a return, and if the rate was based on the depreciated value of the property it would tend to prevent competition or new construction, because no new property could have as low a rate as an existing road.

No expert, Mr. Ford thought, could divide depreciation according to (1) obsolescence, inadequacy and age, and (2) normal wear. There was no definite and accepted standard of obsolescence or inadequacy. As Mr. Ford understood the testimony on this subject by the engineers of the commission, they said that they had never before endeavored to separate depreciation into these constituents.

Age of course was merely a kind of normal wear due to deterioration from the action of the elements. Normal wear consisted of mechanical action and also the action of the elements.

Obsolescence was not a proportional or comparative term. An article was either obsolete or a proper standard; it could not be 50 per cent obsolete. The fact of whether or not an article was obsolete must be determined from a business standard as to whether or not it was economical to operate. This was the determining factor in the change from the horse car to the cable and then to electricity. The horse-car system reached a point where it was entirely obsolete, but until that point was reached it could not have been considered a certain percentage obsolete. To an extent the term adequacy was of the same nature as obsolescence.

While normal wear could be measured and estimated with accuracy an estimate of the life of any given item dependent on the approach of obsolescence or inadequacy was in the nature of a prophecy and whether a given power generator or electric car would be of economical value two or 20 years from date could not be foretold accurately. The prescribed charge against net earnings for renewal of an obsolete article or system while not yet worn out, as proposed by the New York and the Interstate commissions, would tend to render any change uneconomical, thus reducing the liability of obsolescence and lengthening the business life of the article.

Mr. Ford discussed various items which had been classified by Mr. Arnold in the appraisal as obsolete. Out of a total of $1,031,000 stated by the experts of the commission as depreciation due to obsolescence, inadequacy and age only one item of $150,000 in power machinery was obsolete from a technical standpoint, and this not from a business standpoint, as it was in operating condition and capable of good service as reserve capacity in the case of breakdown of a new plant. Its retention had obviated the necessity of a reserve turbine unit.

Of the remaining $881,000 of so-called obsolescence, Mr. Ford testified that $353,000 should be transferred to the heading of normal wear and $528,000 should be eliminated entirely for reasons stated by him. In the item of cars, semi-convertible cars used all the year had in the Chicago valuation been depreciated at 3 per cent per year, while the Coney Island cars forming a complete duplicate equipment of summer and winter cars, one part used five months and the other seven months in the year, had both been depreciated 5 per cent per year, although these cars were of the two standard types that would still be purchased new by the company to-day.

With regard to the theory which the commission's experts had applied for the first time in ascertaining the depreciation of the Coney Island company's track, special work, paving, overhead trolley construction, feeders, underground cable, etc., by which the normal wear was estimated at one-half the total cost of one complete renewal on the assumption that the average condition of all the parts is midway between the point of complete repair and entire disrepair, Mr. Ford stated that, while this might be a quick method of estimating physical condition, it would give the correct result only in accidental cases, except possibly for large systems in the cases of horses and special work. Track, paving and overhead line were usually built, worn out and renewed by entire lines or as a complete system. There were never enough separately built units to give this 50 per cent average, and an accurate estimate of condition must be based upon careful inspection of the separate parts, as had always been done in similar investigations.

At the close of this testimony an adjournment of the hearing until Dec. 9 was announced.

MEETING OF ENGINEERING EXECUTIVE COMMITTEE

A meeting of the executive committee of the American Street & Interurban Railway Engineering Association was held in New York on Dec. 5 and 6. Those present were President F. H. Lincoln, of Philadelphia; First Vice-President W. J. Harvie, of Syracuse; Second Vice-President E. O. Ackerman, of Columbus; Third Vice-President J. S. Doyle, of New York; Secretary and Treasurer John W. Corning, of Boston; Martin Schreiber and John Lindall. Past Presidents H. H. Adams, of New York, and Paul Winsor, of Boston, were also present.

The object of the meeting was to plan the work of the committees for the coming year and assign the subjects which these committees will consider. At present the association has six committees as follows: Power generating committee, power distribution committee, equipment committee, way matters committee, standardization committee and co-committee on a uniform form of station, way and shop accounts to work in conjunction with the Accountants' Association. It was decided to continue these committees and also to establish a special committee, of which J. S. Doyle will be chairman, to be known as the heavy electric traction committee. This committee will take up the problems connected with the heaviest class of electric transportation, including those of the electrified steam lines. There was some discussion about establishing another new committee, to be entitled committee on buildings and structures, to take up questions relating to the design of car houses, stations and structures of all kinds, including bridges. These subjects are now a part of the work assigned to the way committee, whose scope, if the plan should be adopted, would be confined to track. It was decided, however, not to appoint this committee at present, but to hold the matter over until the next meeting.

The subjects tentatively assigned to the different committees were as follows:

Power generation committee, to continue the subject of steam meters and low-pressure turbines and also to take up the subject of forced draft and condensers.

Power distribution committee, economical maintenance and standardization of overhead equipment, bonds and bonding methods, and the joint use of poles.

Equipment committee, standard gears and pinions, standard taper for pinions, gage for mounting wheels and the economical reduction of the weights of cars. The subject of specifications for heat treated-steel axles, which Mr. Doyle as a subcommittee of this committee initiated last year, has been transferred to the committee on heavy electric traction.

Way matters committee, economical maintenance of track, specifications for open hearth and manganese steel rails, rail joints, rail grooves and track gages for curved tracks and clearance between street surfaces and car equipment.

Standardization committee, rolled-steel wheels, flanges and treads and rails, the consideration of rail standards to be based upon the recommendations contained in the report of the way committee last year.

Co-committee on a standard form of station, way and shop accounts; the committee appointed last year was continued. It consists of W. G. Gove, co-chairman, Charles Hewitt and John Lindall.

Another point considered by the executive committee was that of issuing special instructions as a guide to the committees in preparing its reports. The following set of rules, suggested by Mr. Schreiber, was adopted:

INSTRUCTIONS TO COMMITTEES

(1) The executive committee has assigned subjects to the various committees only as a guide. It is not the purpose that all these subjects be reported upon this year or completed now. The number to be acted upon and completed should be determined after a thorough estimate of the importance of each subject, the length of the report and the time necessary by the convention for its careful consideration.

(2) Each report should refer briefly to all specifications or standards recommended by the committee on the same subject for the previous year and to the action taken by the association upon these recommendations. Where no final action has been taken, the subject should be submitted to the association again either in the same or a revised form and the committee should point out exactly what action is desired. It will not be necessary to repeat the text of a previous report; a reference to it will be enough unless extensive changes in the former publication have to be made.

(3) Committees are at liberty to obtain data or information in any proper way, and if they desire, the secretary of the association will issue inquiry circulars, but the questions in these circulars should be specific, pertinent to the subject being discussed, and of such character as to simplify the work of replying to them. The compilation of data and their subsequent analysis in the form of criticism and arguments form a valuable preliminary part of the committee work. All reasonable criticisms that have or may be offered to recommendations made by the committee should also be considered.

(4) All committees should make an earnest endeavor to secure written discussions of their reports for consideration at the convention. It is very important that all conclusions and recommendations of standards or practice should be expressed in clear, comprehensive and concise language and be grouped in regular order and that all plans, definitions, specifications, tables and formulas, embodied in the recommendations should be definitely indicated. Only that portion of the text of the report which is absolutely essential to a clear interpretation of the conclusions and recommendations made should be included in the body of the report; the remainder of the data should appear as an appendix or appendices.

(5) Committee reports should be submitted to the secretary not later than Aug. 1 of each year.

The names of the gentlemen appointed on the different committees will be announced in an early issue.

HEARING ON MODIFICATION OF CAR HEATING ORDER IN NEW YORK

The application of the street railways within the jurisdiction of the Public Service Commission of the First District of New York for a modification of the car-heating order published in the Electric Railway Journal of Dec. 4, 1909, page 1165, by the elimination of the clause requiring the posting of the order in the cars was held on Dec. 2, 1909. J. L. Quackenbush, for the Interborough, Metropolitan, New York & Queens County and other companies, made a strong argument against the posting of the order. He stated that the present inspectors of the commission were amply equipped and qualified to determine whether the order was being obeyed, but if the notice was posted many passengers would consider they had authority to interpret and enforce immediate compliance with the regulations, and there would be serious altercations between them and the conductors. Moreover, while the commission had power to make reasonable rules, he doubted its authority to invade the property of the company for the purpose of promulgating its rules. Moreover, if this order was posted, the companies might eventually be required to placard their cars with orders of all kinds. Mr. Menden, from the Brooklyn Rapid Transit Company, also protested against the posting of the order. Decision was reserved.

COMMUNICATIONS

CALCULATION OF LOCOMOTIVE CAPACITY

CHICAGO, Dec. 1, 1909.

To the Editors:

Will you kindly answer the following questions:

1. Theoretically, how many tons should an electric locomotive of the following description pull by direct current (A) on a 1¾ per cent grade 1 mile long? (B) On a 1 per cent grade? (C) On level track?

2. How heavy should an electric locomotive be to pull the maximum tonnage with 800 hp?

3. If an 800-hp electric locomotive had its proper weight, how many tons could it pull on a 1 per cent and a 1¾ per cent grade? And on level track?

4. How do you determine the pulling power of an electric locomotive?

LOCOMOTIVE DATA

Weight (all on drivers)	57 tons
Diameter of driving wheels	37 in.
Type of motor	West. 50-B
Gear ratio	15:54
Number of motors	4
Rated horse-power, total	600
Rated amperes, total	1080
Voltage	550

A SUBSCRIBER.

[The determination of the weight of train which an electric locomotive should, under given conditions, be expected to haul, resolves itself into two parts, namely, the pull or tractive effort the locomotive can exert, and the weight of train which a tractive effort of this magnitude will haul.

If, as is usually the case in electric locomotives, the motors are sufficiently powerful to slip the wheels, the tractive effort for short periods is limited only by the adhesion of the locomotive to the rails. For pulls of longer duration, the heating of the motors must be taken into account and the duty of the locomotive limited so as to keep the temperature of the motors within a safe limit. The maximum tractive effort is the product of the weight on drivers, multiplied by the coefficient of adhesion. The Standard Handbook for Electrical Engineers, page 809, gives the following values for this coefficient: On clean dry rail, 30 per cent; on wet rail, without sand, 18 per cent; wet rail sanded, 22 per cent. A safe value is 20 per cent.

The tractive effort of a locomotive is used to overcome three principal opposing forces, of which two are capable of exact determination. (1) The grade resistance of a train is equal to its weight multiplied by the decimal representing the grade. Thus the grade resistance per ton on a 1¾ per cent grade is $2000 \times .0175 = 35$ lb. per ton. (2) The tractive effort required for acceleration, per ton of train, is equal to the rate of acceleration expressed in miles per hour per second, multiplied by the constant 91.3. Thus the tractive effort required for acceleration at the rate of one-eighth of 1 m.p.h. per second is $\frac{1}{8} \times 91.3 = 11.4$ lb. per ton. (3) Train resistance is made up of the various frictions, wind resistance, etc. There are many formulas in use, giving widely diverse results. We may without serious error take a value of 5 lb. per ton for low speeds. For starting cars from a state of rest, three times this value may be required. The weight of train which can be hauled is obviously the quotient obtained by dividing the tractive effort of the locomotive by the amount of tractive effort required per ton of train, the sum of the three values found as just described.

We can now apply the principles outlined above to our correspondent's first case, a 57-ton locomotive on a 1¾-per cent grade. The tractive effort at the slipping point of the drivers is $57 \times 2000 \times .20 = 22{,}800$ lbs. Assuming that the train is required to accelerate at the rate of ⅛ of 1 m.p.h. per second, the tractive effort required per ton is $35 + 11.4 + 5 = 51.4$ lb. per ton, and the weight of train, including locomotive, is $22{,}800 \div 51.4 = 444$ tons Similarly, on the 1 per cent grade the tractive effort required per ton is $20 + 11.4 + 5 = 36.4$ lb. per ton, and the weight of train $22{,}800 \div 36.4 = 626$ tons. On level track the grade resistance becomes zero, the tractive effort 16.4 lb. per ton and the train weight 1390 tons.

Up to this point we have not considered the capacity of the motors. By reference to the characteristic curves supplied by the manufacturers of the motors, we may ascertain the amount of current taken when the motor is exerting any given tractive effort. The curves as issued apply to only one particular wheel diameter and gear ratio, and care must be taken to make the necessary changes in the curves before applying them to other wheel and gear conditions. These current values for the three trains, whose weights were calculated in the preceding paragraph, are tabulated below (lettered A, B and C, to correspond with the three parts of question 1). Trains A and B, the maximum trains which the locomotive can haul on the given grades, require much less current after passing off of the grades onto the level track, and these values are also given

	Lbs. per Ton.	Tons.	T. E.	Amps.
Train A (Maximum train on 1¾ per cent grade)	51.4	444	22,800	1,560
Train A on level	16.4	444	7,280	650
Train B (Maximum train on 1 per cent grade)	36.4	626	22,800	1,560
Train B on level	16.4	626	10,280	850
Train C (Maximum train on level)	16.4	1,390	22,800	1,560

Considering, now, the values in the ampere column, and comparing them with the one-hour rated current as given by our correspondent, it will be seen that train A, when accelerating on the grade, takes a current 45 per cent in excess of the rated current. If already heated to a normal service temperature, the motors will take a current of this magnitude for only a very few minutes without injurious overheating. The ascent of the 1-mile grade, starting from rest at the bottom and accelerating at the rate specified, will take about five minutes. Unless the ascent is to be followed very shortly by a long stop or by a period of coasting, affording the motors an opportunity to cool, a train of this weight should not be hauled on the 1¾ per cent grade. Train B takes the same current on the grade as train A, and the reduction in current when it runs onto level track is less than in the case of A. It will require either a reduction in weight or a period of rest after ascending the grade. If the locomotive in either of these cases starts with its motors cool, their temperature after the ascent will be such as to allow a long period of level-track running without overheating; but this condition of starting cool is one which can occur only a very few times in a day, and cannot in most cases be counted upon. In the case of train C, the only reduction in current will be due to increase of speed and the ending of acceleration, after about three minutes. If the train resistance at the maximum speed be taken as 8 lb. per ton, the total tractive effort will then be $8 \times 1390 = 11{,}120$ lb., and the current will be about 900 amp, 83 per cent of rated current. This is too high for continuous running, though even when the motor has become heated from previous service it may be continued for probably half an hour before reaching the maximum permissible temperature.

It will be apparent from the foregoing that the schedule —the degree of continuity of service and the frequency and duration of opportunities for cooling—are of the greatest

importance in determining the loads a locomotive can handle, or the adequacy of a given motor equipment for any given service. Our correspondent has furnished us no data in this direction, and, accordingly, no more definite answer can be made to his questions.

The remaining questions can be answered very briefly:

(2) It has been shown that the 600-hp locomotive has sufficient weight to develop a tractive effort which taxes its motors (assuming a schedule of only average severity) to their capacity. A proportionate weight for the 800-hp locomotive would accordingly be very ample.

(3) If the weight is proportionate to that of the 600-hp locomotive and the motors have similar characteristics, the train weights also will be proportionate.

(4) "Pulling power" or tractive effort is found as already explained, by multiplying the weight on drivers by the coefficient of adhesion. It should be noted that "tractive effort" and "drawbar pull" are not synonymous terms. Tractive effort includes the effort used in propelling the locomotive itself, and train weights obtained by the use of the value of tractive effort include the weight of the locomotive, whereas drawbar pull is the force applied to the cars alone.—Eds.]

OPERATING RULES FOR OHIO INTERURBAN RAILWAYS

Railroad Commission of Ohio,
Columbus, Ohio, Nov. 29, 1909.

To the Editors:

The following statement gives the reasons which influenced the Railroad Commission of Ohio to make certain changes in the standard code of rules of the American Street & Interurban Railway Association in order to adapt these rules for use as a standard by the interurban railways in the State of Ohio. We are signing this statement jointly as the opinion of the committee of electric railway officials and of the commission as finally agreed upon and issued by these organizations in one statement to the public and interurban operatives.

The change in Rule 103 for the signal to back from a standing position is made that the signal (three bells) may conform to a long-established steam railroad practice which has been almost universally followed by the interurban railways of this State because of the fact that a large proportion of their trainmen had received previous training on the steam lines.

Rule 110 was modified because it is impossible to display a light on a traction car that will show green to the front and side and red to the rear for the reason that in city operation there is not sufficient space for cars to pass without disturbing such lamps. Nearly every interurban line in the State of Ohio operates through some city with more or less double track.

The objection to Rule 128 is that it puts too much work on the conductor; it would keep him answering bells all the time and would give no opportunity for the collection of fares. The committee thought it entirely safe for the exchange of signals to be required only when the siding was to be used as a meeting point.

The commission was actuated by the following reasons when it modified Rule 203: The members feel very strongly that it would not be safe for a train to leave a junction, initial point, etc., until it had been ascertained that all trains which might have rights against them had arrived, but left the method of ascertaining such information to the different companies. Some roads use registers and some depend upon the train dispatchers. The committee felt satisfied that if it had a positive rule which would prohibit a train from leaving until it had been ascertained that all trains which might have running rights against them had arrived, it would afford a safe basis of operation, but the detail as to whether there should be train registers or information obtained from dispatchers was left with each company to determine for itself.

The committee could not see how a train could have "time-table rights" under circumstances which would require any flagging, but assuming that the words "time-table rights" in Rule 203 meant only that the train had a right to proceed on its time-table schedule, protecting itself against opposing trains, it was thought to be impractical considering the fact that interurban trains usually have but two in the crew. If one man was ahead flagging, there would be but one remaining on the car, and if circumstances should arise requiring a flag to be sent to the rear, the car and its passengers would be left without any protection whatever from the train employees.

The modification of Rule 203 made Rule 203-a non-essential. This rule was only an explanation of protection by flagging and the provision for protecting by a flag under such circumstances has been stricken out. Further, we did not consider Rule 203-a a proper rule for the reason that if the conductor was ahead flagging, say around a curve, and anything should happen which would require protection to be sent out to the rear, the car would be left entirely unattended with none of the crew to operate it or look after the passengers.

With regard to our modification of Rule 210, we felt that two minutes would require a greater interval between cars than 3000 ft., in that the distance between cars would increase as the speed increased, thereby affording better protection for trains scheduled at a high rate of speed. The committee also felt that an interval of two minutes could be definitely ascertained by trains leaving an initial point and could be definitely determined if the leading train was running on its scheduled time, whereas the matter of distance could not be ascertained except on straight track and then only approximated.

The matter touched upon by Rule 226 is covered by Section 3443-6, Sec. 2 of the Revised Statues of Ohio, which reads as follows:

(3443-6) Sec. 2. (Street cars must come to full stop when approaching intersecting steam railway, etc.) That whenever the tracks of any street railroads in this State cross the tracks of any steam railway at grade, the street railway company operating said line of cars shall cause their street cars to come to a full stop not nearer than 10 ft. nor further than 50 ft. from the crossing, and before proceeding to cross said steam railway tracks, shall cause some person in their employ to go ahead of said car or cars and ascertain if the way is clear and free from danger for the passage of said street cars, and said street railroad cars shall not proceed to cross until signaled so to do by such person so employed as aforesaid, or said way is clear for their passage over said tracks.

Regarding the objection of the committee to the forms of orders shown in the standard code, the committee did not have any specific objection to the forms used, but did believe it was better to use the steam railroad practice of having the orders written out in full than to use a form and have certain blank spaces in the printed form filled in with the necessary data. We feel that the practice of having the orders written out in full is less liable to cause mistakes and more apt to fix the order in the minds of the train crew.

It will be understood that the book of rules which has been prepared by us is not a standard code of rules in the sense that it will have to be adopted by the interurban roads of Ohio; it was a suggestion for a code of rules. It is not the idea of the commission that each interurban road in Ohio shall take these rules and file them with it in this form. They must submit a satisfactory set of rules in some form to the commission, and this is to be sent to them as a basis to be used in the preparation of their codes.

JOHN C. SULLIVAN, Commissioner,
For the Railroad Commission of Ohio.
FRANK A. DAVIS, Chairman,
Committee of Electric Railway Operating Officials.

MEETING OF NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS

At the twenty-first annual meeting of the National Association of Railway Commissioners held in Washington, D. C., Nov. 16 to 19, a number of committee reports were presented. A few of the reports of interest to electric railway managers are briefly abstracted below.

The report of the committee on railroad taxes and plans for ascertaining the fair valuation of railroad property contained a communication from B. H. Meyer, chairman of the Wisconsin Railroad Commission, discussing the relation of the tax and rate value of public service corporations.

The report of the committee on powers, duties and work of the State railway commissions contains an appendix in relation to the affairs of the various commissions.

The report of the committee on grade crossings and trespassing on railroads, signed by William J. Wood, of Indiana, reiterates the conclusions of the same committee in 1907 and 1908, that highway grade crossings should be abolished where practical and that these crossings should be put under the control of the railroad commissions. The association is urged to continue its efforts to secure adequate legislation and to cultivate public opinion against grade crossings and trespassing on the tracks of railroads. Appended to the report is the full text of the Wisconsin law empowering the railroad commission to order gates or alarm bells to be installed at road crossings and to order the separation of grades when required for the public safety, the cost of the separation to be borne jointly by the railroads, the municipality and the State. Two bills introduced at the last session of the Indiana Legislature, but which failed of passage, are also appended. One was intended to give the railroad commission of that State powers similar to those conferred by the Wisconsin act in the matter of ordering separation of grades at highway crossings. The other bill would make it a misdemeanor, punishable by fine or imprisonment, to trespass on a railroad right-of-way. The provisions of both bills included all the steam and electric railways within the State.

The report of the committee on safety appliances calls attention to the very large number of casualties to trespassers on railroad rights-of-way, and recommends that measures should be taken in all the States to reduce the number of such casualties. Any practicable means of accomplishing this would receive the hearty support and cooperation of the railroads. The number of persons killed at highway crossings is small compared with the number of persons killed along the track, being less than one-fourth. Referring to the use of telephones for train dispatching and for communicating between manual block signal stations, the report states that the telephone is rapidly displacing the telegraph, and that "the question of safety seems to hinge almost entirely upon the personnel and methods in the operation of the apparatus."

The committee recommends an amendment to the safety appliance law, making it compulsory for the railroads to adopt all of the various appliances intended for the protection of trainmen which are included in the standards and recommended practice of the Master Car Builders' Association. It also recommends the passage of uniform State laws supplementing the Federal laws covering safety appliances, hours of service and employers' liability. The following resolution was presented to the convention for adoption:

Be it Resolved, That this convention express its approval of the Esch bill (H. R. 17979) of the Sixtieth Congress, providing for government investigation of railroad accidents, passed by the House of Representatives on May 27, 1908; also the Watson bill (H. R. 26725) of the Sixtieth Congress, providing that the safety-appliance law be extended to include the various appliances enumerated in the Master Car Builders' standard for the protection of trainmen and giving the Interstate Commerce Commission power to designate proper methods of location and application for such appliances, which bill passed the House of Representatives on February 15, 1909; and it is recommended to Congress that the measures expressed in these bills be speedily enacted into law.

The report was signed by Edward A. Moseley, James E. Sague and Joseph E. Willard.

The next meeting will be held in Washington on Nov. 15, 1910.

HEARING ON FENDERS AND WHEEL GUARDS IN NEW YORK

A hearing was held before Commissioner Maltbie of the Public Service Commission of the First District of New York on Dec. 1, 1909, on the question of fenders and wheel guards and safety devices in use on the cars operated in the Boroughs of Brooklyn and Queens. The hearing reopened case No. 1048 in so far as the Coney Island & Brooklyn Railroad and the Brooklyn Rapid Transit Company were concerned.

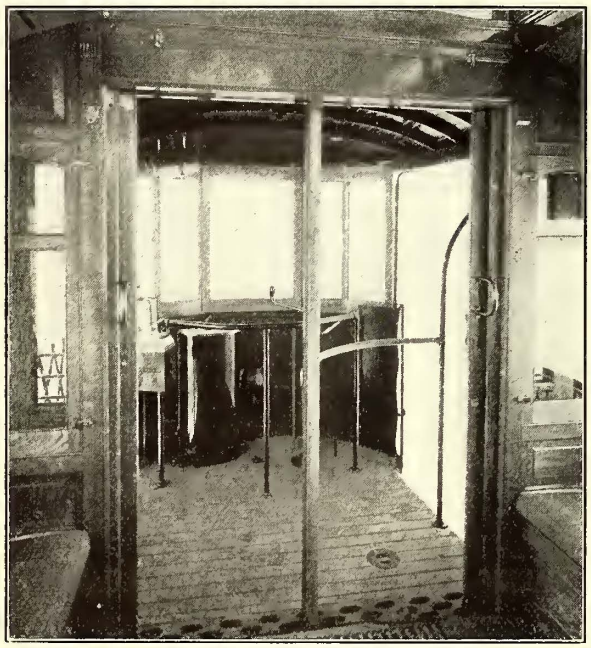
W. S. Menden, assistant general manager of the Brooklyn Rapid Transit Company, testified that wheel guards attached to the car body suffered less damage from accidental tripping due to bad track or pavement than wheel guards attached to the trucks. It would cost from $50 to $100 per car to reconstruct 250 of the company's 500 open cars in order to make it possible to apply wheel guards satisfactorily. During the nine months ended Oct. 31, 1909, 573 persons had been struck by cars and in only 32 cases would a wheel guard have been a factor in preventing serious injuries. The witness did not think it fair to compel the Brooklyn Rapid Transit Company to equip its cars with wheel guards of doubtful efficiency after it had only recently equipped all of its cars with projecting fenders. He did not know what it had cost to maintain the wheel guards now in use, but offered to equip 50 cars with wheel guards only and about 120 cars on two trunk lines with both fenders and wheel guards for the purpose of experimenting further and ascertaining the comparative maintenance cost and efficiency.

S. W. Huff, president of the Coney Island & Brooklyn Railroad, said his company, which operated 190 cars, had also had trouble with accidental tripping of wheel guards due to bad track or street pavement.

Decision was reserved.

A ONE-MAN PAY-AS-YOU-ENTER CAR

The J. G. Brill Company recently has completed for the Chatham Construction Company, Brunswick, Ga., four double-end, single-truck cars, the unusual feature of which is that they are to be operated as pay-as-you-enter cars without a conductor. The passengers will be permitted to enter the car only by way of the front platform where they will deposit the fare in a cash box under the eye of the motorman. The platform and entrance-exit designs, with sliding end-body doors, provided for this purpose

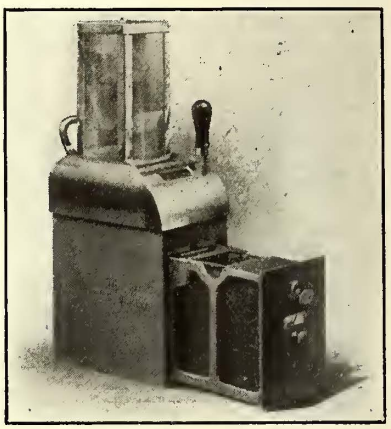


Entrance and Exit Platform of the One-Man Pay-as-You-Enter Car for Brunswick, Ga.

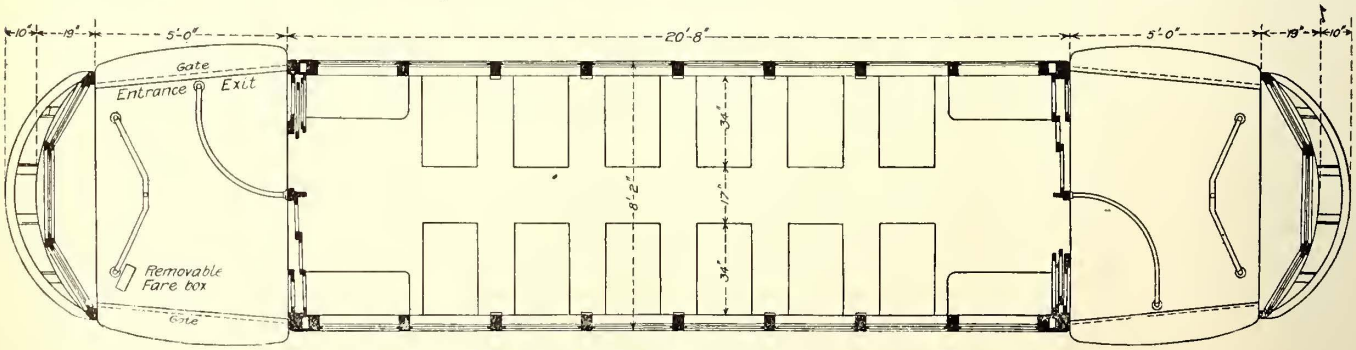
are shown on the accompanying car plan. It will be observed that the cash box is placed on the far side of the platform, this position having been selected to increase the freedom of movement. If the fare box had been set on the other side of the platform near the step, the first person to enter the vestibule would have had to stop to deposit his fare and thus prevent others from boarding the car immediately.

The Brunswick car has two similar platforms, each 6 ft. 7 in. long with opening and step at both sides for double-end operation. The car body, which has longitudinal seating at the ends, is 20 ft. 8 in. over the end panels at the sills and 33 ft. 10 in. over the platform crown pieces. The car has an interior finish of three-ply bird's-eye maple veneer and is supplied with bronze car trimmings, wired ventilator sash and Forsyth curtain fixtures. Among the car builder's specialties installed are the draw-bars, "Dumpit" sand boxes, "Dedenda" gongs and "Walkover" seating. The truck is of the Brill No. 21 type and carries two Westinghouse No. 12-A motors.

Not the least interesting feature of these cars is the new No. 4-A portable fare box shown in one of the illustrations. The over-all dimensions are 6 in. x 9¼ in. x 20½ in. The cash till is 3 in. x 6 in. x 7 in. The weight of the box complete is 35 lb. The main case is of steel and the cash receiver of bronze, including the portion above the rectangular case. The box has two projections which engage lugs on the platform rail or support. This arrangement is such that the handle must be pulled, thereby dropping the coin or tickets from the tilting plate into the locked cash box, before the box can be removed from its support. Should the box be turned upside down a device for disconnecting the handle from the tilting plate by gravity completely secures the contents during the change from one end of the car to the other. The tilting plate at the base of the glass cash receiver covers an opening and permits coins and tickets to be inspected before they are dropped into the till by operating the handle located beside the receiver. The handle can also be arranged to operate a fare-counting machine or totalizer. The tilting plate has a curved follower plate which prevents fares that have been placed in the receiver after the handle has been pulled, from passing uninspected through the opening. The follower plate provides an additional bar to attempts at gaining access with wire or string to the contents of the till through the receiver. The drawer containing the cash till can only be drawn out, after it is unlocked, by pulling back the handle which operates the tilting plate, thereby preventing fares from being left in the cash receiver. The act of drawing out the cash drawer closes and securely locks the lid of the cash till. The drawer cannot be closed again except when another cash till with the lid wide open for receiving fares is placed in position.



Cash Box for Brunswick Car



Seating and Platform Plan of One-Man Pay-as-You-Enter Car for Brunswick, Ga.

Five accumulator cars have been in operation on the Belgium State Railways since 1899, between Antwerp and Lierre, distant apart about 10 miles. Each car weighs about 40 tons and carries 66 people. The Government will buy more cars to operate between Antwerp and Malines

QUARTERLY MEETING OF THE STREET RAILWAY ASSOCIATION OF THE STATE OF NEW YORK

A quarterly meeting of the Street Railway Association of the State of New York was held in Albany, Dec. 7 and 8. An informal dinner at the Hotel Hampton on Tuesday evening was attended by about 75 members and guests. E. F. Peck, president of the association, presided at the dinner. Over the coffee and cigars the subject "Relation of State Highways and Interurban Railways" was discussed by J. W. Hinkley, Jr., president and general manager, Poughkeepsie City & Wappingers Falls Electric Railway; S. Percy Hooker, chairman, State Highway Commission, and Joseph K. Choate, general manager, Otsego & Herkimer Railroad.

Mr. Hinkley said that he had made a close study of the new State highway law, the Public Service Commission law and the general railroad law of New York, and had found in the highway act a number of sections which affected, directly or indirectly, the status of electric railways occupying the highways within the State. Section 52 gave the Highway Commission the right to order the removal of poles and other structures from the highway when they obstructed the roadway. There was no provision in the highway act requiring the railway company to remove weeds growing in its roadbed, but this duty devolved upon the abutting property owners. His company, however, cut down the weeds to protect its track and ties.

Sections 135 and 136 provided for the construction of new roads and included a provision for payment of damages by the towns to abutting property owners for changes in grade or location of the highway after an appraisal. Mr. Hinkley thought that a railway occupying a highway was also entitled to damages when the construction of a new State road involved a change of location or considerable grading to bring the track on a level with the roadway surface.

Sections 333 and 334 gave the town superintendent of highways control over trimming shade trees along a State road, and the speaker thought this control should be exercised in causing to be removed shade trees which obstructed the view of an intersecting road by the motorman of a trolley car running on or along a State road. Trees could not be trimmed, however, without the consent of the owner.

Section 77 of the highway law gives the district engineer the right to close a highway to traffic while constructing or repairing a State road. In one case a contractor had attempted to close a road near Poughkeepsie along which a trolley line operated. The contractor tried to stop the cars as well as other vehicles, and was only prevented by an injunction. The law did not contemplate any such action, which was unwarranted. Another point in this connection was that a railway company was not relieved from liability for accidents to vehicles or pedestrians trespassing on its track during the construction or repairing of the roadway, nor could it recover any damages from the road contractor or the State for incidental damages to its ties, bonds, joints or switches.

Section 137 covered the construction of a State highway through a village. The State Highway Commission had adopted a policy of continuing the macadam roads through villages, and a railway occupying the center of the highway through a village must conform to the provisions of general railroad law covering paving between and for 2 ft. outside of its rails. The Highway Commission is paving with macadam a strip 8 ft. wide outside of the brick pavement between tracks, leaving to the village the pavement of a gutter strip 3½ ft. wide on each side and the setting of the curb. The railway company must either pave its track with brick, if it is to remain in the center of the roadway, or consent to its removal to the side of the road. This policy is entailing a great hardship on some companies.

The point has been raised that there is no provision in the highway act compelling a railway already in operation and holding a franchise to move its tracks to accommodate the plans for road improvement of the State Highway Commission. The Attorney-General of the State has rendered such an opinion, but has pointed out that Section 50 of the Public Service Commission law gives the Public Service Commission power to order a change in the location of tracks if demanded by public necessity or convenience. Messrs. Stephens and Sague, of the Public Service Commission, Second District, have informally stated that they interpret this provision to apply only to the use by the public of the railway, and that it cannot be made to apply to a change in highway location.

Mr. Hooker stated the views of the State Highway Commission on some of the points raised by Mr. Hinkley. A railway company's right to the use of any highway or street is subsidiary to the rights of those who use the highway for vehicles or foot traffic. A franchise to operate a railway on a highway does not carry with it any fee or ownership in the ground on which the highway is built. When necessary for highway improvement a railway should move its tracks to the side of the roadway, or even to private right-of-way, and it could not expect to recover damages. There had been no decision on such a question by the courts, but the speaker believed it would be wise to bring a friendly suit and settle the points of law involved at once. As to closing highways against the operation of cars during construction or repairs, the commission had no authority or desire to make such an order under any conditions. The commission's attitude toward the railways in the matter of removing poles or tracks was entirely friendly, and it did not intend to inflict any hardship or inconvenience if it could be avoided. No more powers than it already has were asked by the State Highway Commission, but it would be very desirable to have an interpretation by the courts of the commission's rights and jurisdiction under the present law. The speaker assured those present that he would do all in his power, personally, to expedite the settlement of any questions or complaints raised by electric railway companies in the State which were called to his attention.

Mr. Choate thought that when improvement of the highways in any district was contemplated the Highway Commission should confer with the electric railways which might be affected before final plans were drawn.

WEDNESDAY MORNING SESSION

The tenth quarterly meeting of the Street Railway Association of the State of New York was called to order at 10:15 a. m. by President Peck, at the Fort Orange Club.

The first order of business was the presentation of a paper by J. K. Choate, of the Otsego & Herkimer Railroad on the subject of the remuneration for mail service. This paper is published on page 1197 of this issue.

TRANSPORTATION OF MAIL

President Fassett opened the discussion by saying that he was a member of the committee of the American Street & Interurban Railway Association on the transportation of mail. It was impossible for him to be present at the Denver convention, but he repeated for the benefit of the

delegates present a synopsis of the report on this subject presented at Denver with the accompanying figures. He then asked whether any companies represented at the meeting had direct contracts with the Government for handling mail matter. Two delegates stated that their companies had. Mr. Fassett, continuing, said that some time ago he found that his company was losing money under his contracts for handling the mail and had notified the Government that it would discontinue this service. The compensation for carrying the mail was then raised. It was the general experience that the purchasing power of the unit passenger fare was growing less and practically the same conditions found in the passenger business existed in the mail business. Instances were also brought out of electric mail service supplanting wagon service which cost from 25 to 30 cents a mile.

Others who discussed Mr. Choate's paper were R. H. Smith, of the Albany & Hudson Railroad; W. H. Collins, of Gloversville; J. H. Pardee, of New York; Frederic H. Beach, of Ballston Spa; Captain J. W. Hinkley, Jr., of Poughkeepsie; C. Loomis Allen, of Utica; J. E. Duffy, of Syracuse; J. T. Smith, of Fishkill; W. R. W. Griffin, of Rochester, and Frank Rhea, of the General Electric Company.

Mr. Allen urged that, in taking the matter up with the Government, the argument for an increase of rates be not based simply upon the complaint that the present revenue was too low, but that emphasis be laid upon the value of the service. He suggested that for closed pouch service a rate be made based on weight, and suggested that 1½ cents per 100 lb. might prove satisfactory.

On motion by Mr. Fassett, the president was empowered to appoint a committee of three to act with the corresponding committee of the American Street & Interurban Railway Association and place the matter before Congress at the same time that the subject of remuneration for mail service of the steam railroads was taken up.

DISCUSSION ON ENGINEERING SUBJECTS

H. A. Benedict, mechanical and electrical engineer of the United Traction Company, Albany, presented a paper on "Tests of Electrical Equipment."

The discussion was opened by E. H. Anderson, of the General Electric Company, who gave information in regard to special and commercial factory tests and described the methods used by the General Electric Company. Mr. Anderson was followed by Charles Remelius, superintendent of rolling equipment, Public Service Railway Company, Newark, N. J., who described the portable testing car used on that line.

Owing to the inability of Charles R. Barnes, railway expert of the Public Service Commission, to present the paper scheduled for him on "Block Signaling on Electric Railways," this paper was laid over until the following meeting.

WEDNESDAY AFTERNOON SESSION

H. A. Benedict, chief engineer of the United Traction Company, Albany, opened the afternoon session with a discussion on electrolysis. W. J. Harvie, chief engineer of the Oneida Railway Company, and E. J. Dunne, superintendent distribution of the Public Service Railway, N. J., also discussed this matter.

Mr. Benedict then described the crushed stone track construction used in Albany, which he believed would last as long as the rails. After a general discussion on rigid concrete track work, Martin Schreiber, engineer maintenance of way, Public Service Railway of New Jersey, gave a long talk on many features of track construction and concluded with a strong plea for the adoption and general use of a few standard rail sections.

Mr. Harvie opened the discussion on fire insurance. He called attention to the differences in the recommendations of the National Board of Fire Underwriters and the State Board of Fire Underwriters. E. J. Cook, general manager of the Rochester Railway Company, said that the rules of the National Board of Fire Underwriters should be followed. Mr. Cook also referred to the possibility of the formation of a central rating bureau for electrical risks during the coming year.

Mr. Harvie introduced the subject of grooving commutators. His experience had been that slotting was an excellent means of reducing the maintenance costs on any type of motor. He had been told, however, that slotting was entirely uncalled for if the proper grade of mica were used. E. H. Anderson of the General Electric Company thought that slotting was the only means of overcoming motor trouble and he believed that in the future it would have to be resorted to in all cases. H. S. Williams, electrical engineer, Utica & Mohawk Valley Railway Company, gave the following figures on the maintenance of commutators and brushes before and after slotting commutators: In 1908, 82 commutators repaired a month and in 1909 only 32 commutators repaired a month; in 1908, 789 brushes required a month and in 1909 only 471 brushes required a month.

The subject of high-tension crossings was then introduced by Mr. Harvie. He called attention to the tendency to eliminate cradles over telephone and telegraph wires because they involved more material in the air. He thought that the greater the cost of maintaining the crossing, the greater the danger. Mr. Benedict quoted from the specifications of the American Telephone & Telegraph Company, covering the construction of high-tension lines which cross their wires. The specifications do not require cradles, but some type of grounding device on the cross-arm of the high-tension line to prevent the high-tension wire from falling on the arm and burning it off before the power goes off the line. Mr. Benedict advocated the use of an angle iron bolted to the cross-arm and projecting slightly above the top surface of the cross-arm. This angle iron should be grounded. Following these remarks there was a long discussion on the subject of crossing foreign wires above high-tension lines.

A. L. Linn, Jr., who had been announced to report as a member of the committee on classification of accounts, was suddenly called back to New York. Mr. Linn, however, did not have any special report to make at this time, but will report at the next meeting.

RULES FOR INTERURBAN RAILWAYS

C. Loomis Allen, vice-president of the New York State Railways, spoke at length in support of the rules for interurban railways adopted at Denver by the American Street & Interurban Railway Transportation and Traffic Association and referred to the action of the Ohio lines and the Ohio Railroad Commission in adopting a tentative system of rules which is radically different in some respects from the rules adopted at the Denver convention. He understood that the American Association's committee had asked for a rehearing on these rules in order to present its side of the question and have the Denver code adopted. He said that the old New York Street Railway Association code was closer to the American Association's code than any other. He wanted to give notice that at the next annual meeting of the New York Association he would move the adoption of the American code with such amendments as might be needed for local conditions in New York. E. S. Fassett,

general manager of the United Traction Company, Albany, moved that the State secretary request the secretary of the American Association to send a copy of the interurban rules as adopted at Denver to every member of the New York State Railway Association. The motion was carried.

MISCELLANEOUS

James F. Shaw, president of the American Street & Interurban Railway Association, and General G. H. Harries, second vice-president of the Washington Railway & Electric Company, had been invited to address the meeting. Both of these gentlemen had fully intended to do so, but were unavoidably prevented from going to Albany at this time. The association expressed its regrets that they were unable to be present.

Mr. Allen moved a vote of thanks to the Fort Orange Club for its hospitality in offering its quarters for the use of the association. After this resolution was adopted, President Peck appointed the following committee of three on "Compensation for Carrying United States Mail": J. K. Choate, general manager, Otsego & Herkimer Railroad; Edgar S. Fassett, general manager of the United Traction Company of Albany, and C. Loomis Allen, vice-president of the New York State Railways, Syracuse, N. Y.

The next meeting of the association will be held in Rochester, N. Y., on March 1 and 2.

REMUNERATION FOR HANDLING UNITED STATES MAIL*

BY J. K. CHOATE, GENERAL MANAGER, OTSECO & HERKIMER RAILROAD

The remuneration for handling United States mail is probably one of the most perplexing questions that the electric railway manager has to consider, for the reason that he finds his most difficult customer in the Post Office Department of the United States Government.

The mail service by electric lines is practically a new business and yet in its infancy, and it has not been fully appreciated either by the railroad companies or by Congress or the Post Office Department. The possibility of a service by electric lines was little thought of until within the last few years, and the first carrying of mails by the electric lines was simply as an accommodation to localities that had in the past received their mails only by star routes or no mails at all. These first efforts have steadily grown, until it has become a very important branch of the Post Office Department service and made it possible not only for isolated localities but for comparatively large cities to receive and dispatch mails in connection with the fast mail service of the great trunk lines by the receipt and delivery of mail at the stopping points of the fast mail trains on these great arteries.

The first service by electric lines was the gathering of mails in the larger cities from substations for delivery at the general post office or railroad stations. This service, apparently, was so satisfactory that the service next extended to outlying districts and little towns for delivery at some general post office.

The efficiency of this service so quickly demonstrated to the Post Office Department not only the efficiency with which mail could be carried, but the saving in cost to the Post Office Department (as against the star route service) that it was fast extended to the interurban lines, not only with a closed pouch service, but finally up to a complete railway post office service, with the consequent result that tremendous saving in time in the dispatch of mails was accomplished, as well as a great saving in cost to the Government. I know of no point where this has been demonstrated more strongly than on the lines of the company I have the honor to represent. Not only has the railway post office car on our lines shortened the time between towns of such importance as Cooperstown, Richfield Springs and Oneonto from one to six hours in the time of the dispatch and delivery of letters between these points and New York City and Boston, but it has made as much as a day in the saving of time on letters to the Far West.

I am quite sure that the experience of other lines is similar to this in the carrying of United States mail. While I think that the Otsego & Herkimer Railroad is the only purely electric line in the State over which the Government operates a railway post office, I feel certain that it is only a question of time before this character of service will be extended to practically all of the interurban electric lines, with great benefit to the Post Office Department, provided the electric lines are to receive proper consideration and proper remuneration for the service performed.

It is very difficult to understand just how the original pay for the carrying of closed pouches on electric lines was determined, but it is presumed that the rate of 3 cents per mile (which seems to be the prevailing rate on nearly all of the electric lines) was fixed as a consideration for carrying a few pouches to outlying and isolated places, and was never intended as a fair or just remuneration for the service the electric lines are now asked to perform.

The Post Office Department is a most difficult customer to deal with. It is difficult to understand or appreciate its arbitrary methods, ways and rules, for certainly no private business could be, or would be, accepted from any patron of a railroad under like conditions. Nevertheless, it is but fair to say that the Post Office Department in many cases is hampered by the laws as they exist. When these laws were passed by Congress it was without proper information, and it was not expected at that time that the service would grow to its present proportions.

The railroad companies themselves have been in a very awkward position up to the present time, for the reason that, acting by themselves, they have been able to exert little or no influence beyond the Congressman representing the district or districts through which they operate, while the postal laws must apply to the entire country.

It would seem to me that the most plausible way to bring about satisfactory results would be by a united effort through the American Street & Interurban Railway Association or a combined effort through the various State railway associations a committee that would present the entire matter to the Congress of the United States; or, better still, by an understanding with the steam railroads and acting with them; for the steam railroads themselves are dissatisfied with the rate of pay as now fixed by the Government, and are making a determined effort to have a fair readjustment of the compensation for such service. To this end they are acting in conjunction with a committee composed of some of the most distinguished officers of steam railroads, with headquarters at Chicago, who are collecting and tabulating detailed statstics of the mail service, both as to the character of the service performed and as to the cost of doing the service, as compared with the remuneration, with a view to presenting claims to Congress.

In addition to this, there is to be a meeting in Washington early in January of representatives of all of the short line railroads with a view to presenting to Congress their claims as to the cost of performing the service as compared with the remuneration received, and also with the further view of showing the unfairness of the rate that applies to a short line of from 25 to 100 miles as being on an equality with the fast mail service over thousands of miles of rails, and as to the application of the rate for single car service as against train load service. As the Otsego & Herkimer Railroad does a general railroad business, and is not purely a passenger railroad, it has been considered among the short line railroads, and it is my intention to be present at that meeting and take part in its deliberations.

These two committees will certainly have a very great influence with Congress by the presentation of the facts as gathered, and I believe it is of the greatest importance that the electric lines should be represented directly in some manner.

It might be possible that this could be brought about through the short line association, and with the approval of our association I should be very glad to suggest at the meeting in Washington the desire on the part of the elec-

* Abstract of paper read before the Street Railway Association of the State of New York, Albany, Dec. 8, 1909.

tric lines to join in any way that would seem proper and agreeable.

These suggestions seem to offer a practical way for us to get the remuneration to which we are entitled, and it is hoped that in this connection some radical change can be brought about, not only for proper payment, but fair treatment at the hands of the Post Office Department.

At the present time the appropriations for the Post Office Department (as I understand it) have been insufficient, and the department has shown a very large deficit. While I think the causes of this deficit have been entirely outside of the transportation of mails either by steam or electric lines, and are almost entirely due to the rural free delivery this deficit has without doubt been the cause of many of the very unfair and unjust propositions of the department itself. For certainly the department in its dealings with railway lines has made propositions so unbusinesslike and so unfair that it is almost inconceivable that they should ever have been made.

The weighing period of 90 days on all lines where the rate of pay is adjusted to the average weight of mails carried has always been fixed for the months of the year most unsatisfactory to the lines outside of the large cities. This, however, is probably not unfair when all sections of the country are considered. After the rate of pay has been fixed for railroads (at the end of the weighing period), for a term of years the department does not hesitate, the day after the weighing is completed, or as many times as it sees fit, to authorize increases in the service, for which it pays nothing. In fact, it issues an order for carrying mails after the weighing period, wherein it specifically states that the order is issued without increase of pay. This is so absurd, so unjust and so unfair on its face that it is inconceivable that any officer of the Government, let alone the Government itself, should issue such an order.

It means nothing more nor less than fining or taxing the railroad company for improved and additional service. No railroad in dealing with any private individual or corporation or any private individual dealing with another would for one moment consider so unfair and unjust a proposition, nor would the proposition receive the slightest consideration from any one making it.

In the matter of fines imposed by the Government, it is entirely unfair. It never gives you the information upon which the fines are based, that you may investigate the matter. You never know that the fine has been justly applied, or, what is of more importance, a chance to improve your service and avoid other delays or protect yourself against being fined in the future for the very same thing. The appearance of the fine slip or notice received from the second assistant postmaster general's office always has the appearance of no investigation, and is simply based upon the report of some postmaster, and that this report, in turn, has been read simply by a clerk, who says the fine should be so much, and accordingly the road is so fined.

We all know the necessity in railroad operation for the most thorough and careful investigation of all complaints and failures. We know that investigations made in anything but the most thorough manner bear no result, and that no good is accomplished.

From my experience in dealing with the Post Office Department I am convinced that in the great volume of business of the department most of these matters of which I complain are not considered of much importance, and never reach the ears of the honorable postmaster general or his principal assistants. I do not mean for one moment to infer by these remarks anything personal to any officer of the Post Office Department; for the officers with whom I have personally come in contact I have a very high regard. The conditions are much as I have presented them, and were it not for the accommodation and convenience that the service gives to our patrons I would throw the mail service off our lines, for it costs us more to do the service than we receive, until such time as we were treated more fairly. The remuneration for handling the United States mail is a troublesome question, but is susceptible of solution. By continuous and efficient "knocking" at the door of Congress, with the facts and conditions fairly presented, I feel certain in the end we will receive the remuneration to which we are entitled, based upon cost and efficiency of the service given.

MEETING OF NEW ENGLAND STREET RAILWAY CLUB

The regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on Dec. 2, with President W. D. Wright in the chair. The evening was devoted to a discussion of the electric railway conditions of the Far West, as observed by the Pacific Coast party in connection with the Denver convention.

Hon. James F. Shaw, president of the American Street & Interurban Railway Association, was the first speaker. He spoke of the gratifying attendance at Denver, and emphasized the excellent physical condition of the properties in Denver, Salt Lake City, Seattle, Los Angeles, El Paso, San Antonio, New Orleans and other cities. He suggested that the Western properties have built well and without many of the mistakes which came earlier in the East.

B. V. Swenson, secretary of the American Street & Interurban Railway Association, reviewed the growth of that organization and spoke of the value of the recent Denver convention in bringing the East and West into closer touch. He praised the manufacturers' exhibits and emphasized the cordial welcome received everywhere on the trip.

Henry C. Page, general manager of the Worcester Consolidated Street Railway Company, spoke on the operating conditions observed on the trip. He reviewed favorably the combination car design used in Denver, pointing out the advantages of its lightness without sacrifice of strength. He considered the track construction the best he had ever seen, all the rails being of T-section. The width of the streets in Salt Lake City was impressive. He spoke of the enormously rapid growth of Seattle; praised the enterprise of the people and the handling of the properties there and in Tacoma by the Stone & Webster organization, and emphasized the steadier riding of the Western communities at different hours of the day. Mr. Page said that the San Francisco revival in growth has been wonderful.

Paul Winsor, chief engineer of motive power and rolling stock, Boston Elevated Railway Company, spoke of the equipment and power of the Western systems. He emphasized the use of sewer water in the condensers of the South Side elevated plant in Chicago; reviewed the advantages of the Denver track in the life of the light cars used, described the reduction of hills by hydraulic power in Seattle, and touched upon his visits to power plants on the Coast. At Portland the power plant burns sawdust. The cost of power from the sawmill, including fixed charges, was said to be about the same as the cost from a water-power plant, including all charges. Water-power developed with very long transmission lines is expensive. The Redondo oil-burning plant is producing current at the equivalent of about 1.8 lb. of Pocahontas coal per kw-hour.

M. H. Bronsdon, electrical and chief engineer of the Rhode Island Company, discussed the track conditions of the Western properties. The use of T-rail and concrete paving in Denver was described. The narrow gage of 42 in. keeps the vehicles away from the tracks; less paving is required, and accidents are reduced by the increase in side overhang of the cars. The speaker also spoke favorably of the T-rail construction in Seattle and Bellingham, and of the track work of San Francisco. Time was saved by the use of electric track switches in Denver. Concluding, Mr. Bronsdon described the pin map used by the San Francisco claim department to show the location of accidents graphically each month, colored pins showing the character of the accident. These maps have been very helpful in reducing accidents by calling the attention of the operating department to bad conditions at particular locations.

News of Electric Railways

Cleveland Traction Situation

At noon on Dec. 3, 1909, the evidence in the street railway arbitration at Cleveland was completed, unless it should be decided by either side to discuss the schedules which were agreed upon in the beginning. Judge Tayler stated that as some of the expert evidence related to a few of the items in those schedules, he would take them into consideration. Both sides were to prepare briefs and make such oral arguments as they felt necessary on Dec. 8. It is possible that Judge Tayler will be ready to announce his findings shortly after the arguments are completed, as he has kept up with the evidence and has formulated rules as the hearing progressed regarding many of the points with which he has to deal. The Judge has indicated that he will treat several doubtful points from a legal standpoint. Franchises will present a difficult problem because two court decisions must be taken into consideration.

While all the sessions were short, the greater part of the week ended Dec. 4, 1909, was taken up in discussing the life and value of the franchises of the different lines. Judge Tayler stated that he would consider the life of each franchise instead of the average of all as suggested by Mayor Johnson. He also said that he would value the franchises of both the Cleveland Electric Railway and the Forest City Railway on the basis of net earnings during 1908 and 1909. It was also stated that 5¾ per cent on the physical valuation would be considered as the cost of financing the rebuilding of the lines.

Horace E. Andrews, president of the Cleveland Railway, introduced figures to show that the operating expenses and taxes represent 63¾ per cent of the gross earnings during the period from February to the present time. Mayor Johnson stated that he would introduce a table which would show different results.

Judge Tayler said that in making up the franchise value he would consider the system as a whole. Mayor Johnson estimated that the franchises of the Forest City Railway are worth about $400,000 and said that this amount should be added to the franchise value of the Cleveland Railway as a credit. Judge Tayler refused to accede to the demand of the Mayor.

On Nov. 30, 1909, President Andrews introduced the report of Superintendent Clark of the Municipal Traction Company which showed the value of the property of the Forest City Railway to be $1,220,450, with no allowance for overhead charges, in comparison with $1,805,000 allowed in the Goff-Johnson settlement. The physical valuation of the property of the Forest City Railway was made on the basis adopted in the former settlement by Superintendent Clark.

The franchise ordinance will be completed as soon as Judge Tayler decides the value of the property and the other matters which have been submitted to him, and will be taken up by the Council at once, but it is very doubtful if the ordinance will be passed before the end of the year. The referendum vote can not be taken until after the administration changes, however. It is a question what stand will be taken by the present officials after they have retired from office.

Warren Bicknell, receiver of the Municipal Traction Company, has been notified that none of the new cars ordered will be received until after Jan. 1, 1910, although some of them were to be completed for use during the holiday rush.

Terms of Ordinance to Be Submitted to Voters of Kansas City

Negotiations for a new franchise to impose terms and conditions under which the Metropolitan Street Railway, Kansas City, Mo., shall operate hereafter were begun early in 1909. An ordinance was drawn and submitted to the West traffic way committee of Kansas City in June, 1909, as a basis for negotiations, and was subsequently modified by the sub-committee of the West traffic way committee and submitted to the whole traffic way committee, as noted in an article in the ELECTRIC RAILWAY JOURNAL of July 17, 1909, page 120, in which a digest of the terms of the unamended grant was given. Since then the matter has been before the Council for consideration and, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 23, 1909, page 918, the franchise as amended when it was presented to that body is to be submitted to the voters of Kansas City on Dec. 16, 1909, for approval. The franchise as finally passed by the Council and approved by the Mayor imposes briefly the following conditions:

The several companies comprising the system operated by the Metropolitan Street Railway shall be merged into one company organized under the laws of Missouri within a year after the grant goes into effect. The penalty for failure to consolidate within that time is the forfeiture of $500,000 to the city. After such consolidation there is to be no transfer of the rights of the consolidated company without the consent of the city. It is intended that the ordinance shall cover all the lines in Kansas City, Mo., and Independence, Mo., for purchasing purposes, and Kansas City, Kan., Argentine, Kan., and Rosedale, Kan. All the rights under the new grant shall cease on June 1, 1951. The city reserves to itself all rights which it may now have by contract or law to regulate fares within the city limits, and after June 1, 1925, the city is given the right to fix the rates of fare by ordinance from time to time. Such rate, however, shall be reasonable and shall not be changed oftener than once every two years.

The company shall charge not more than 5 cents for a single fare for passengers 12 years of age or over for a continuous trip in one direction, and one-half fare for passengers under 12 years of age. Children under 7 years of age, accompanied by a person paying fare, shall be permitted to ride free. After Jan. 1, 1913, the company shall furnish all conductors with tickets which shall be sold at the rate of six for 25 cents and shall establish at least 25 convenient agencies where 25 tickets can be purchased for $1, five of such places to be located in Kansas City, Kan. Commencing with the acceptance of the ordinance half-fare tickets shall be sold at the rate of two for 5 cents. All transfer privileges now in force shall be continued, and universal transfers shall be given in Kansas City, Mo., and on the system in Kansas; such transfer privileges, however, not to be construed to enable a passenger to return substantially to the initial point for a single fare. A time limit of not less than 30 minutes in which a passenger can use a transfer shall govern. If the company cannot agree with any of the other cities mentioned regarding the extension of its franchise, then it shall not be obliged to extend such transfer privileges to such city or cities.

The company shall not be required to build more than 5 miles of single track nor more than 2½ miles of double track in a year, the provisions of the ordinance to govern such new lines. All paving, repairing and reconstruction shall be done to the satisfaction and approval of the city. The company shall pave its tracks between the rails and for 18 in. outside of the outside rails and keep such paving in repair.

At all points where the tracks of the company cross a steam railroad watchmen shall be constantly employed at the joint expense of the company and the railroads. The company is to provide arc lights at all crossings of its line with steam railroads, the railroads to share the expense. The company shall also maintain arc lights at the intersections of its own lines.

All cars of suburban lines other than those of the new company operated into the city shall be manned by employees of the city company at the point of intersection. Passengers on such cars shall be subject to the conditions governing passengers on the company's own cars and enjoy the same privileges as such passengers. The suburban companies shall be paid 1 cent for each passenger turned over to the Kansas City company, and the Kansas City company shall pay the suburban companies 1 cent for each passenger turned over to them.

Except between the hours of 6:30 a. m. and 9 a. m., and 4:30 p. m. and 7 p. m., the company shall receive and transport all cars of suburban lines carrying freight, charging for this service the actual cost of such transportation, plus 10 per cent. The right is also reserved to the company to carry light freight and parcels over its own lines, such service, however, not to interfere with the regular passenger traffic.

The company shall contribute to the cost of the Twelfth Street viaduct, assuming the responsibility for certain costs, such costs, however, not to exceed $1,315,000. The right is reserved to the city to make and enforce such police regulations as shall be reasonably necessary to secure adequate and sufficient accommodations to the public.

All cars hereafter placed in operation shall have center aisles, are to be without running boards, and shall have cross seats facing forward, except two longitudinal seats with a capacity for four passengers each, which may be

used at the ends of the cars. At least 50 cars shall be acquired and placed in service within one year from the passage of the grant. The speed of cars within limits clearly defined shall not be more than 15 m.p.h. Outside the city limits the speed shall not be more than 20 m.p.h. Cars shall be operated according to a schedule given in detail in the ordinance.

The terms of the ordinance giving the city the right to purchase the property of the company and governing the price to be paid by the city follow:

"Section 28. 'The companies' by the acceptance of this ordinance, shall and do grant to the said city, and the said city hereby reserves to itself the right upon the first day of June or upon the first day of December of each and every year after Jan. 1, 1945, upon giving at least six months' notice in writing of its intention so to do, to purchase and take over the entire street railway system and properties of 'the companies' then existing.

"In case the city shall purchase and take over the street railway system of 'the companies' as in this ordinance provided, then it shall pay for the same the actual value thereof as the same may be agreed upon by the city and 'the companies' at the time of the purchase, and in the event of disagreement, then for such price as the Circuit Court of Jackson County may adjudge to be the just and fair valuation thereof (excluding franchise value) after a fair judicial examination of the question as in ordinary and usual procedure in said court, saving to both parties hereto the right of appeal from such finding and vesting said Circuit Court and Appellate Courts with full authority to hear and determine the same, and authorizing and empowering said court to enter such judgment as will effectuate the purpose of this agreement.

"In the event that it shall be determined that the city is at the time this ordinance is passed or at the time this ordinance takes effect without lawful power or authority to acquire, own or operate street railways under the provisions of this ordinance or otherwise in any one or more of the cities in this ordinance referred to, and the city of Kansas City, Mo., shall thereafter acquire such power or authority, thereupon and after such acquirement the city shall have the right to purchase, acquire and operate said street railways, rights and property under the provisions of this ordinance to the same extent and in the same measure as if said city had full right and lawful authority so to purchase, acquire and operate said street railways, rights and property at the date of the passage of this ordinance and on the date when this ordinance takes effect.

"The city shall have the right to elect whether it will take the entire street railway system, including the property located in Missouri, as well as the property located in Kansas, or in lieu thereof, it may elect to purchase only the lines and property located in the State of Missouri. Any appraisement shall only include the lines and properties which the city so elects that it shall purchase, but it is stipulated and agreed that the Missouri lines and properties if purchased must be taken as a whole, if at all, and that the Kansas lines and properties, if included, must be taken as a whole, if at all."

Transit Affairs in New York

The Brooklyn Rapid Transit Company has discussed informally with the Public Service Commission a plan for improvements to the lines of the company which involves the expenditure of $50,000,000. Briefly summarized, this plan proposes the following:

To equip and operate the Fourth Avenue subway.

To extend its Fifth Avenue elevated line, as an elevated road, to Fort Hamilton.

To elevate its West End line from Coney Island to Eighteenth Avenue, and to depress the tracks from that point north to Forty-third Street, where they will run into the Fourth Avenue subway.

To elevate its Sea Beach road from Coney Island to the point where it joins the West End line.

To elevate its Culver line for its entire length.

To extend its Brighton Beach division by subway to Flatbush Avenue and Fulton Street, and thence via the Fourth Avenue subway, the Manhattan Bridge and the Canal Street subway in Manhattan, to a loop at the North River.

To third-track its Fulton Street elevated line.

To third-track its Lexington Avenue elevated line.

To third-track its Broadway elevated line.

To make various extensions to its elevated system in the Eastern District with a view to furnishing the East New York and Ridgewood sections with a much better transportation service than now exists.

The Board of Estimate has sent a recommendation to the Public Service Commission for an experimental moving sidewalk line under Thirty-fourth Street between Second Avenue and Ninth Avenue. The commission subsequently announced that it did not favor trying the plan on north and south thoroughfares for fear that it might interfere with contemplated subway extensions.

To carry on its work next year and perform the duties prescribed under the law of 1907, the Public Service Commission has laid before the Board of Estimate and Apportionment a requisition for $1,093,274. For special purposes the sum of $58,300 is asked, and $25,000 for contingencies, but apart from the regular maintenance charges the bulk of the total, amounting to $931,994, is to be apportioned to the head which includes executive, engineering, statistics, franchises, gas and electricity, legal and transportation bureaus, salaries and disbursements, including stationery, library supplies, printing, maps, plans and engineering supplies. The total to be provided by the Board of Estimate does not, however, cover the entire cost of the commission, as the salaries of the members of the commission, their counsel and secretary are paid by the State.

The Public Service Commission has issued to the Interborough Rapid Transit Company a permit to begin the work of lengthening the platforms in the subway, for which the Board of Estimate recently authorized an issue of bonds to the extent of $1,500,000.

Philadelphia Transit Talks

Transit Talk No. 30, of the Philadelphia (Pa.) Rapid Transit Company was published on Nov. 9, 1909. It was entitled "Connections With Outside Lines," and was introduced with a brief statement about Philadelphia being the terminal of 12 interurban lines, all of which connect with the lines of the Philadelphia Rapid Transit Company. A list of junction points followed with instructions about reaching them. As an addition to the talk proper, a statement containing less than 100 words was published about the company's new freight service.

Talk No. 31 was published on Nov. 11, 1909. It was entitled "Street Railway Fare Increases," and contained extracts from the announcements of the Hartford & Springfield Street Railway and the Tacoma Railway & Power Company regarding increases in fare on their lines, the original statements of which companies have been published in full in the Electric Railway Journal. This talk was also supplemented with a reference to the company's freight service.

Talk No. 32 was dated Nov. 16, 1909. It was entitled "Our Schedule System," and was written to convey an idea of the schedule system and to show the effort that is made to distribute cars equitably.

Talk No. 33 was dated Nov. 18, 1909. It was entitled "The Most Transportation for the Least Money." The talk follows:

Twenty-four per cent of Philadelphia's population—360,000 people—must ride three miles to reach the center of the city.

Thirty-five per cent—525,000 people—must ride four miles or more.

Twenty per cent—300,000 people—must ride five miles or more.

Fifty-nine per cent—885,000 *people, or nearly three-fifths of the city's population*—are so distributed that they must ride from three to ten miles to arrive at Market Street east of Broad.

This distribution of population is based upon a careful analysis of ward population by the city statistician.

These figures explain why we must maintain so many long-distance routes—a greater number, in fact, than any other traction company in the world.

The figures also prove that 5 cents buys more transportation here than in any other city.

Some wards having the largest population are on the outskirts of the city. The Twenty-second, for example, with 70,000 residents—the largest ward in point of population—is located five miles north of Market Street and extends to a point 10 miles north. The Twenty-third Ward, with 35,000 population, is equally remote. And travel from these wards to the central section is consistently heavy.

It is true that all passengers on our cars are not traveling to the central district all of the time. Some ride further, many travel a shorter distance.

But all of the people must have facilities for reaching the center of the city at all times. And in a given period practically the entire population does visit the central district.

These facts indicate a high average length of ride—higher here than elsewhere, just as our average length of route (11½ miles) is greater than the average in other cities.

And, of course, the higher the average length of ride the more transportation there is given for the rider's 5 cents.

Talk No. 34 was dated Nov. 22, 1909. It was entitled "No Passengers on Front Platforms," and referred to the necessity for enforcing the rule of the State Railroad Commission prohibiting passengers from riding on front platforms. The talk follows:

We have been ordered by the State Railroad Commission to enforce its mandate that passengers shall be excluded from the front platforms of our cars.

We believe that the rule is a good one and we have been endeavoring to enforce it so far as consideration for the wishes of the traveling public permitted.

The Railroad Commission now orders that the rule be enforced at all times, under all circumstances, and whether the public likes it or not. In justification of this position, Commissioner Ewing says:

"The safety of the public demands that this rule shall be rigidly enforced. I want to make it plain that the rule is to benefit the public, and not the company. Where it might result in some inconvenience and disorder, it is better to have the inconvenience and disorder at the start than danger of accident."

In accordance with the commission's instructions, beginning Wednesday, Nov. 24, both front gates of our cars will be closed, and passengers will not be allowed to stand on or to enter or leave the cars by the front platform. This rule does not, of course, apply to pay-within cars, which will be operated as heretofore.

Talk No. 35 was dated Nov. 25, 1909. It was entitled "Keeping Our Equipment Up to the Mark." The talk follows:

Eternal vigilance is the price of safety. That is why we keep an inspection force of 530 men eternally vigilant.

These men must make sure that each of our 2000 cars is in perfect working order every time it goes out on a run. To insure rigid inspection, the work is supervised by four deputy inspectors, two visiting deputy inspectors and one chief inspector.

All cars receive thorough inspection at the barns each day when they complete their runs. This applies to all mechanism, and also to the car bodies.

Motors and trucks are lubricated daily. For this purpose we use about 2600 gal. of oil and 5000 lb. of gear lubricant per month.

When cars are in service the inspection is all the more exacting. Our motormen constitute an auxiliary inspection force. If a motorman says his car is not running the way he thinks it ought to run, it is taken off the line immediately for barn inspection, even if no defects are apparent.

Motormen are required to make daily reports at their barns about the condition of all cars. The barn superintendents and district inspectors in turn forward reports each day to the chief inspector, thus keeping the operating department fully informed.

And we carry precaution to a further point. Our inspection system requires that each car pass through the shop once in eight weeks for a complete overhauling, even though it may appear to be in satisfactory running order.

It is this "eternal vigilance" that keeps our cars up to the standard of efficiency shown last month, when two of our barns made perfect reports. This means that they had not a single car withdrawn from service because of mechanical defects. *And the least favorable showing was that of a barn which reported trouble with the mechanism of only one car out of every 250 operated.*

Program of Meeting of Central Electric Accounting Conference

The Central Electric Accounting Conference announced the following program for the meeting of the conference at the Algonquin Hotel, Dayton, Ohio, on Dec. 11, 1909:

Business session, 1 p. m.

Report of committee on uniform practice in the treatment of car miles and car hours, with abstract of proceedings of the Denver convention, by S. C. Rogers, chairman.

Paper: "Conductors' Fare Collections," by Chas. E. Thompson, auditor of the Chicago & Milwaukee Electric Railroad.

Paper: "Accounting Features of Corporation Tax Law," by C. D. Gault, auditor of the Mahoning & Shenango Railway & Light Company.

Election of officers.

Adjournment.

Decision Defining Powers of Public Service Commission

In a decision handed down on Dec. 7, 1909, the Court of Appeals of New York holds that the Legislature did not intend that the Public Service Commissions should substitute its judgment and discretion for that of the directors and stockholders of a corporation as to the wisdom of a transaction; that a statute that should make such substitution would probably be unconstitutional, for the ownership of property carries with it the right of occupancy and management, and a statute that would deprive an owner of that right would undermine his right to protect and make his property remunerative.

The Public Service Commission of the Second District of New York on Dec. 7, 1908, refused assent to the issue by the Delaware & Hudson Company of bonds to pay indebtedness incurred by the purchase of the securities of the Hudson Valley Railway amounting to $4,665,295.85, and a part of the indebtedness incurred in the purchase of undeveloped coal lands in Pennsylvania amounting to $2,500,000. The properties in question were not included in the mortgage upon the property of the Delaware & Hudson Company under which it was proposed to issue these bonds. The property was acquired prior to the commission coming into existence. An appeal was taken by the Delaware & Hudson Company and on Sept. 30, 1909, the Appellate Division of the Third Department annulled and set aside on certiorari the order of the commission which refused assent to the bonds in question.

The Court of Appeals in its opinion holds that the paramount purpose of the Public Service Law creating the commission was the protection and enforcement of the rights of the public in that the commission must simply see to it that the railroads maintain their equipment, tracks and roadbed in good order and operate with safety to the public and give proper service, and that they should also supervise the issuance of securities so as to protect the public against over-capitalization.

Plans for Elevated Extension Filed in Boston.—The Boston (Mass.) Elevated Railway has filed detailed plans of its elevated extension from Sullivan Square to Malden and Everett, with the Railroad Commission.

Reduced Fare Ordinance for Passengers Who Stand Passed in Houston.—The City Council of Houston, Tex., has passed an ordinance which provides that a fare of only 3 cents shall be collected from passengers in street cars operated in Houston who are not provided with seats.

New Franchise Drawn in Des Moines.—The City Council of Des Moines, Ia., passed a resolution on Nov. 15, 1909, instructing the legal department of the city to prepare a draft of an ordinance to conform to a tentative agreement entered into between the City Council and the Des Moines City Railway. Such a draft has since been completed, and is being printed for distribution.

Franchise Tax Suits Before New York Supreme Court.—The Appellate Division of the Supreme Court of New York has granted a motion by Attorney-General O'Malley for the designation of a special term of the Supreme Court to hear suits brought by the Attorney-General to collect special franchise taxes from a number of corporations. The cases will begin in the January term.

Wisconsin Electrical Association to Meet in Milwaukee in January.—The next meeting of the Wisconsin Electrical Association, which is a consolidation of the Northwestern Electrical Association and the Wisconsin Electric & Interurban Railway Association, will be held at the Hotel Pfister, Milwaukee, Wis., on Jan. 19 and 20, 1910. The program for the meeting is now being arranged.

Suit to Annul Contract Between City and Company in Philadelphia Appealed.—An appeal has been filed in the Supreme Court from the recent decision of Common Pleas Court No. 1 in dismissing the taxpayer's suit brought by Elmer E. Brode attacking the validity of the contract between the City of Philadelphia and the Philadelphia Rapid Transit Company. The appeal will probably be argued in January.

Suit to Annul Franchise in Beaumont.—The city attorney of Beaumont, Tex., has filed suit in the District Court to forfeit the several franchises under which the Beaumont Traction Company operates in Beaumont, alleging failure on the part of the company to comply with conditions of the franchise by properly constructing the track on concrete foundation and failure to operate cars in accordance with the schedule defined in the franchise.

Submission of San Francisco Plan to Voters.—The Council of San Francisco has decided that the vote on the question of the reconstruction of the Geary Street, Park & Ocean Railroad by the city and the building of an extension in Market Street from Geary Street to the Market Street ferry shall be taken on Dec. 30, 1909, and that the amount of bonds to be authorized to cover the cost of the work shall be $2,100,000.

Canadian Paving Decision.—The Ontario Railway & Municipal Board has decided that the Dominion Power & Transmission Company, Ltd., Hamilton, Ont., is required to pave and keep in repair the streets over which it operates street railways for 2 ft. outside of the rails. The decision involves about $2,500, and the settlement of the disputed question. The company contended that the city should make the repairs and collect the cost from the company. The case will be appealed.

Council of Toronto Favors Subway Proposal.—The City Council of Toronto has decided to adopt the report and recommendation of the special civic committee dealing with the proposed subway, mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 4, 1909, page 1163, and at the municipal election in January the electors will be asked if they favor the city obtaining the necessary legislative authority to construct and operate a municipal subway and surface railway subject to the approval of the qualified ratepayers.

Consideration of Providence Tunnel Indefinitely Postponed.—C. S. Mellen, president of the New York, New Haven & Hartford Railroad, in a letter dated Nov. 23, 1909, addressed to Charles R. Makepeace, Providence, R. I., has declined to enter into any further conferences with the members of the city committee on the East Side approach in Providence and declared that as far as he is concerned the proposition of an East Side tunnel is indefinitely postponed. He charges that the committee has broken faith with him, and that it has declined for a second time to abide by a definite understanding made between that body and the railroad. It was originally agreed that the city should secure the necessary legislation, furnish the capital, obtain the right-of-way and own the tunnel, but that the construction work should be done by the Rhode Island Company under the supervision of one of its own engineers and an engineer to be appointed by the city.

Financial and Corporate

New York Stock and Money Market

December 7, 1909.

The activity and strength of the Wall Street maket to-day were centered largely in the Interborough-Metropolitan issues, the persistent buying of which indicates confidence in the reorganization plans and in the earning capacity of the properties. Both the preferred and the common reached new records to-day, the former selling at 61¾ and the latter at 25¾. Brooklyn Rapid Transit has also been moderately active and has recorded small gains. Third Avenue has been weak and lower, selling to-day for 15¼. This is as low as it has sold this year.

The money market continues easy. Quotations to-day were: Call, 4½ to 5 per cent; 90 days, 4¾ per cent.

Other Markets

In the Philadelphia market transactions have been fairly numerous and the price has improved more than 2 points. Other tractions with limited activity have been unchanged.

There has been little trading in traction shares on the Chicago market. Subway reached new low records, but the appointment of receivers has checked activity.

In Boston, Massachusetts Electric has been less active than during the past few weeks, although the tendency is still downward. The preferred has lost 2 points during the week. Other traction issues have been out of the market.

In Baltimore, the bonds of the United Railways continue to be active at prices practically unchanged.

In last week's auction of securities in New York the following were sold: 30 shares Christopher & Tenth Street Railroad, at 88½; 45 shares Forty-second Street & Grand Street Ferry Railroad, at 220; 51 shares Twenty-third Street Railway, at 201½; $3,000 Second Avenue Railroad first consolidated 5 per cent bonds, at 70½, and 250 shares St. Louis Car Company, $50 for the lot.

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

	Nov. 30	Dec. 7
American Railways Company	a45¼	a45½
Aurora, Elgin & Chicago Railroad (common)	a49¾	a60
Aurora, Elgin & Chicago Railroad (preferred)	*92	a92½
Boston Elevated Railway	a131	a130
Boston & Suburban Electric Companies	a18	a16
Boston & Suburban Electric Companies (preferred)	a76¾	75½
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a50	a50
Brooklyn Rapid Transit Company	77½	82½
Brooklyn Rapid Transit Company, 1st pref., conv. 4s	85⅞	88
Capital Traction Company, Washington	a133½	a133½
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*2	*2
Chicago & Oak Park Elevated Railroad (preferred)	*10	*10
Chicago Railways, ptcptg., ctf. 1	a100	a100
Chicago Railways, ptcptg., ctf. 2	a32¾	a31
Chicago Railways, ptcptg., ctf. 3	a20	a21
Chicago Railways, ptcptg., ctf. 4s	*10	*10
Cleveland Railways	*84	*84
Consolidated Traction of New Jersey	a77½	a76½
Consolidated Traction of New Jersey, 5 per cent bonds	a107	a106
Detroit United Railway	*60¼	*65
General Electric Company	159¼	160
Georgia Railway & Electric Company (common)	100	a101
Georgia Railway & Electric Company (preferred)	87	87
Interborough-Metropolitan Company (common)	22¾	25⅝
Interborough-Metropolitan Company (preferred)	54¾	61¾
Interborough-Metropolitan Company (4½s)	82⅞	84⅜
Kansas City Railway & Light Company (common)	a38½	a38½
Kansas City Railway & Light Company (preferred)	*82	*82
Manhattan Railway	139½	*140
Massachusetts Electric Companies (common)	a16	a16
Massachusetts Electric Companies (preferred)	a78⅞	a76
Metropolitan West Side, Chicago (common)	a17	a17
Metropolitan West Side, Chicago (preferred)	a52½	a52
Metropolitan Street Railway	a24	a23
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	78	82¾
Northwestern Elevated Railroad (common)	a18	a18
Northwestern Elevated Railroad (preferred)	a68	a68
Philadelphia Company, Pittsburg (common)	a48¾	a49¾
Philadelphia Company, Pittsburg, (preferred)	a44½	44
Philadelphia Rapid Transit Company	25⅞	25⅞
Philadelphia Traction Company	89	a90
Public Service Corporation, 5 per cent. col. notes	*100⅛	*100⅛
Public Service Corporation, ctfs	a105	a100¼
Seattle Electric Company (common)	a117	a117
Seattle Electric Company (preferred)	a104	a104
South Side Elevated Railroad (Chicago)	a53	a52
Third Avenue Railroad, New York	18¾	16
Toledo Railways & Light Company	*8	*8
Twin City Rapid Transit, Minneapolis (common)	109½	113
Union Traction Company, Philadelphia	52¼	a54
United Rys. & Electric Company, Baltimore	a14	a14⅜
United Rys. Inv. Co. (common)	40	41
United Rys. Inv. Co. (preferred)	*72½	72¾
Washington Ry. & Electric Company (common)	a44	a42¾
Washington Ry. & Electric Company (preferred)	a91	a91⅛
West End Street Railway, Boston (common)	93	a93⅛
West End Street Railway, Boston (preferred)	104¼	a106
Westinghouse Electric & Manufacturing Company	83	84
Westinghouse Elec. & Mfg. Company (1st pref.)	*140	135

a Asked. * Last Sale.

Decision of Public Service Commission Regarding Issue of Bonds by the Coney Island & Brooklyn Railroad

Mention has been made of the decision of the New York Public Service Commission, First District, approving in part the application of the Coney Island & Brooklyn Railroad for authority to issue $372,000 additional consolidated mortgage bonds. The opinion was written by Commissioner Bassett and says in part:

"This is an application for an order authorizing the issuance of $372,000 of 4 per cent bonds, to be sold at 80 in order to realize $297,000 which the company submits is the estimated cost of reconstruction of its railroad in Franklin Avenue and DeKalb Avenue, Brooklyn, the relaying of its present rail in Smith Street and the paving of all three streets.

"The mortgage to an authorized amount of $10,000,000 was consented to by the former Board of Railroad Commissioners by an order entered Dec. 14, 1904, and by that order the company was directed before issuing any bonds under such mortgage beyond $5,500,000 to make application to the Board of Railroad Commissioners for its approval. Bonds to the amount of $5,500,000 have been issued as follows:

"1. $2,000,000 to be held by the trustee to retire in 1948 a like amount of bonds of the Coney Island & Brooklyn Railroad.

"2. $2,000,000 to be held by the trustee to retire in 1939 a like amount of bonds of the Brooklyn City & Newtown Railroad.

"3. $1,500,000 issued and sold.

"The company shows upon the application that the directors have by resolution declared that in their judgment the betterment proposed under this application ought not to be charged as expense of operation.

"The figures and estimates submitted by the company as to the cost of this work have been carefully examined by the engineers of the commission and a report made, and it is apparent that the company's estimate is probably not much, if any, in excess of the probable necessary cost. It is, however, shown that the larger portion of the work proposed to be done is replacement of structure and material, and that only a portion thereof, estimated to be about $85,000 in cost, can be regarded as an improvement or betterment. If new track of the same weight as the old were laid, and in the same manner substantially as the old, then the whole would be a replacement, but to such extent as the present track is heavier and laid in a better and more expensive manner, such excess over mere replacement should be treated as a betterment. The commission is of the opinion that replacements should not, except possibly in extraordinary cases, be made with the authority of the commission from the proceeds of bond issues, but that depreciation in perishable structures and property should be provided for and made good out of the earnings of the venture. The result of providing for the replacement of worn out and perishable property by constant issues of new stock or new bonds of public service corporations has been shown to be a constantly increasing capitalization representing a constantly decreasing property and equipment, resulting in false statements by public service corporations as to their assets in public reports and in reports to stockholders, which have been misleading and damaging. This subject has been carefully considered in an opinion of the Public Service Commission of the Second District entitled: 'Matter of Application of Niagara Light, Heat & Power Company, decided June 29, 1909,' and the practice of capitalizing replacements of property or equipment of public service corporations has been disapproved.

"The commission is therefore of the opinion that bonds should be authorized to be issued by the company upon this application only so far as may be necessary to pay for the $85,000 of betterments and improvements which are included in this work proposed to be done. The 4 per cent bonds, however, proposed to be issued are not first mortgage bonds, but consolidated bonds, and testimony has been introduced which tends to show that at this time they cannot be sold at a price in excess of .80.

"It is accordingly recommended that an order be made authorizing the issue of not exceeding $107,000 of such bonds which shall be sold at not less than .80 and net the company $85,000, the proceeds to be applied only to pay for the said betterments and improvements in carrying out this work, and the discount and expenses in connection with the sale to be distributed over the term of the bonds and charged against the income of the company. The order should also contain a proper provision for audit by the commission."

The commission adopted an order in accordance with the recommendations of Commissioner Bassett.

Modified Reorganization Plan Filed for Third Avenue Railroad

The committee of bondholders of the Third Avenue Railroad, New York, N. Y., has filed a modified plan of reorganization with the Public Service Commission of the First District of New York, the commission having disapproved the original plan for reorganizing the company. It is proposed to assess stockholders 45 per cent on the $16,000,000 stock, and they in exchange will receive $45 in new stock and $40 in first refunding mortgage 50-year 4 per cent gold bonds. Securities of the old company, stocks, bonds and notes are stated at $65,088,737 and new securities at $79,125,000, of which only $54,916,000 would be immediately issued, the balance being in reserve until receiving approval of the commission. The new securities to be issued sum up as follows:

First refunding mortgage 50-year 4 per cent gold bonds, dated Jan. 1, 1910, as follows: To present bondholders, being 15 per cent of principal and 10 per cent in payment of unpaid interest, $9,390,000; to stockholders, on payment of $45 per share, $6,400,000, making immediate issue, $15,790,000; to be reserved for underlying bonds and future extensions, betterments, etc., $24,210,000, making total authorized issue $40,000,000.

Adjustment mortgage 50-year 5 per cent income gold bonds, dated Jan. 1, 1910, to present bondholders 60 per cent of principal, $22,536,000. Holders of the adjustment mortgage bonds are to have full voting powers upon all questions upon which stockholders may vote until full interest, including accumulations, is paid for five consecutive years, and the bonds shall be redeemable at par and interest in whole, but not in part, at any time on three months' notice.

The securities thus proposed compare with present securities as follows:

Obligations of old company, exclusive of first mortgage, $5,000,000; prior claims, $7,200,000; bonds, $41,888,737; stock, $16,000,000; total, $65,088,737.

Obligations of the new company, exclusive of first mortgage, will be: Refunding bonds, $15,790,000; adjustment bonds, $22,536,000; stock, $16,590,000; total, $54,916,000; reduction, $10,172,737.

It is proposed by the bondholders that a new railroad be formed under provisions of sections 9 and 10 of the stock corporation law, and to vest in it ownership or control of all properties as acquired by the committee at foreclosure sale or otherwise, except so far as the stocks may be dealt with in effecting the plan.

The Public Service Commission has ordered a hearing on Dec. 15, 1909, on a plan of the bondholders' committee for the reorganization of the company. Wm. R. Willcox, chairman, and Milo R. Maltbie, of the commission, will preside.

Hearing on Increase of Capital of Boston & Worcester Street Railway

The Massachusetts Railroad Commission gave a public hearing on Dec. 1, 1909, on the petitions of the Boston & Worcester Street Railway for authority to issue new stock to the amount of $500,000 and additional bonds to the amount of $500,000. William M. Butler, president of the company, stated that the company's total assets on Nov. 1, 1909, were $4,960,728. The principal items were track and roadway, $2,484,648; overhead line construction, $333,706; power and substation equipment, $634,338; rolling stock and miscellaneous equipment, $391,125; electrical equipment of latter, $272,720; engineering, interest, etc., about $600,000. George A. Butman, treasurer of the company, submitted a statement showing that the working capital required for the last two years amounted to $191,256. Mr. Butler stated that the company desired to undertake an express business in the territory which it served. The line from Boston to Worcester was nearly all double-tracked. It was estimated that six freight cars would handle the business at the start between the terminus of the lines of the Worcester Consolidated Street Railway and the Boston Elevated Railway. At present the company was handicapped by the difficulty of securing the right to carry freight at the Boston and the Worcester ends of its line. The company was considering the plan of handling the express matter by automobile trucks after it left its own system, six trucks being estimated as necessary for the work. In order to handle the business properly Mr. Butler said that the company would have to build the following freight stations: Chestnut Hill, cost, $10,000; Natick, $2,500; South Framingham, $5,000; White's Corner, Westboro and Shrewsbury, $500 each; Lake Junction, $2,500; Hudson, $3,000, and Marlboro, $5,000. At Chestnut Hill about $6,000 would have to be expended in grading, and tracks and overhead work would cost at that point $5,000 additional. The company does not desire to begin the new service until the business is in good condition, and would probably not do any construction work before the spring of 1910. The board took the matter under advisement.

Boston & Northern Street Railway, Boston, Mass.—The Boston & Northern Street Railway and the Old Colony Street Railway have petitioned the Railroad Commission of Massachusetts for authority to issue bonds to the amount of $300,000 for each company to refund floating indebtedness. A hearing on the matter will be held on Dec. 14, 1909.

Brockton & Plymouth Street Railway, Plymouth, Mass.—The Brockton & Plymouth Street Railway has petitioned the Railroad Commission of Massachusetts for authority to issue new bonds to the amount of $35,000 to refund floating debt.

Cape Electric Tramways, Ltd., Cape Town, S. A.—The report of the directors of the Cape Electric Tramways, Ltd., presented at the thirteenth annual meeting in London on Nov. 16, covers the year ended June 30, 1909. The number of passengers carried in Cape Town was 11,888,180, as compared with 14,742,155 in the preceding year; the number of car-miles run was 1,874,802 in the last year, as compared with 2,185,103 in the previous year; the total receipts from traffic amounted to $588,570, as compared with $604,545 in the previous year. In Port Elizabeth the gross receipts were $157,275 last year, as compared with $187,235 in the preceding year; the number of passengers carried was 2,978,217 and 3,561,211 in the last year and preceding year, respectively. The total dividends declared by the subsidiary companies aggregated $235,145, as compared with $230,405 in the previous year.

Eastern Ohio Traction Company, Cleveland, Ohio.—The Cleveland & Chagrin Falls division of the Eastern Ohio Traction Company has been ordered sold by Judge Phillips, of the Common Pleas Court at Cleveland. The court was informed that the first mortgage bondholders purpose to bid in the property, and if that is accomplished they will form a new company to operate the line.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway under foreclosure of the $1,600,000 second mortgage has been set for Feb. 1, 1910. The amount found to be due for principal and interest is $1,676,933.

Illinois Tunnel Company, Chicago, Ill.—Judge C. C. Kohlsaat in the United States Circuit Court has appointed receivers for the Illinois Tunnel Company and the Chicago Warehouse & Terminal Company, controlled by the Chicago Subway Company. David R. Forgan, president of the National City Bank, and Charles G. Dawes, president of the Central Trust Company of Illinois, were named receivers for the Illinois Tunnel Company. Edwin A. Potter, president of the American Trust & Savings Bank, was made receiver for the Chicago Warehouse & Terminal Company.

Irwin-Herminie Traction Company, Irwin, Pa.—The Irwin-Herminie Traction Company has increased its capital stock from $100,000 to $125,000.

Massachusetts Electric Companies, Boston, Mass.—The Massachusetts Electric Companies has made public its report for the year ended Sept. 30, 1909. The operating statement for the year compared with the previous year, follows: Gross earnings for 1909, $8,052,355, as compared with $7,809,010 for 1908; operating expenses for 1909, $5,148,396, as compared with $5,001,517 for 1908; net earnings for 1909, $2,903,958, as compared with $2,807,492 for 1908; fixed charges for 1909, $1,778,128, as compared with $1,784,437 for 1908; balance for 1909, $1,125,829, as compared with $1,023,054 for 1908; dividends for 1909, $1,000,464, as compared with $880,773 for 1908; surplus for 1909, $125,365, as compared with $142,281 for 1908.

Metropolitan Street Railway, New York, N. Y.—G. E. Tripp has been elected chairman of the joint committee on reorganization of the Metropolitan Street Railway constituted by representatives of the bondholders' committee of the general 5 per cent bonds and the refunding 4 per cent bonds, to succeed the late John W. Castles. In a memorandum filed in the United States Circuit Court, Judge Lacombe says that the special master in charge of the New York City Railway has up to the present time passed on claims aggregating $3,000,000, which are presumably substantial, but there are still a number of claims which were filed long ago which have not yet been approved or passed upon. Judge Lacombe also says that the same special master has before him other claims against the receivers of the Metropolitan Street Railway presented by the Third Avenue Railroad, Fifty-ninth Street Crosstown Railway,

and Second Avenue Railroad, which over a year ago took back their property. Concluding the memorandum, Judge Lacombe says: "It is suggested to all parties in interest and claimants and their respective counsel, that the court does not regard the receivership of this group of roads as perennial. The Supreme Court has indicated that the judicial administration should cease at the earliest possible moment."

Ocean Shore Railway, San Francisco, Cal.—J. Downey Harvey, president of the Ocean Shore Railway, is quoted as follows regarding the reorganization of the company: "We have overcome every obstacle; 80 per cent of the bondholders has already turned in their holdings and as soon as the new company is incorporated will receive the bonds of that company in lieu of the previous issue. We fixed Nov. 10, 1909, as a final date for the receipt of the old bonds in order that the reorganization committee might determine definitely whether the plan was feasible. That has now been demonstrated and no restrictions are placed on those who still desire to turn in their bonds."

Ohio Electric Railway, Cincinnati, Ohio.—The Ohio Electric Railway reports earnings for the year ended June 30, 1909, as follows: Railway, $2,555,321; light and power, $198,-397; miscellaneous, $21,888; total, $2,775,607. The earnings of the Indiana, Columbus & Eastern Traction Company for the year follow: Railway, $967,063; miscellaneous, $6,-274; total, $973,338. The earnings of the Columbus, Newark & Zanesville Electric Railway for the year follow: Railway, $622,704; light and power, $76,760; miscellaneous, $9,-339; total, $708,805. The earnings of the Lima Electric Railway & Light Company for the year follow: Railway, $135,048; light and power, $121,637; miscellaneous, $896; total, $257,581. The earnings of the Cincinnati, Dayton & Toledo Traction Company for the year follow: Railway, $501,036; miscellaneous, $3,047; total, $504,084. The earnings of the Ft. Wayne, Van Wert & Lima Traction Company for the year follow: Railway, $211,174; miscellaneous, $1,434; total, $212,608.

Springfield (Mass.) Street Railway.—The Railroad Commission has approved the petition of the Springfield Street Railway and the Western Massachusetts Street Railway for permission to consolidate and has authorized the Springfield Street Railway to increase its stock by the issue of not more than 5500 shares, to be exchanged share for share for the outstanding stock of the Western Massachusetts Street Railway.

Toledo & Indiana Railway, Toledo, Ohio.—The property of the Toledo & Indiana Railway was sold under foreclosure on Nov. 27, 1909, by C. F. M. Niles, receiver, to J. M. Longnecker, Delta, Ohio, and associates, minority stockholders, for $1,006,000. A bid of $1,004,500 was made at the sale in the interest of the Ohio Electric Railway, and after the sale D. J. Cable notified Mr. Niles of the willingness of the Ohio Electric Railway interests to pay $1,056,000 for the property, accompanying the offer with a check for $50,000 as a guaranty of good faith. The offer was filed with the court with the master's report and will be considered when the sale comes up for confirmation.

United Railways, Portland, Ore.—The following new board of directors has been elected by the United Railways: P. L. Greenough, A. E. Emmon, L. B. Wickersham, F. E. Bowman, Portland; J. H. Hilbert, Ohio; Chas. D. Pullen, Seattle. Following the election of the new directors, T. L. Greenough was re-elected president; Chas. D. Pullen was elected vice-president to succeed Jos. E. Healy; A. C. Emmons was elected secretary, and L. B. Wickersham was retained as general manager.

Westchester Street Railroad, White Plains, N. Y.—The Westchester Street Railroad was incorporated at Albany on Dec. 1, 1909, with a capital stock of $1,000,000 in the interest of the New York, New Haven & Hartford Railroad as the successor of the Tarrytown, White Plains & Mamaroneck Railway, sold under foreclosure as noted in the Electric Railway Journal of Nov. 13, 1909, page 1038. The directors of the company are: Richard Sutro, William Greenough, Charles M. Sheafe, Jr., William L. Barnett, John L. Anderson, Frank F. Hall and Edward O. Brown, New York, N. Y.; John G. Parker and August S. May, New Haven, Conn.

Worcester & Blackstone Valley Street Railway, Worcester, Mass.—The Railroad Commission of Massachusetts has approved the terms of consolidation of the Worcester & Blackstone Valley Street Railway with the Uxbridge & Blackstone Street Railway, and also an increase of the capital stock of the Worcester & Blackstone Valley Street Railway by an issue of shares not exceeding 1200, amounting at par to $120,000, to be issued for the purpose of carrying out the terms of contract. The stock of the Worcester & Blackstone Street Railway are to be issued share for share for the outstanding stock of the Uxbridge & Blackstone Street Railway.

Traffic and Transportation

Service in Pittsburgh

As a result of the study which it made recently of street railway operating conditions in Pittsburgh the Railroad Commission of Pennsylvania, through Nathaniel Ewing, its chairman, has made public the following statement regarding the effort made by the Pittsburgh Railways to meet the recommendations made by the commission in the spring of 1909 and abstracted in the Electric Railway Journal of March 20, 1909, page 528:

"Since the former recommendation of this commission the evidence that we have had leads us to the conclusion that there has been a considerable increase of travel on the street car lines of Pittsburgh, and in consequence it would follow that recommendations that were adequate at that time would hardly prove so to-day. At that time the commission's experts thought there was crowding of the cars on at least certain of the lines in the city to such a degree as demanded relief, and our own observation and experience since we have been here on this occasion, as well as the information which we have received from various reliable sources, convince the commission that there is such crowding of the street cars during the rush hours as naturally arouses the antagonism of the public and calls for immediate relief. In consequence of that the commission has been advising with the Pittsburgh Railways and the Mayor, informing them of the commission's opinion in this respect, and we have concluded that as a result of that conference no further testimony in this case is needed, and all that is required at present is for the commission to make a recommendation, which we are prepared to do now. That recommendation in brief is this:

"That the company put into immediate service all its available closed cars, suitable for the season, assigning the extra cars to those of their routes which seem the most crowded. That assignment to be subject to supervision and direction of an expert to be appointed by the commission, and in connection with that assignment the commission's expert shall also take up the question of a change in the routing of the different lines to ascertain what relief can be obtained in that way, and this work to be done as speedily as possible.

"Furthermore, if after the employment of all the cars now in control of the company it is found that the service is still inadequate the commission recommends that the company forthwith proceed to supply additional cars. It is understood that other cars have already been ordered, but have not yet been delivered. Some of them are expected in a short time. They are to be put into service as soon as they are received.

"When the expert to be appointed by the commission makes his report as to the adequacy of the service, what additional cars are yet needed and what changes, if any, can be made advantageously in the routes of the different lines, the commission will make a further recommendation embracing those points."

Subsequently the company issued a statement about general betterments to its system, in which it said in part:

"The company will put into operation at once 50 trail cars on the lines which are most crowded during the rush hours. To do this it will be necessary to pull two trailers with some motor cars to make up for others of the cars that have not sufficient motor capacity to pull one trailer. Grades on some lines prevent the operation of trailers.

"The company placed orders on June 10, 1909, with The J. G. Brill Company, Philadelphia, for 30 cars for city service, and later transferred to The Brill Company an order for 50 cars of the same type originally placed with another company. On June 8, 1909, the company placed an order with G. C. Kuhlman Car Company, Cleveland, Ohio, for 20 interurban palace cars for use on the suburban lines, the intention being thoroughly to remodel the present interurban cars for city service.

"The report of our inspectors at the car building shops shows that 18 of the interurban cars are in the paint shop and that the entire 20 will be ready for shipment to Pittsburgh within two weeks. The Westinghouse Electric & Manufacturing Company, which has the order for the electrical equipment for these cars, is also behind in shipment, so that all of the material for these cars will not be received in Pittsburgh before Jan. 1, 1910. The city cars will cost about $750,000.

"During the year drawing to a close the Pittsburgh Railways has expended about $2,000,000 for these new cars, the erection of subpower stations, additions to existing power plants, improvements and additions to car barns, laying and renewing roadbed, track and street paving throughout the

system. The power plant at Brunot's Island has been enlarged by the erection of a new building in which an additional 5000-kw turbo-generator and 6000 hp of boilers have been installed, and a large substation has been about completed at the south end of the Mount Washington tunnel to care for the traffic of the South Hills district. Two units of 1000 kw each have been installed in this substation, greatly reinforcing the power through the tunnel and on the hills beyond. This will insure greater speed, greater regularity of service, fewer delays and annoyances and greater comfort to the public.

"The action of the police department in securing authority from Councils to inaugurate a traffic squad to compel better observance of street traffic rules will aid materially in relieving congestion in downtown streets and will afford the company a better opportunity to operate its cars on schedule and take better care of the public. Regular automobile and carriage 'bus stands are maintained on the most crowded downtown streets, and many business men allow their automobiles to stand in front of their office buildings the entire day. This aggravates downtown congestion."

Report of Fort Wayne & Wabash Valley Traction Company's Employees' Association

The second annual report of the Employees' Mutual Benefit Association of the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind., was submitted at a recent meeting of the trustees of the association. The association organized with 352 members out of a total of 758 employees of the company, making 46 per cent of the employees members of the association. The membership of the association now numbers 627 out of a total of 804 employees, or 79 per cent. The report, which is for the year ended Oct. 1, 1909, shows that 160 members were disabled during the year. The amount paid during the year for sick benefits was $832; for accident benefits $850, and for death benefits $300. This makes the total paid for sick, accident and death benefits since the organization of the association $3,192. The statement of the receipts and expenditures for the year follows:

Receipts:		
Carried over from last report	$2,150	
Dues from members	3,576	
Interest on bank deposits	80	
		$5,806
Expenditures:		
Contributions returned	$5	
Accident benefits	832	
Sick benefits	850	
Death benefits	300	
		$1,987
Leaving balance on hand in treasury		$3,818

In addition to the above relief expenditures, the following amounts have been expended by the company:

Clerk hire	$420
Expenses on E. M. B. A. rooms	618
Books, printing, stationery, magazines, etc	85
Wages paid employees while attending meetings	67
	$1,190

The members of the association have elected the following as trustees: Noble Graham, Fort Wayne, shop department; M. B. Gouty, Fort Wayne, power house department; Arthur Johnston, Fort Wayne, maintenance of way department; Charles A. Beamer, Fort Wayne, transportation department; F. G. Hill, Logansport, transportation department; W. H. Stephens, Lafayette, transportation department, and Fred H. Schmidt, Fort Wayne, accounting department.

Record Traffic in Boston.—On Nov. 20, 1909, the day of the Yale-Harvard football game, the Boston (Mass.) Elevated Railway carried 1,400,000 people without an accident.

Massachusetts Company Seeks Freight Rights.—The Old Colony Street Railway, Boston, Mass., has petitioned the Railroad Commission of Massachusetts for authority to act as a common carrier of baggage and freight in the city of Quincy and the town of Weymouth.

Accidents in Fog in Chicago.—Eleven persons were injured in three collisions between cars in Chicago on the morning of Dec. 3, 1909, during a dense fog. Trains over the suburban steam roads operating into the city were from 10 minutes to 30 minutes late.

Portable Waiting Stations on Interurban Railway.—The Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind., has purchased more than 20 portable waiting stations from the Foster Lumber Company, Indianapolis, Ind., and will install them at various points along its line for the convenience of its patrons.

Extra Car Out of Dayton in the Evening.—As the cars of the Dayton & Troy Electric Railway leaving Dayton at 4:30 p. m. and 5:30 p. m. have been very heavily patronized recently, the company has put on an extra car, for 30 days, which leaves Dayton at 5 p. m. If patronage warrants the 5 p. m. car will be established permanently.

Express Service on Colorado Road.—The Denver & Interurban Railway, operating between Denver and Boulder, 30 miles distant, will soon establish an express service between the two cities with a stop only at Louisville Junction. The run will be made in 50 minutes, at an average of 40 m.p.h. This service will be in addition to the present hourly service.

Service Stripes in York.—Conductors and motormen in the employ of the York (Pa.) Railways have been wearing stars and stripes on their sleeves since Nov. 15, 1909, to designate the number of years they have been in continuous service. Conductors wear gold stars and stripes and the motormen silver ones. Each star indicates five years of service and each stripe indicates one year.

Pay-as-You-Enter Service in Columbus, Ohio.—Forty of the 70 cars in regular use on the main lines of the Columbus Railway & Light Company, Columbus, Ohio, are of the pay-as-you-enter type. A red board sign which is illuminated from behind by a red light at night has been adopted as a special marker to distinguish these cars, in addition to the sign on the side of the car.

Swastika Selected as Emblem by an Indiana Company.—The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., has adopted the Swastika, the Indian sign of good luck, as its official emblem, and has formed the points of the Swastika to represent the eight county seats reached by the lines of the company, namely, Ft. Wayne, Huntington, Wabash, Bluffton, Peru, Delphi, Logansport and Lafayette.

Tickets on a New Hampshire Line.—The Claremont Railway & Lighting Company, Claremont, N. H., which some time ago increased the unit of fare on its lines from 5 cents to 6 cents and subsequently made a special rate to workmen of 6 tickets for 25 cents, good in the morning and evening rush hours, has placed on sale ticket books which contain 20 tickets for $1, good for transportation at any time during the day. The cash fare, however, is still 6 cents.

Fare Readjustment Asked in Massachusetts.—A petition has been presented to the Railroad Commission of Massachusetts by residents of Hamilton for a re-adjustment of fares as follows on the Gloucester division of the Boston & Northern Street Railway: Hamilton to Essex, 5 cents; Hamilton to Ipswich, 5 cents; Hamilton to transfer station on Cabot Street, Beverly, 5 cents, and within the limits, Hamilton, 5 cents. A public hearing will be given on the matter.

Meeting of Central Electric Traffic Association.—At the meeting of the Central Electric Traffic Association held in Fort Wayne, Ind., on Nov. 29 and 30 and Dec. 1, the work of compiling divisions of through rates published in Joint Passenger Tariff No. 3 was completed. The next meeting of the association will be the regular annual session and will be held in Columbus, Ohio, on Jan. 27, 1910, the day previous to the annual meeting of the Central Electric Railway Association.

Freight Over Indianapolis-Louisville Line.—The Indianapolis & Louisville Traction Company has established a freight service between points on its line and Louisville, Ky. For the last two years the company has been unable to handle heavy shipments into Louisville on account of bridge conditions. Cards were used to announce the service, and on the backs of them the rates in effect between Louisville and points south of Seymour, Ind., were printed. The phrase for the service is, "Ship your goods via 'The Gateway Route.'"

Increase in Wages in Lincoln.—The Lincoln (Neb.) Traction Company has announced an increase in the wages of its employees of 1 cent an hour for first-year men, 1½ cents for second, third, fourth, fifth and sixth-year men, and 2 cents for all employees who have been in the service of the company more than six years. All of the men who have been in the employ of the company for 10 or more years will receive a uniform each year and will be permitted to wear one service stripe for each five years' service. The schedule of wages paid at present follows: First year, 19 cents per hour; second year, 20½ cents per hour; third year, 22½ cents per hour; fourth year, 22½ cents per hour; fifth year, 23½ cents per hour; sixth year, 24½ cents per hour; seven and one-half years and thereafter, 26 cents.

Hearing on Fenders and Wheel Guards in Washington.—The District Electric Railway Commission, Washington, D. C., granted the Washington, Alexandria & Mt. Vernon Railway and the Great Falls & Old Dominion Railway a hearing on the question of fenders and wheel guards on Nov. 24, 1909. On June 21, 1909, the Interstate Commerce

Commission, on recommendation of the District Electric Railway Commission, adopted a new regulation relative to fenders and wheel guards as used in the District of Columbia, the regulation to become effective on Nov. 1, 1909. The Washington, Alexandria & Mt. Vernon Railway and the Great Falls & Old Dominion Railway operate almost entirely outside of Washington, and claim that the new regulation should not apply to them, especially as they operate at high speed outside of Washington and a fender of wheel guard of the platform-operated or automatic type would be a source of danger in the suburbs. No decision has been rendered in regard to the matter.

Elevated Traffic in New York.—The Interborough Rapid Transit Company made public on Dec. 6, 1909, figures which show that for the first time since the subway was opened the elevated lines of the company are carrying more passengers than at any time before in the history of the company. The year previous to the opening of the subway, 1904, the elevated lines carried 286,634,195 passengers, of which number 139,315,267 were transported the first six months and 148,318,928 the last six months. During the first six months of the present fiscal year, with the remainder of the present month estimated, the number of passengers carried on the elevated lines will reach 144,372,552, an increase over the corresponding period of 1904 of 5,057,285 passengers. Assuming that the same ratio of increase in the number of passengers carried the first six months of the present fiscal year obtains throughout the remaining six months of the year, notwithstanding the large growth of travel on the subway, the company estimates that the elevated lines will carry not less than 292,000,000 of people, an increase of 5,365,805 passengers over 1904.

Circular to Employees in St. Louis.—The following is the first of a series of notices to the employees of the United Railways, St. Louis, Mo., over the signature of Robert McCulloch, president and general manager of the company, to impress the men with the fact that any course of action taken by them in the interest of the company necessarily is to their best interest individually: "A word of beseechment is sent to every person in the service of the United Railways and intended for all, from the president to the most remote employee, warning all and every one as to the danger and folly of internal dissension or disagreement. 'The world, the flesh and the devil' are all combined against us and loyalty and honesty and prudence warrant and suggest the same compactness of organization on our part. Personal contention between ourselves is unworthy; reserve all your strength, mental and physical, for defense against the combination always against us. The motto of our good State is 'United We Stand, Divided We Fall'—so let us not waste strength or energy in even trivial disagreement, but harmonize and forgive and forget, and hold always to the strength and correctness of our own affairs as against everybody outside."

Illinois Traction System Advertising Card.—The first advertising matter of the Illinois Traction System to call attention to the magnificent terminal which is being constructed by that company in St. Louis, Mo., has just been issued in the form of a wall or rack card. The entrance into St. Louis of the Illinois Traction System is being made at a cost of about $6,500,000. This work includes the construction of double tracks on a private right of way leading from the present southern terminus of the interurban system at Venice, Ill., 2½ miles to the bank of the Mississippi River; the erection of a great steel bridge crossing the river, the total length of which, including approaches, is 2 miles; the construction of 5 miles of heavy city trackwork leading from the western end of the bridge, on the Missouri side, up to a terminal in the business center of St. Louis near the Jefferson Hotel, and the erection of passenger and express stations at that terminus. The company has also purchased 23 acres of river front property, part of which is under the Missouri side approach to the bridge and all of which will be used for freight yards, team tracks and freight handling purposes. In addition to this work, a large modern electric generating station is being built close to the eastern approach to the bridge and near the river's edge on the Illinois side. The present advertising card displays an artist's drawing showing a portion of the wholesale district of St. Louis, the freight yards, the bridge and its approaches and the new power station on the Illinois side. At the right-hand end of the advertising card an outline map of the State of Illinois, with the routes of the Illinois Traction System and the Chicago, Ottawa & Peoria Railway, is presented. These interurban railways have more than 500 miles of track in addition to the many local railway and lighting plants. All of these properties are under the management of superintendents reporting to H. E. Chubbuck, general manager.

Personal Mention

Mr. Douglas Robinson, receiver with Mr. Adrian H. Joline of the Metropolitan Street Railway, New York, N. Y., sailed on Dec. 2, 1909, on an extended tour of Europe and Asia.

Mr. Lloyd Lyon has resigned as auditor of the Mobile Light & Railroad Company, Mobile, Ala., effective Jan. 15, 1910, to become treasurer of the Mexico Tramways and the Mexican Light & Power Company, Ltd., Mexico City, Mex.

Mr. William Stewart has been elected secretary of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to succeed Mr. Charles M. Murdock, who has been elected president of the company to succeed Harry B. Smith, deceased.

Mr. James Campbell has been elected president of the North American Company, New York, N. Y., to succeed Mr. C. W. Wetmore. Mr. Campbell is a prominent banker of St. Louis, and is one of the leading members of the syndicate which recently secured control of the 'Frisco Road.

Mr. G. P. Chapman has resigned as superintendent of the Pascagoula Street Railway & Power Company, Scranton, Miss., to accept the position of general manager of the Pascagoula Northern Railroad, a steam railroad which extends from Scranton (Pascagoula) to Evanston, Miss., a distance of about 45 miles.

Mr. C. W. Wetmore has resigned as president of the North American Company, New York, N. Y., and Mr. James Campbell has been elected to succeed him. Mr. Wetmore's resignation was caused by continued ill health. He will remain as a member of the board of directors, and has been appointed its special adviser.

Mr. George D. O'Connor has been appointed superintendent and local manager of the Northwestern Gas & Electric Company, Walla Walla, Wash. Mr. O'Connor was formerly traffic manager of the company. He was born in 1879 and became connected with the Northern Pacific Railway in 1891 as a messenger. He was promoted from time to time and finally became traveling freight and passenger agent of the company. He resigned from the Northern Pacific Railway in 1908 to become traffic manager of the Northwestern Gas & Electric Company.

Mr. Charles M. Murdock has been elected president of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to succeed Harry B. Smith, deceased. Mr. Murdock being a director of the company, Mr. John Smith was elected a director to succeed Harry B. Smith. Mr. Murdock was born in Lafayette in 1867 and was educated at Purdue University. His father, James Murdock, was a successful railroad promoter and invested later in interurban railways, and Mr. Charles M. Murdock succeeded to the interest of his father at the death of the latter.

Mr. S. Tompkins, who has been in charge of the shops and engineering department of the Miller School in Virginia, has succeeded Mr. P. J. Murphy as superintendent of power stations of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y. Although Mr. Tompkins has spent a considerable portion of his time in the mechanical and electrical departments of several universities, he has also had extended commercial engineering experience in power generation, distribution and shop work. Besides taking over the work heretofore in charge of Mr. Murphy, Mr. Tompkins will be chief engineer of shops and track.

Mr. Edwin E. Witherby has resigned as vice-president of the Susquehanna Railway, Light & Power Company, Parkersburg, Pa., and the Railways Equipment Company, Ltd., New York, N. Y. When the Union Gas & Electric Company was merged with the United Gas & Electric Company the title of the latter company was taken and held until 1906, when the Susquehanna Railway, Light & Power Company succeeded the United Gas & Electric Company. Mr. Witherby has been chief engineer and assistant to the president of the Susquehanna Railway, Light & Power Company for more than a year, or since the office of general manager of the company was discontinued. He has been vice-president of the Railways Equipment Company since its formation.

Mr. J. P. Tingle has been appointed secretary to Mr. William A. House, president of the United Railways & Electric Company, Baltimore, Md. Mr. Tingle entered the service of the Western Maryland Railroad in 1893 as a clerk in the freight department and was transferred a year later to the office of General J. M. Hood, president of the company. In 1902, General Hood was elected president of the United Railways & Electric Company, and Mr. Tingle was continued by General Hood as his confidential secretary. When Mr. House succeeded General Hood as president of the United Railways & Electric Company in 1906, he appointed

Mr. Tingle chief clerk and has recently advanced him from this office to that of private secretary. The appointment was made in accordance with the practice of Mr. House of filling all positions by promotions whenever practicable.

Mr. P. J. Murphy has resigned as superintendent of power stations of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., to take charge of construction work in San Francisco for Ford, Bacon & Davis, New York, N. Y., in connection with a contract which that firm has with the United Railroads of San Francisco. More than two years ago Mr. Murphy undertook to superintend the rehabilitation and reconstruction of the power distribution system of the Coney Island & Brooklyn Railroad for Ford, Bacon & Davis, and in June, 1908, he accepted the position of superintendent of power stations of the company. Mr. Murphy's conduct of the power, transmission and line departments of the company has been marked by very economical results, as noted in the article on the power station improvements published in the ELECTRIC RAILWAY JOURNAL of Aug. 14, 1909.

Mr. F. E. Pritchard, who recently resigned as superintendent of the Rochester & Manitou Railroad, Charlotte, N. Y., to become general manager of the Indiana County Street Railway, Indiana, Pa., was born in Illinois. Most of his early childhood, however, was spent in Iowa. In 1889 he came East to introduce an electric water wheel governor, of which he was patentee; but in 1890 he sold his interest in the governor and accepted the position of superintendent of the People's Electric Light & Power Company, Oswego, N. Y. In 1891 the People's Electric Light & Power Company purchased the Oswego Street Railway and began the work of equipping the street railway with electricity. Mr. Pritchard had the duties of superintendent of the railway added to those of superintendent of the light and power company. In 1899 he resigned from the companies at Oswego and removed to Rochester, N. Y., where he engaged in electrical work of various kinds until April, 1900. He then built and operated a municipal lighting plant at Fairport, N. Y., in connection with the water works plant in Fairport, continuing in charge of both until August, 1908, when he was appointed superintendent of the Rochester & Manitou Railroad. The original governor made in accordance with Mr. Pritchard's design and installed in Oswego is still in service there.

OBITUARY

Charles Stewart Smith, a member of the Rapid Transit Commission of New York City, which was succeeded by the Public Service Commission of the First District, is dead. This is the third member of the old Rapid Transit Commission to die within the year. The surviving members are Mr. Alexander E. Orr, Mr. John Claflin and Mr. Woodbury Langdon.

S. W. Cantril, superintendent of transportation of the Denver (Col.) City Tramway, is dead. Mr. Cantril submitted to an operation for appendicitis in June, 1909, and it became necessary to operate on him again recently. He gradually lost strength after the second operation and died on Dec. 2. Mr. Cantril was born in Iowa on Aug. 8, 1854, and was educated in the public schools in that State. When 20 years of age he went to Colorado and started as a merchant at Castle Rock. Subsequently he was made Deputy United States Marshal. After remaining in the Government service for eight years he resigned to accept the position of coal agent for the Denver & New Orleans Railroad. Public service again claimed Mr. Cantril's attention, and from 1891 to 1895 he served as deputy county treasurer. Subsequently he became connected with the Denver Consolidated Gas Company, with which he remained until 1898, when he resigned to enter the employ of the Denver City Tramway. Shortly after entering the employ of the Denver City Tramway he was appointed assistant to the superintendent of the cable division and was later given the title of superintendent of transportation. Mr. Cantril is survived by a widow, a daughter and two sons.

NEW PUBLICATION

Electric Waves. By William S. Franklin. New York, 1909: The Macmillan Company Cloth, 320 pages (illustrated) with 93 Problems. Price, $3 net.

It is unfortunate that the title of this book could not be made to express the author's simple treatment of wave phenomena. Wave motion is a most interesting and important study to electrical men, but hitherto writers have laid too much stress on the theoretical side. Professor Franklin's book shows how the subject of electric waves is directly applicable to the study of transmission lines and commercial types of alternating-current machinery. The mathematical treatment is confined to essentials and can be comprehended by those who have had only a brief course in the differential and integral calculus.

Construction News

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

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

RECENT INCORPORATIONS

Westchester Street Railway, White Plains, N. Y.—Incorporated, with a capital stock of $1,000,000, as a reorganization of the former Tarrytown, White Plains & Mamaroneck Railway. The New York, New Haven & Hartford Railroad recently bought the property and franchises of the Tarrytown, White Plains & Mamaroneck Railway in foreclosure proceedings brought by the Knickerbocker Trust Company, as trustees of the electric railway. The route of the new lines will be the same. Directors: Richard Sutro, William Greenough, Charles M. Sheafe, Jr., William L. Barnett, John L. Anderson, Frank E. Hall, and Edward O. Brown, New York; John G. Parker and Augustus S. May, New Haven, Conn.

***Port Hope-Toronto Railway, Toronto, Ont.**—Application has been made at Ottawa for the incorporation of this company for the purpose of building an electric railway from Port Hope to Toronto, passing through Newcastle, Bowmansville, Oshawa and Whitby, with branches to Peterborough and Lindsay, and also stub lines to Lake Ontario. Capital stock, $1,000,000. Applicants for charter are: Dr. T. E. Kaiser, W. F. Cowan and Robert McLaughlin, Oshawa; Frank Robson and J. H. Downey, Whitby, and Ralph R. Mobray, Kinsale.

Cle Elum (Wash.) Traction Company.—Incorporated to build an electric railway from Roslyn to Cle Elum, via Jonesville, a distance of 17 miles. Capital stock, $300,000. Incorporators: Frank S. Farquhar and M. E. Farquhar. [E. R. J., July 31, '09.]

FRANCHISES

Bridgeport, Conn.—C. H. Chapman, superintendent of the Connecticut Company, has asked the City Council for permission to extend the line on Barnum Avenue, from the present terminus to the boundary line between Bridgeport and Stratford, a distance of nearly 1 mile. A duplicate of the petition has been presented to the Selectmen of Stratford, asking for permission to extend the tracks in Barnum Avenue from the boundary line easterly to Main Street, Stratford. Both the petitions provide for double tracks.

***Des Moines, Ia.**—Morton E. Weldy, dean of the Highland Park College of Law, has asked the City Council for a chance to submit a proposition for a franchise for an electric railway in Des Moines. Pending the arrival of his clients, Mr. Weldy will not disclose the interests which will finance the proposition.

***Cumberland, Md.**—J. P. J. O'Brien, Wheeling, is said to be negotiating to secure the franchise to build an electric railway from Piedmont to Bloomington, Md. The franchise, which had been granted Wheeling parties, expires Dec. 15. No effort toward building the line, which would pass through Luke, Md., and Beryl, W. Va., has been made. Mr. O'Brien agrees for his clients to give $5,000 bond to complete the line within one year and to pay $200 a year for the franchise.

Cleveland, Ohio.—The City Council has granted to the Cleveland Underground Rapid Transit Company a 75-year franchise for the use of certain streets for subway purposes. [E. R. J., April 24, '09.]

Lawton, Okla.—At a special election recently held in Lawton, a street railway franchise was voted to the Lawton & Fort Sill Electric Railway, which proposes to build a street railway in Lawton, and an interurban railway through the Fort Sill Military Reservation, connecting Lawton with Fort Sill and Medicine Park, northwest of the reserve, a distance of 20 miles. The right-of-way through the military reservation has just been granted to the company by the War Department. D. L. Sleeper, vice-president. [E. R. J., Nov. 6, '09.]

Monaca, Pa.—An extension of a year has been granted the Monaca & Ambridge Street Railway, whose franchise through Monaca, Moon and Hopewell Townships expired Dec. 1.

Salt Lake City, Utah.—The City Council has granted a 50-year franchise to the Salt Lake & Los Angeles Railway for the purpose of double-tracking and electrifying its lines from the city limits of Salt Lake City to Saltair. [E. R. J., Nov. 20, '09.]

Walla Walla, Wash.—The City Council has granted the Northwestern Gas & Electric Company a 25-year extension of its franchise covering its three activities, street railway, gas and electric power and lighting.

Kenosha, Wis.—Robert D. Wynn, vice-president of the Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill., has asked the City Council to consider a plan to build an electric railway into Kenosha. The proposed line will carry both passengers and freight. If the proposition is favored by the people of Kenosha, it is the purpose of the company to appeal to the Wisconsin Railroad Commission at once for a certificate of necessity and convenience for the building of the line. [E. R. J., Oct. 23, '09.]

TRACK AND ROADWAY

Kansas-Colorado Railroad, Cañon City, Colo.—This company will construct about 40 miles of new track during 1910. R. B. Ketcham, chief engineer.

Meriden, Middletown & Guilford Railway, Meriden, Conn.—This company, which proposes to build an electric railway to connect the cities named in the title, has placed an order with the Pennsylvania Steel Company for 1800 tons of steel rails. [E. R. J., Nov. 20, '09.]

Delaware Interurban Railway, Wilmington, Del.—At a meeting of the stockholders of this company recently held at the offices of David J. Reinhardt, Wilmington, it was decided to dissolve on recommendation of the board of directors. This company was organized several years ago, with the intention of building an electric railway from Wilmington to Elkton.

Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.—This company has decided to build 17 miles of track during 1910, to extend from Godfrey to Jerseyville, Ill. W. R. Heager, general manager.

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—This company will build 30 miles of new line during 1910 extending from Tampico to Genesco, via Rock Falls and Hooppole. The company has just placed through Burns & Company, Chicago, an order with the Illinois Steel Company for 2500 tons of 60-lb. steel rails with fastenings for delivery early next spring.

Indiana Northwestern Traction Company, Monticello, Ind.—This company has secured terminal facilities in Chicago by contracting for the purchase of the Chicago Heights & Eastern Electric Railroad, which will give it an entrance into the city. The company has arranged for an immediate survey of the route. The La Salle Supply & Construction Company, Trust Building, Monticello, has been awarded the contract to build the line. [E. R. J., Nov. 20, '09.]

South Bend & Logansport Traction Company, South Bend, Ind.—The board of public works has signed a contract with this company in which it is given permission to operate within the city limits over and upon the tracks of the Chicago, South Bend & Northern Indiana Railway. [E. R. J., Nov. 20, '09.]

Wabash & Northern Indiana Traction Company, Warsaw, Ind.—This company has filed for record at Wabash a mortgage to the Carnegie Trust Company, New York, N. Y., as trustee, to secure an issue of $1,200,000 in bonds. The company is constructing an interurban railway from Warsaw to Wabash. [E. R. J., Oct. 23, '09.]

Winona Interurban Railway, Winona Lake, Ind.—This company has nearly completed a 40-mile connection between Warsaw and Peru, Ind. Cars are now operating over sections at each end about 10 miles long and rails are being laid on the remaining 20 miles of grade. It is expected that this connection will be put into service shortly after the beginning of the year. This will make possible through electric travel between Chicago and Indianapolis.

***Mississippi Shore Line Railway, Davenport, Ia.**—Walter D. Olney, Lock Box 430, Davenport, advises that this company proposes to build an interurban railway between Davenport and Muscatine. Articles of incorporation will be filed next February.

Rockland, South Thomaston & Owl's Head Railway, Rockland, Maine.—This company will construct during 1910 a 3-mile line connecting Martin with South Thomaston Village. John T. Berry, superintendent.

Boston (Mass.) Elevated Railway.—This company has filed with the Railroad Commissioners a petition for the approval of its plans for connecting the new East Cambridge elevated extension with the Washington Street tunnel and the Sullivan Square and Atlantic Avenue elevated lines. The plans provide for a new elevated station on Causeway Street in front of the North station, capable of accommodating 8-car trains, and for four tracks on Causeway Street between the new station and the Sullivan Square junction. Two tracks are to be used by the Sullivan Square trains and two by those to Cambridge. The commission has approved the plans of the company for a double-track connection between the Park Street station of the Tremont Street subway and the Cambridge Bridge, where the line will join the tracks of the Main Street subway now being built in the City of Cambridge by the company. West of Park Street the line will be carried under Beacon Hill by a tunnel, coming to the surface near Grove Street, in the West End.

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich.—This company has awarded a contract to Frederick C. Wales, Boston, Mass., for surveying the right-of-way of its proposed railway. It was erroneously stated in a recent issue that the contract for this work had been let to P. C. Johnson, Chicago, Ill. F. A. Bean, 706 Union Trust Building, Detroit, chief engineer. [E. R. J., Nov. 20, '09.]

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.—C. W. Gaither, secretary, advises that this company expects to place contracts during the next few weeks for material and apparatus for the construction of about 100 miles of track. The company expects to build eight or ten bridges. The proposed railway is to extend south from Mexico to Columbia and Fulton, and north to Santa Fe, Perry and Hannibal. All material will be purchased through Burns & Company, Isabella Building, Chicago, Ill.

Kansas City, Lawrence & Topeka Electric Railroad, Kansas City, Mo.—It is officially announced that during 1910 this company expects to build 32 miles of electric railway from Monrovia to Lawrence, Kan., passing through De Soto and Eudora, Kan. Willard E. Winner, purchasing agent.

North Missouri Central Railway, St. Louis, Mo.—This company has awarded a contract to the M. A. Talbott Company, Baltimore, Md., for the construction of its 60-mile interurban railway from Jefferson City to Mexico, via Columbia. Contracts for the material and supplies are now being let, and work will begin as soon as the weather permits. Headquarters, National Bank of Commerce Building, St. Louis. O. F. Spaete. [E. R. J., Sept. 11, '09.]

St. Louis, Lakewood & Grant Park Railway, St. Louis, Mo.—It is planned by this company to construct during the coming year a 6-mile extension to the Meramac River. E. G. Hughes, general manager.

Brooklyn (N. Y.) Rapid Transit Company.—This company has discussed informally with the Public Service Commission of the First District tentative plans for improvements which will provide for an expenditure of $50,000,000. The plans of the company include the equipping and operating of the Fourth Avenue subway, construction of more elevated lines and laying of more tracks on its present elevated structures.

Ashville & East Tennessee Railroad, Ashville, N. C.—This company will build during the coming year 7 miles of track extending from Weaverville to Grantville, Ohio.

North Carolina Traction Company, Danbury, N. C.—Dr. H. P. MacKnight, Southern Pines, N. C., chief engineer, writes that this company has not yet been fully organized. The original incorporators will have charge of the work until Jan. 1, 1910, when officers and directors will be elected. The line, as projected, will be 80 miles in length, and will extend from Winston Salem to Rural Hall, Capell Gap, Vade Mecum, Piedmont, Danbury, Hartman, Campbell, N. C., and Stuart, Va. Work has already been begun on the line and it is the intention to award all contracts within the next 60 days. The company proposes to erect a power station on the Dan River and will locate its repair shops at Danbury. Three popular resorts will be reached by the line. Connections will be made with the Danville & Southern Railroad at Stuart, Va.; with the Southern Railway at Rural Hall and Walnut Cove, and with the Norfolk & Western Railway at Walnut Cove and Madison, N. C. Capital stock authorized, $2,000,000; bonds authorized, $1,500,000. [E. R. J., Dec. 4, '09.]

Ohio Electric Railway, Cincinnati, Ohio.—Negotiations are being conducted in the interest of this company for the purchase of the Toledo, Wabash & St. Louis Electric Railway, which was planned originally to extend from Toledo to St. Louis. The company formally opened on Nov. 5 its new line between Lima and Defiance.

Cincinnati, Harrison & Indianapolis Traction Company, Cincinnati, Ohio.—Will L. Finch, of the Cincinnati Industrial Bureau, Union Trust Building, Cincinnati, who is interested in this proposed railway, writes that the company has taken out its preliminary incorporation papers, has completed a survey from Cincinnati to Harrison and is now at work securing the right of way. The line will be built from Cincinnati to Harrison. [E. R. J., Nov. 20, '09.]

People's Gas & Electric Company, Defiance, Ohio.—This company proposes to add 3 miles of new track to its line during the next year.

Toledo, Urban & Interurban Railway, Toledo, Ohio.—It is announced that this company will build 32 miles of new line during the coming year, to extend from Findlay to Kenton, Ohio. C. F. Smith, purchasing agent.

El Reno (Okla.) Interurban Railway.—Henry Schafer, president, advises that this company has 2 miles of track in operation in El Reno. A gasoline motor car is operated over this section temporarily. The company expects to place the line now under construction between Oklahoma City and Youkon, 12 miles, in operation next February. The plan is to connect El Reno and Oklahoma City.

Enid & Central Oklahoma Traction Company, Enid, Okla.—Contracts will be let in about two months for the construction of this 65-mile interurban railway between El Reno and Enid. One bridge 900 ft. long will be required, besides two bridges of 100 ft. each. Office, Chamber of Commerce Building, Enid. W. S. Whittinghill, president. [E. R. J., Sept. 11, '09.]

Southwestern Traction Company, London, Ont.—This company expects to build from 20 to 40 miles of new line during 1910. One line will extend from London to Ingersoll and the other from St. Thomas to Aylmer, Ont. S. W. Mower, general manager.

St. Thomas (Ont.) Street Railway.—The Municipal Street Railway Commissioners and a committee of the City Council have agreed to ask the ratepayers to vote $25,000 to improve the roadbed and equipment and make extensions to the city's street railway. $15,000 to be spent for new rolling stock, $5,000 on roadbed and $5,000 on extensions.

***Toronto, Ont.**—Messrs. Watson, Smoke, Chisholm & Smith, a local legal firm representing capitalists, it is said, have made an offer to Mayor Oliver to construct and operate a subway and radial railway lines for a term of years not to exceed the life of the Toronto Railway's franchise.

Oregon Electric Railway, Portland, Ore.—This company proposes to build about 50 miles of new track during 1910. One branch will extend between Tigard and McMinnville, Ore.; the other will connect Salem with Albany, a distance of 25 miles. George F. Nevins, purchasing agent.

Port Vue Street Railway, McKeesport, Pa.—G. F. Myer advises that construction is under way on this local street railway. It will be about 1 mile in length, broad gage, and will extend from McKeesport to the Port Vue Borough line. It is being built by the Realty Company, McKeesport, of which G. F. Myer is president. One car will be operated. [E. R. J., Sept. 18, '09.]

***Phœnixville, Valley Forge, Stratford & Philadelphia Electric Railway, Philadelphia, Pa.**—This company has been organized to build an electric railway from Phœnixville southeast to Philadelphia. A. W. Klay, Phœnixville, president.

Pennsylvania Railroad, Philadelphia, Pa.—This company has decided on a plan for a new branch line to extend from Park Place, Newark, to Harrison, N. J. The tracks from Harrison to Jersey City will also be electrified and direct track connection made with the Hudson & Manhattan Railroad east of Marion station, Jersey City. The construction and electrification of this new line will provide a new electric train service from Newark into Jersey City, and a direct route into the Church and Cortlandt Streets terminal of the Hudson & Manhattan Railroad.

Pittsburgh, Chester & East Liverpool Street Railway, Pittsburgh, Pa.—This company announces that construction will be started on its projected railway in or before the early spring. The route is from Pittsburgh to East Liverpool, Ohio, passing through Imperial, Clinton, Murdocksville, Frankfort Springs and Chester, a distance of 35 miles. The motive power has not yet been definitely decided upon. Officers: J. M. Reed, Box 1146 Frick Building, Pittsburgh, treasurer; A. M. Buchanan, Montgomery, W. Va., secretary; J. H. McLaren, Murdocksville, treasurer. [E. R. J., June 26, '09.]

Tioga Traction Company, Wellsboro, Pa.—This company, which proposes to build a 15-mile railway to connect Wellsboro, Whitneyville, Cherry Flats, Covington and Mansfield, has secured the necessary rights of way and expects to begin work early next spring. The plans of the company include the building of a power plant and repair shop at Wellsboro, where its headquarters are also located. It is the intention to furnish power for lighting to towns along the route. Capital stock authorized, $150,000. Officers: B. F. Edwards, Wellsboro, president; Thomas L. Young, Wellsboro, vice-president; H. C. Kerwin, Wellsboro, secretary; S. O. Putnam, Covington, treasurer; Geo. F. Keagle, Avis, general manager and purchasing agent; H. C. Young, Wellsboro, superintendent and chief engineer. [E. R. J., March 27, '09.]

Metropolitan Steam & Electric Railway, San Antonio, Tex.—Announcement is made that this company, which was incorporated last May in Delaware for the purpose of constructing railways in Texas, will build a line from San Antonio to New Braunfels, Seguin, Lockhart, Gonzales and Austin. Branches are proposed from Seguin to Gonzales and Sutherland Springs. It is expected that the total length of the system will be 500 miles. Charles H. Russell is in charge of the preliminary work. Officers: John G. Marmion, San Antonio, president; E. L. Squire, Wilmington, Del., vice-president; M. Kaufman, Yorktown, secretary and treasurer. [E. R. J., May 29, '09.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—This company announces that it will have the first 3 miles line from Morgantown to Randall, in operation by Jan. 1. F. P. Weaver, secretary.

SHOPS AND BUILDINGS

Connecticut Company, Bridgeport, Conn.—This company has awarded a contract to Charles W. Murdock, New Haven, for the construction of its new brick and concrete car houses in Bridgeport, foundations for which have been completed. The building is to cost about $150,000. The new building is to cover 241 ft. x 331 ft. partly two stories high and partly one.

Northern Indiana Railway, South Bend, Ind.—This company has taken an option on a site located at Jefferson and Main Streets, Goshen, on which to build a new interurban depot. Plans are now being prepared for a passenger and freight station with offices in the second story.

Wichita Railroad & Light Company, Wichita, Kan.—This company is preparing plans for a new car house to be erected on Waco Avenue north of Second Street, Wichita. The structure will be 100 ft. x 300 ft., two stories high and will be of concrete and steel construction. It will contain six tracks and will have a storage capacity of 36 cars. The waiting room will be 40 ft. x 52 ft. The second floor will be used for quarters for the company's employees. The estimated cost of the building is $30,000.

Mexico, Santa Fe & Perry Traction Company, Mexico, Mo.—This company advises that it plans to award contracts during the next few weeks for the construction of car shops C. W. Gaither, secretary.

Virginia Railway & Power Company, Richmond, Va.—Announcement is made that this company is planning to expend $600,000 in improvements which will include the erection of a new terminal passenger station, car house and repair shops at Manchester.

POWER HOUSES AND SUBSTATIONS

Lexington (Ky.) Railway.—This company is installing in its power plant a 1000-kw General Electric turbo-generator and one 500-kw turbo-generator.

Fitchburg & Leominster Street Railway, Fitchburg, Mass.—Plans are being prepared by this company for increasing the capacity of its power plant at South Fitchburg. An extension, 50 ft. x 82 ft. and two stories high will be built to the present station. The company will install a 500-kw generator, 1000-hp, cross-compound Cooper Corliss engine and additional boilers.

Mexico, Santa Fe & Perry Traction Co., Mexico, Mo.—This company, which proposes to build a 100-mile interurban railway to connect the cities mentioned in the title, advises that contracts will soon be awarded for the construction of three power plants. C. W. Gaither, secretary.

Pt. Pleasant (N. J.) Traction Company.—This company advises that it expects to place orders during the next six weeks for two 150-hp water-tube boilers. F. B. Musser, Harrisburg, Pa., purchasing agent.

Binghamton (N. Y.) Railway.—This company is installing in its power plant a 750-hp turbine and a General Electric generator. The company has already purchased all the appliances in connection with this apparatus.

Metropolitan Street Railway, New York, N. Y.—This company has filed plans for a one-story substation to be built on Madison Avenue, south of Eighty-sixth Street, on the site of the old car house that was destroyed by fire last year. The station is to be 40 ft. x 36½ ft., of brick and stone. It will cost $3,500 and will give place later to a larger building.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—This company expects to contract during the next few weeks for a 1000-kw turbine. P. H. Gadsden, president.

Union Utilities Company, Morgantown, W. Va.—This company will shortly be in the market for a 200-kw 60-cycle generator and a low-pressure turbine. H. R. Warfield, general manager.

Manufactures & Supplies

ROLLING STOCK

San José & Santa Clara Railroad, San José, Cal., is making inquiries as to various types of city cars.

Albany Southern Railroad, Hudson, N. Y., may purchase two new motor cars early next year.

Niagara Gorge Railroad, Niagara Falls, N. Y., is constructing six additional trailers in its own shops.

Long Island Railroad, Long Island City, N. Y., will buy 10 62-ft. double-truck steel baggage cars during 1910.

Grand Rapids (Wis.) Street Railroad will purchase enough cars during 1910 to equip an 80-mile interurban road.

Third Avenue Railroad, New York, N. Y., is drawing new specifications for about 100 cars to be ordered in the near future.

Mineral Wells & Lakewood Park Street Railway, Mineral Wells, Tex., is considering the purchase of a few open cars during 1910.

United Railroads, San Francisco, Cal., will buy 50 city cars next year, although the type and equipment have not yet been decided upon.

Hudson & Manhattan Railroad, New York, N. Y., expects to close an order for 30 all-steel passenger cars for tunnel service before Jan 1.

Washington Water Power Company, Spokane, Wash., has ordered 10 30-ft. 8-in. closed motor car bodies to be mounted on Brill 27-E-1 trucks from The J. G. Brill Company for April 1 delivery.

North Carolina Traction Company, Danbury, N. C., expects to buy four McKeen 200-hp, 71-ft. all-steel gasoline-motor cars and six all-steel freight cars next year. The company is also considering the purchase of 20 all-steel freight cars.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., reported in the Electric Railway Journal of Dec. 4, 1909, as expecting to buy four single-truck and six double-truck passenger cars, has placed an order for four 20-ft. 8-in. Brill semi-convertible motor cars with The J. G. Brill Company.

Virginia Railway & Power Company, Richmond, Va., it is reported, is in the market for 20 semi-convertible double-truck pay-as-you-enter cars and 40 sets of new motor equipment to be used for replacement. New high-speed motors and motor equipments will also be ordered for the cars operating between Manchester and Petersburg.

British Columbia Electric Railway, Vancouver, B. C., has one 43-ft. 4-in. passenger, baggage and smoking car; one 43-ft. 4-in. passenger and smoking car and two 53-ft. 8-in. baggage and express cars, all to be mounted on Brill 27-E-3 trucks, under construction, and practically completed at the plant of the American Car Company. The company also has five cars under construction at the plant of the John Stephenson Company.

Oklahoma Railway, Oklahoma City, Okla., mentioned in the Electric Railway Journal of Nov. 27, 1909, as contemplating the purchase of 10 city cars and six interurban cars, it is learned, has ordered six 20-ft. closed city cars to be mounted on Brill 21-E trucks from the American Car Company and also six 45-ft. interurban double-truck motor cars with center vestibules and enclosed ends from the Niles Car & Manufacturing Company.

TRADE NOTES

American Goetze-Gasket & Packing Company New York, N. Y., has changed its address to P. O. Box 44, New Brunswick, N. J.

Allis-Chalmers Company, Milwaukee, Wis., has removed its Cleveland office from the New England Building to 1411 Schofield Building.

Dearborn Drug & Chemical Works, Chicago, Ill., have removed their St. Paul office from 1237 Lincoln Avenue to 1238 Grand Avenue.

Lackawanna Bridge Company, Buffalo, N. Y., has added H. C. Sharpe, formerly connected with Joseph T. Ryerson & Son, Chicago, to its staff.

Robert McF. Doble, Denver, Col., announces that he has removed his engineering offices from the Majestic Building to 417 Century Building, Denver.

Coin Counting Machine Company, New York, N. Y., has received an order from the Third Avenue Railroad, New York, N. Y., for 300 Johnson fare boxes.

Burdett-Rowntree Manufacturing Company, Chicago, Ill., has moved its factory and offices to the new factory building at 515 Laflin Street, Chicago, the telephone number of which is 2237 Monroe.

Hayes Track Appliance Company, Geneva, N. Y., announces the election of G. E. Ellis as vice-president of the company. Mr. Ellis was formerly signal engineer of the Rock Island System and more recently has been manager of installation for the Federal Signal Company.

Electric Railway Equipment Company, Cincinnati, Ohio, which manufactures catenary and standard overhead line material and metal tubular poles, is located at Cormany Avenue and Township Street, Cincinnati, Ohio, where it has larger quarters and increased facilities for attending promptly to orders.

American Specialty Company, Chicago, Ill., has been appointed sole export agent for the line of portable electric drilling machines made by the Van Dorn Electric & Manufacturing Company, Cleveland, Ohio. The American Specialty Company also has the agency for these tools in Chicago and several Western districts.

Watson Insulated Wire Company, Chicago, Ill., Western agent for the Kerite Insulated Wire & Cable Company, New York, has elected Robert A. Patterson, formerly manager of the railway department at New York of Fairbanks, Morse & Company, Chicago, vice-president, with offices in the Railway Exchange Building.

Pennsylvania Inspection Bureau, Johnstown Trust Building, Johnstown, Pa., has been organized with a capital of $5,000, and is equipped to handle all chemical and physical testing, and to inspect cars, car wheels, rails, structural steel, building material and locomotives. Its officers are J. C. Wickersham, chief inspector for the United States Government for the last eight years, and S. Arch Replogle, both of Johnstown, Pa., and Jas. Plummer, Pittsburgh, Pa.

F. A. Richards has been appointed manager of the car department of Pierson, Roeding & Company, Pacific Coast agents for The J. G. Brill Company. Mr. Richards entered the railway field in 1898, forming a connection at that time with the Peckham Manufacturing Company. He held various positions with that company at its Kingston, N. Y., factory and in the New York sales office until 1901, when he became associated with J. A. Hanna, Cleveland, Ohio. Messrs. Hanna and Richards handled Peckham trucks and Stephenson cars until The John Stephenson Company was purchased by The J. G. Brill Company. They then formed the J. A. Hanna Company, and since 1904 have represented the Niles Car & Manufacturing Company and the Baldwin Locomotive Works in the Central West. Mr. Richards withdrew from the J. A. Hanna Company on Nov. 1, 1909, to accept the position of manager of the car department of Pierson, Roeding & Company. He will represent The J. G. Brill Company in Washington, Oregon, California, Arizona, Nevada, Idaho and Southwestern British Columbia.

ADVERTISING LITERATURE

Ohio Filler & Shield Company, Columbus, Ohio, has issued a publication entitled "A Word About Lubrication of Ropes and Gears."

The J. G. Brill Company, Philadelphia, Pa., has issued catalog No. 186, in which its single-motor trucks are described and illustrated.

Union Steam Pump Company, Battle Creek, Mich., has issued a very complete work in which its air compressors are described and illustrated.

Warren Webster & Company, Camden, N. J., have issued a publication entitled "The Selection of a Heating System," in which the Webster modulation system is briefly described and illustrated.

Chicago Pneumatic Tool Company, Chicago, Ill., and New York, N. Y., has printed a pamphlet describing the Franklin high-speed air compressor, which is particularly suitable for locations where space is limited.

Ohmer Fare Register Company, Dayton, Ohio, has printed an interesting pamphlet entitled "Patent Protection," in which are summarized the history, scope and strong features of the Ohmer fare register patents.

Pettingell-Andrews Company, Boston, Mass., has devoted the greater part of the issue of *Juice* for December to the supplies which it handles for making an electrical Christmas, including tree lighting outfits, pocket lamps and electric toys.

Ingersoll Engineering & Constructing Company, Pittsburgh, Pa., has described and illustrated its racing coaster in a publication entitled "$648 an Hour." A number of letters from those who have installed the coasters are reproduced, including one from the Indiana Union Traction Company and one from the Ohio Valley Electric Railway.