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#### CONTENTS

The Volume Index.....	1303
Competition in a Chicago District.....	1303
Average Gains in Gross Earnings.....	1304
Alternating Current in Boston.....	1304
Collapse of Highway Bridge at Burlington, N. J.....	1305
Joliet Extension of the Chicago, Ottawa & Peoria Railway.....	1306
Strike at Texarkana.....	1312
Power Generation and Distribution System of the Boston Elevated Railway .....	1313
Detroit Franchise Situation.....	1319
Agents' List of Points Reached by Electric Package Agency.....	1320
Committees of the Accountants' Association.....	1320
Comparative Earnings of Properties.....	1320
Fare Collection and Registration in Providence, R. I.....	1321
Electric Railway Signaling Committee of Railway Signal Association	1321
Car Proposed by Brooklyn Rapid Transit System for Subway Service.	1322
Mid-Year Banquet on Jan. 26.....	1322
Coasting Clock Savings on the Third Avenue Railroad.....	1322
News of Electric Railways.....	1323
Financial and Corporate.....	1326
Traffic and Transportation.....	1328
Personal Mention.....	1330
Construction News.....	1331
Manufactures and Supplies.....	1334

#### The Volume Index

This issue completes Volume XXXVIII of the ELECTRIC RAILWAY JOURNAL, and, in accordance with our usual custom, we are binding with this issue the index for the volume. A great deal of time and expense is devoted to the compilation of this index, but we shall feel repaid if our readers make extended use of it. Those who have not in the past kept their copies of the paper, either in bound volumes or in some filing system, can hardly realize the value which will accrue through a system by which articles published on stated subjects may readily be found in previous volumes. In our trips through the field we have found that a number of companies have elaborate and very useful systems of indexing and cross-indexing the JOURNAL and of filing its pages, so that any official connected with the company can readily assemble all the data upon any subject which have been published during the previous five or ten years. While these systems are very useful to a company or individual who has much research work to do, the ordinary reader must necessarily depend for his references upon the semi-annual index, and this, we believe, will be all that is necessary for 99 per cent of our readers.

#### Competition in a Chicago District

A rather unusual condition of competition has developed in a residential district in Chicago which is served amply by a spur of the South Side Elevated Railroad, surface lines operated by the Chicago City Railway and the suburban service of the Illinois Central Railroad. In this district, located about 6 miles from the center of Chicago, only the two latter methods of transportation stated were available until 1907. The Chicago City Railway Company formerly operated crosstown lines from the Forty-third Street and Forty-seventh Street stations of the Illinois Central and gave transfers to through lines, so that the trip to the business center was made for 5 cents. This was less than either the commutation rate charged by the steam railroad or the single fare, which was 10 cents. For the higher steam railroad rates the trip was made in much less time than on the street railway lines by the use of transfers. The expansion of the South Side Elevated Railroad system included the construction of a spur from its main north and south line to a point on Forty-second Street, near the Illinois Central Railroad and operation, beginning in 1907, between there and the central business district for a rate of 5 cents. The condition of competition thus brought about was intensified by the introduction of through line service on the Chicago City Railway from the terminals at the Forty-third Street and Forty-seventh Street stations of the Illinois Central road to the downtown



district for a fare of 5 cents. It appears that the new service of the elevated and surface electric roads cut very materially into the traffic of the steam road from these points. That company has therefore announced recently lower commutation rates. Its fare for unlimited twenty-five-ride tickets now between the downtown district and Forty-third Street, where competition is met from both elevated and surface lines, is \$1.25, or at the rate of 5 cents per ride. The single fare is not changed. The commutation rate from the Forty-seventh Street station, where there is competition only with the surface electric line, was also reduced, but not to the same extent as from Forty-third Street. Where the steam line was formerly contented to take part of the traffic at the higher rate of fare warranted as compensation for the saving of time made by passengers, it has now set out to meet the fare conditions of the competing lines. The advantage still remaining to the electrically operated roads is that they have downtown terminal facilities nearer the center of activity than their steam competitor.

#### Average Gains in Gross Earnings

A compilation of earnings of six properties under the management of Stone & Webster, published originally in the *Public Service Journal*, has been reprinted in circular form. It is intended to show the great increase in gross earnings, dividends paid, etc., during the period between the calendar years 1906 and 1910. The properties are fairly well scattered as to territorial location, except that three are situated in Texas. Half of the companies do a combined electric railway and lighting business, and the others are electric railways. All show a large percentage of increase in gross earnings during the period for which the figures are given. The total gross earnings of the six companies in the calendar year 1906 were \$5,809,376, and in the year 1910 the aggregate was \$9,872,195. This is a gain of 69.9 per cent. In order to show a little more in detail what the increase in gross earnings of the six properties selected was from year to year, we have compiled the totals from the *McGraw Electric Railway Manual*. The properties showed a gain in 1907 as compared with 1906 of 24.1 per cent; in 1908 over 1907 of 9.8 per cent; in 1909 over 1908 of 22.8 per cent, and in 1910 over 1909 of 1.5 per cent. These fluctuations are, we believe, more extreme than the average experience of all properties, but the chief point of importance which is emphasized is that taking the period as a whole the gross earning power is well sustained notwithstanding the industrial conditions which have existed. The percentage of dividends paid is increased very largely because of the fact that all but one company have begun payment of common stock dividends since the panic of 1907. No data are given regarding the trackage operated during the period, but some large capital expenditures were made which increased the capacity of the properties to produce revenue. The outstanding capitalization, stock and bonds combined, was \$36,866,000 in 1906 and \$53,002,400 in 1910, and most of the increase was in bonds, the outstanding amount of which was nearly doubled. Well-maintained gross earning capacity is a striking characteristic of street railway properties through a period of years.

#### ALTERNATING CURRENT IN BOSTON

Ever since the opening of the first electric street railway line in Boston the management of the Boston Elevated Railway and of its predecessor company has retained the practice of direct-current generation of electricity and its distribution from stations of relatively small size. The development of alternating-current generators of large capacity and high efficiency and the improvement in steam turbines, resulting in the almost universal adoption of alternating-current apparatus in all large central stations, had not changed the attitude of the company in any way up to two years ago. Seven direct-current power stations, none of them exceeding 14,000 kw in capacity, were being operated regularly, and one small steam station and two gas-engine stations were being operated intermittently to relieve the peaks. These stations, through skilful management, were producing electrical energy at a cost equal to if not lower than most of the large central stations in other cities. The average cost of power at the station switchboards for the entire system averaged less than 0.75 cent per kw-hour throughout the year and in some months was less than 0.70 cent. This cost included coal, labor repairs, supplies and superintendence, but no overhead charges on the plant investment.

With such a low producing cost there would probably have been no saving from alternating-current generation, transmission and conversion, so long as the load centers were not too far removed from the existing stations and the feeder losses were not too great. But the need of more power station capacity was imperative at the end of 1909, and a decision had to be made as to the type and location of additional generating equipment to be installed. The choice lay between the erection of several new direct-current stations in the outlying residential districts, where the load was increasing most rapidly, or of one central station on tidewater and to generate and transmit alternating current from this station to a number of converter substations. Under these conditions, which had not applied heretofore, the advantages of the alternating-current system were paramount, and plans accordingly were made for a single new station of the most modern type to have an ultimate capacity of 125,000 kw, or more than twice the present maximum load on the system.

The extensive transmission system, the new substations and the changes which will be made in the operation of the existing direct-current generating plants are described at length elsewhere in this issue. The cost of the alternating-current system which has been installed was remarkably low for the high-class construction employed throughout. The generating station, underground transmission line and substations complete cost about \$112 per kilowatt capacity of the initial equipment. This is little if any more than the probable unit cost of four or five isolated direct-current stations of from 5000 kw to 10,000 kw capacity each, which would have been necessary in the near future to handle the increasing load on the system. Additional alternating-current apparatus can be installed in the future as required at a much lower unit cost.

It would have been difficult to look forward far in the future and forecast the probable load centers in the out-



lying districts with a view to locating the stations exactly where they would be needed. This was one important reason for installing comparatively inexpensive substations, which could be enlarged if necessary or others could be built as required in new locations. Another reason was the desire to limit the output, and hence the return current, of each center of distribution.

For the present, at least, the five largest and most modern direct-current generating stations, with a total capacity of 41,700 kw, will be continued in operation. Probably it is only a question of time, however, when they will be superseded by additional substations supplied from the new alternating-current generating substation in South Boston. To operate the new power station at its maximum efficiency it will have to carry a large average load during all of the twenty-four hours of each day, and under the existing load conditions this cannot be done unless most of the direct-current plants are shut down during the off-peak hours. But until the load increases by a considerable amount during the middle of the day and late at night the most efficient method of operation for the system as a whole will be to operate one of the 15,000-kw units at South Boston on a moderate load for twelve or sixteen hours a day and to run the second unit, if necessary, during the morning and evening peaks while the five direct-current stations are being operated with good average load factors for from twenty to twenty-four hours a day. The load factors of the direct-current stations are relatively more important than in the case of the South Boston power station and converter substations, and as long as they can be kept high without incurring excessive distribution losses in long-distance transmission of direct current, it will be economical to operate the old stations. As these stations become more and more obsolete or conditions affecting their economical production of energy change, they can be abandoned without seriously affecting the remainder of the company's generating and distributing system.

#### COLLAPSE OF HIGHWAY BRIDGE AT BURLINGTON, N. J.

The accounts thus far received of the collapse of the highway bridge at Burlington, N. J., and the causes leading thereto, are meager and contradictory, but the important and principal fact standing out above all others is that the bridge fell down. That the ten passengers aboard the electric car which had entered upon the bridge when it fell were not seriously injured is indeed fortunate, and if this bridge were in a class by itself its collapse would call for little or no comment. But there are hundreds of highway bridges carrying electric cars which, although not of the same style as this structure, must be placed in the same class so far as ownership, supervision and maintenance are concerned. It is unnecessary to discuss here the details of construction of the Burlington bridge, even though such a discussion would prove interesting to many engineers. Electrolysis from stray current, diminution of sizes of truss and floor members due to thirty years' rusting, weakness due to increased weight of rolling stock—these are interesting points which should be settled by a careful examination.

This much is known, however: That the bridge was built in 1881 for ordinary highway traffic, that about the year 1900 it was strengthened by the addition of new stringers to support the street railway track which was laid at that time, that the bridge is owned and was supposed to have been maintained by the county, and that the railway company was presumed to be paying one-half the cost of maintenance. It is reported on good authority that one engineer who was asked in 1900 to suggest a plan for strengthening the floor system advised against the use of the structure as a railway bridge, and that the case was then referred to another engineer. If this be true it is important as showing that even eleven years ago the advisability of running electric cars over the structure was very questionable. It is also reported that the ironwork was painted only a few weeks ago, and that at the time of the collapse some webs of I-beam roadway stringers were found to have holes in them caused by long-continued rusting. Are these webs any indication of the physical condition of the rest of the ironwork?

The Burlington bridge had been in service thirty years, and during this time it had been strengthened once. But during the same time the weights of ordinary highway traffic as well as of cars have greatly increased. Whether such increase has taken place in the weights of cars operated over the structure under consideration is not at present known, but it is fair to assume that a bridge built in 1881 is not adequate for service thirty years later unless more than ordinary care has been exercised in its maintenance and provisions have been made from time to time for increased weight in rolling stock.

This deduction does not apply to the case under consideration only. The fact is that the problem of highway bridges is a serious one to almost all street railway companies. As a rule, these bridges are owned by the cities or the counties in which the bridges are located, and electric cars operate over them under a franchise which sometimes requires a special payment for maintenance, as in this instance, and sometimes not. But in practically every case the duty of maintenance devolves upon the owner—that is, the city or the county. Sometimes the state authorities also have jurisdiction over such structures. But street railway companies will always have to face the question as to the extent to which they should go to check up any dereliction on the part of the owners of the highway bridges which they use in the maintenance of such bridges. In the case of a manifestly unsafe bridge undoubtedly a company would be justified in stopping its cars at each end of the bridge and requiring passengers to cross on foot. This would certainly call public attention to the danger and would stir the authorities to action. But should a railway company go further and employ bridge engineers to make periodical examinations of all structures which carry its cars, regardless of who are the owners of such structures? This would be the safest plan, but the railway company is simply one user of the highway bridge, and it would be imposing a large burden upon it to conduct such an inspection. Nevertheless, in localities where politics enter largely into the appointment of those legally responsible for this work, it might often be the most desirable plan to follow.



# Joliet Extension of the Chicago, Ottawa & Peoria Railway

Construction Details and Costs of a Well-Built Interurban Extension of the McKinley System in Northern Illinois—  
The Transmission Line and Substation Installations

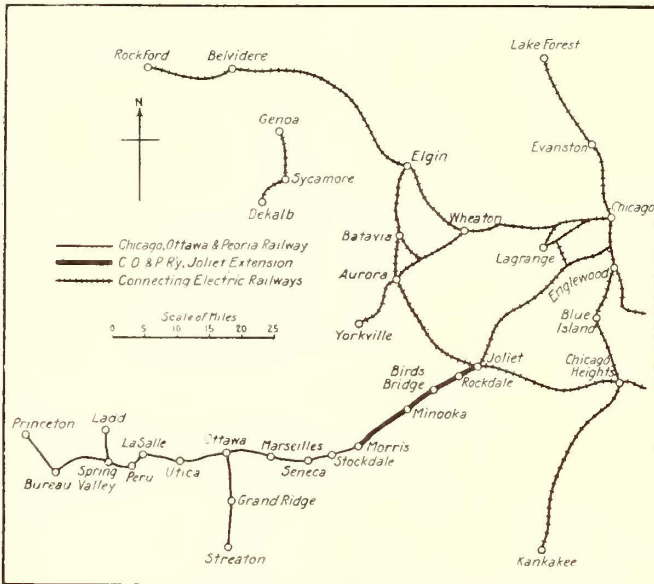
The Chicago, Ottawa & Peoria Railway, one of the McKinley System properties, opened its Joliet extension on Dec. 17, 1911. This extension adds another 22-mile link to a line already 100 miles long and gives this company its first terminal in a city of large size. It also completes a

chased for a public park, and of the high wooded slopes and sandstone cliffs which rise from the water's edge on the south of the river.

Some very interesting engineering problems were worked out along the old line when the roadbed was constructed upon a shelf cut out of solid sandstone, and a number of long, high bridges were necessary to carry the line over the deep valleys between La Salle and Springfield, where it runs along the tops of the bluffs. The territory served has numerous large coal mines and manufacturing industries, such as the plants of the Marquette Cement Company, the Mathewson-Hegler Zinc Company, the Chicago Portland Cement Company, the Owl Cement Company, the Mineral Point Zinc Company, the American Steel & Wire Company's wire fence factory and the large steel plants at Joliet. These factories are located some distance out from the cities and towns, and special cars are run in order to take the laborers to and from their work.

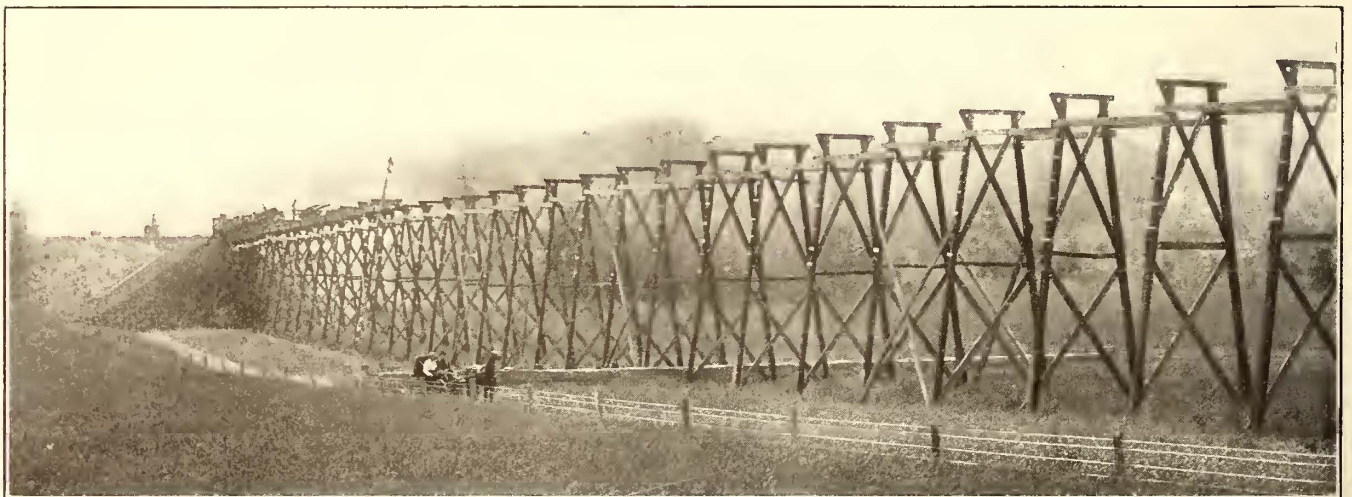
## ROADWAY CONSTRUCTION

The new extension practically parallels the Chicago, Rock Island & Pacific Railway main line from Morris to Joliet, and is one of the best constructed sections of interurban line in the Central West. About two years ago the line was completed through Morris; therefore it was not necessary to obtain additional rights there. The company obtained very liberal fifty-year franchises at Minooka, Rockdale and Joliet. In these cities and towns the traffic is not limited as to character or quantity, and there are no restrictions as to the class of equipment to be used or the length of trains. The franchises contain the usual paving and speed clauses, and in Joliet the company was required to replace an old highway bridge with a bridge which would not only carry its own traffic, but would furnish a roadway and sidewalks for street traffic. It was not necessary to draft an original franchise at Joliet, as satisfactory arrangements were made whereby a franchise orig-



Joliet Extension—Map Showing Connecting Lines

through electric route from Chicago to Bureau and Streator, Ill., and leaves a gap of only 45 miles between Bureau and Peoria. When this gap is closed a through electric railway route from Chicago to St. Louis will be furnished, as well as a connection with the 500-mile network of electric lines which the Illinois Traction System has built in the central part of the State. The extension



Joliet Extension—Trestle for High Embankment Near Minooka

and the existing line of the Chicago, Ottawa & Peoria Railway, or "Illini Trail," as it is called, serves a thickly populated district and is built at the foot of the picturesque sandstone bluffs which lie to the north of the Illinois River. An excellent view is obtained from the cars of the famous "Starved Rock," which the State of Illinois has just pur-

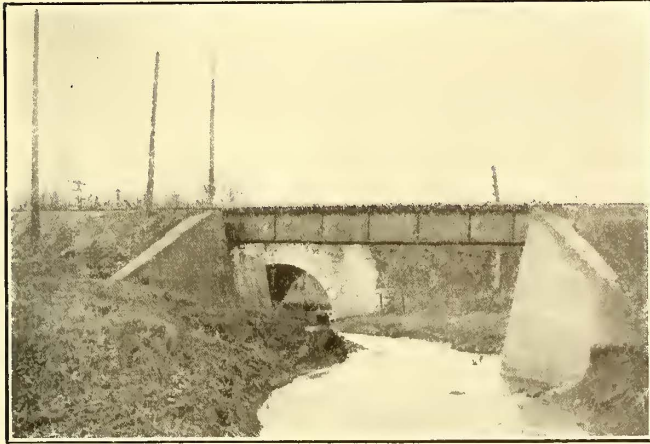
inally granted to the Joliet & Southern Traction Company was transferred to the Chicago, Ottawa & Peoria Railway.

The new line is constructed on private right-of-way in the rural districts and on streets in the cities. The average width of the right-of-way is 60 ft., and it cost approximately \$170 per acre, not including the damages paid



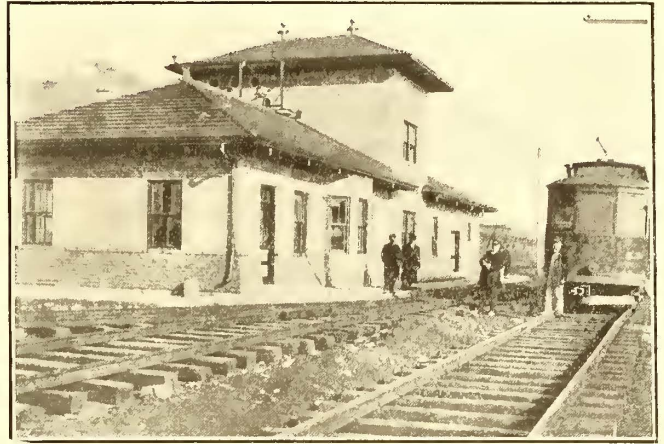
to the property owners. These damages, however, were small, as the line parallels a steam road practically its whole length, and only eight condemnation suits were necessary. Had ordinary interurban construction practice been followed this road would have been built with some very sharp curves and heavy grades, but the experience

cu. yd. of overhaul beyond 500 ft. In general the materials handled were black loam and yellow clay in the shallow cuts and borrow pits. In the heavy work at Minooka and Rockdale it was necessary to classify for hard pan and loose rock. The roadbed is 16 ft. wide, with a one and one-half to one side slope on fills under 10 ft., 18 ft. wide on



Joliet Extension—Plate Girder Deck Bridge Over Small Stream

which this company has had on its other lines in the rapid development of heavy freight business showed the desirability of reducing the curvature and gradients not only to meet present traffic conditions, but also to provide for future heavy freight movements. The grades and curves are practically the same as those on the Rock Island main line, which the electric line parallels. The maximum curve is 2 deg., except for three 150-ft. radius curves at street corners in Joliet. To obtain this curvature the railway company was obliged to purchase some very high-priced corner property at two street intersections. There is only 8000 ft. of 1 per cent grade, which is the maximum on the entire line. This grade occurs where the line leaves the Dupage River bottom near Minooka. To keep within this maximum limit of grade some very heavy earthwork was necessary. The larger portion of this heavy construction was centered at one very heavy cut at Minooka, consisting of 100,000 cu. yd. of earth, and another cut at Rockdale, where 40,000 cu. yd. of loose rock was taken out.



Joliet Extension—Combination Passenger, Freight and Substation

fills from 10 ft. to 20 ft. and 20 ft. wide on all fills over 20 ft. high. The width of the subgrade in all cuts is 28 ft., which allows for a 16-ft. roadbed and two 6-ft. ditches 18 in. deep. The sides of cuts are sloped one to one. The additional width of roadbed was used on the high fills in order to take care of slides and shrinkage and to assure a final width of 16 ft. after settlement had taken place.

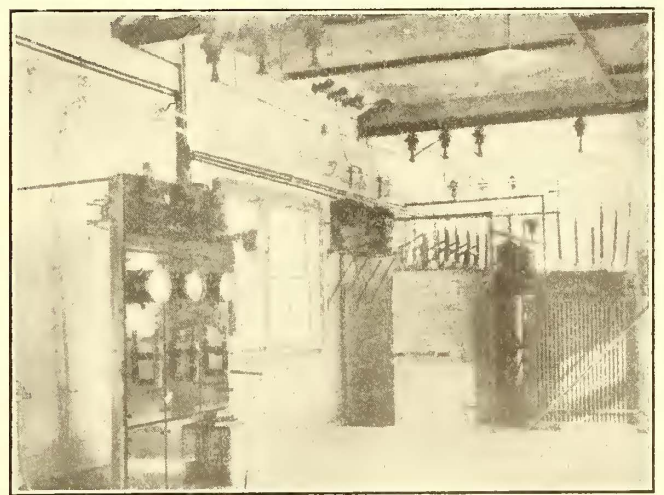
MASONRY AND BRIDGES

All the waterways were taken care of with permanent bridges consisting of I-beams or through girders for openings of more than 4 ft. in span. The most expensive piece of bridge construction was the bridge built over the Des Plaines River and the Illinois and Michigan Canal at McDonough Street in Joliet. This consisted of three 120-ft. through truss spans of the Pratt type. It provides a 24-ft. roadway, which is also occupied by two tracks at 12-ft. centers and two 6-ft. sidewalks supported on cantilever beams riveted to the outer ends of the floor beams. It contained 700 tons of open-hearth steel and cost approxi-



Joliet Extension—Span Wire Catenary Construction

The excavation for the entire line totaled 240,000 yd. and was contracted for at 19½ cents per cubic yard. Classification was necessary so that prices for loose rock or hard pan and solid rock were furnished. There were 60,000 cu. yd. of solid rock at 79 cents. It was also necessary to pay 1 cent per 100 ft. per cubic yard for 1,200,000



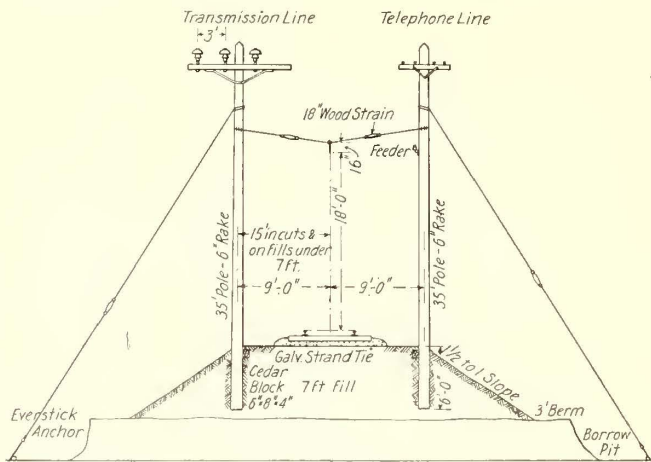
Joliet Extension—High-Tension Apparatus in Substation

mately \$35,000 erected complete on the old highway bridge masonry and painted with two coats of graphite paint.

The specifications for concrete structures along the line called for washed crushed gravel and sand, mixed with Portland cement in proportions of 1:3:6, and the work was paid for in detail at the following approximate prices:



Concrete, \$5.80 per yard, plus 35 cents per yard of concrete hauled per mile; dry excavation, 50 cents per cubic yard; wet excavation, 90 cents per cubic yard; water work, force account plus 15 per cent. The price for concrete was low, but this was due to the low cost of materials and the

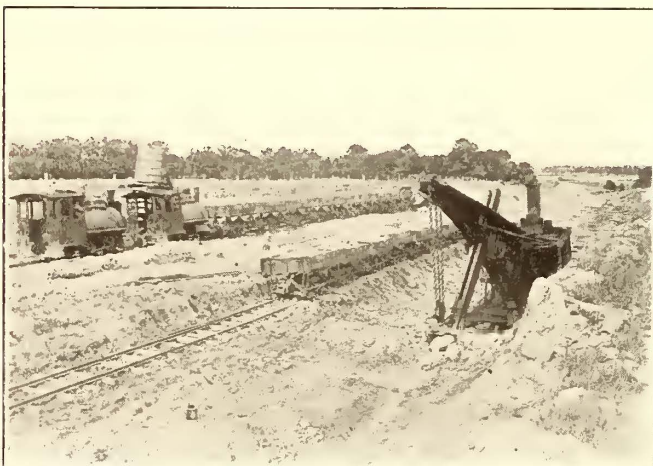


Joliet Extension—Standard Cross-Section of Track

short haul to the various sites. The total concrete yardage was distributed at nineteen openings, where the amount deposited varied from 40 cu. yd. to 700 cu. yd. There were only five openings, however, that contained over 150 cu. yd.

Waterways requiring less than 4-ft. openings were made with American ingot iron corrugated pipe, varying in diameter from 12 in. to 36 in. With but one exception the pipe was laid in a prepared trench, so as to give an even bearing and proper grade, and the earth was filled in over it. The exceptional case was where a 36-in. pipe came under a 33-ft. fill. While the engineers had every reason to believe the pipe would sustain the heavy earth loading, it was reinforced with an 8-in. casing of concrete as an extra precaution. The trenching, necessary hauling and laying of this pipe were contracted for at 25 cents per lineal foot. This is exceptionally low for pipe culverts, but proved profitable to the contractor.

The right-of-way is fenced on both sides with 42-in. American Steel & Wire high-tight fence with a single barbed wire strung along the top. Illinois Traction standard wing fences were used at all highway crossings. The average cost of this type of fence, including 5-in. round cedar posts spaced 16½ ft. apart, wing fences, cattle guards



Joliet Extension—Deep Cut Near Minooka

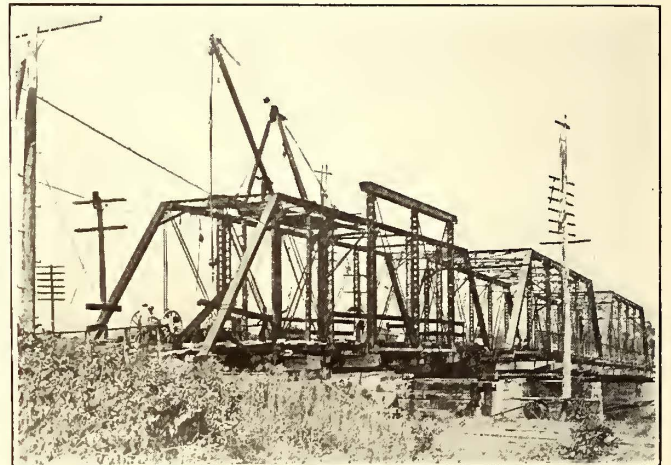
and necessary farm gates, was \$475 per mile. Some of the fence was constructed through sections where there was an outcrop of limestone. To reduce the cost of digging postholes in this material for 6-in. wooden posts, 5000 steel posts were purchased from the American Steel & Wire

Company. These are of the tubular type which this company has recently put on the market and are made from 99 per cent pure iron, galvanized. Some of these posts have been under test in the ground for twelve years and show no indication of corrosion. To set these posts it was necessary to drill holes only 2½ in. in diameter and 2 ft. deep. The posts were afterward grouted in with cement and sand.

#### TRACK CONSTRUCTION

The main line and sidings, except 8000 ft. in Joliet, were laid with 70-lb. A. S. C. E. rail on 6-in. x 8-in. x 8-ft. creosoted oak ties, spaced eighteen to a 33-ft. rail. The turnouts and railroad crossings are Illinois Traction System standard construction. The former consist of No. 9 frogs, 15-ft. split switchpoints and lead 72 ft. long over all. The switchstands are Buda No. 16, of the column type, with special target blades. The company laid 8000 ft. of track with 90-lb. A. S. C. E. rail in streets in Joliet. The special track work used with this heavy rail, including frogs and switchpoints, is of hard-center construction. The special work included not only frogs and switchpoints, but all the curved running and guard rails necessary in the 150-ft. radius curves and the turnouts.

The entire roadbed, with the exception of that portion in the Joliet streets, was ballasted with 6 in. of crushed gravel under the ties, and sufficient gravel was deposited at



Joliet Extension—McDonough Street Bridge

the ends of the ties to form a 2-ft. shoulder. The track work in the streets of Joliet was laid on 6 in. of crushed stone and filled up to the top of the rail with crushed stone and screenings.

The rails were bonded with American Steel & Wire Company's compressed terminal bonds, and long-laced bonds with plastic terminals were used to carry the return circuit around all special work. Five laced cross bonds were installed to every mile of track. The average cost per bond for installation was 13½ cents. This was high but not excessive, considering the conditions under which the work was done. Small Paulus track drills were used, and there were frequent delays due to interference by construction trains. It was also necessary to ship the bonding gangs to different points along the line in order to keep the men busy, as the tracklaying was delayed by the grading at certain points and it was necessary to shift the bonding gangs around the graders.

#### OVERHEAD CONSTRUCTION

The overhead lines, which were constructed under the supervision of K. J. Keith, consist of a three-phase, 33,000-volt transmission line, a 600-volt catenary-supported trolley line, two telephone circuits and feed wires. One pole line supports the transmission wires, and the other carries the trolley, telephone and feed wires. The transmission line is built of No. 2 B. & S. copper line wire and is sup-



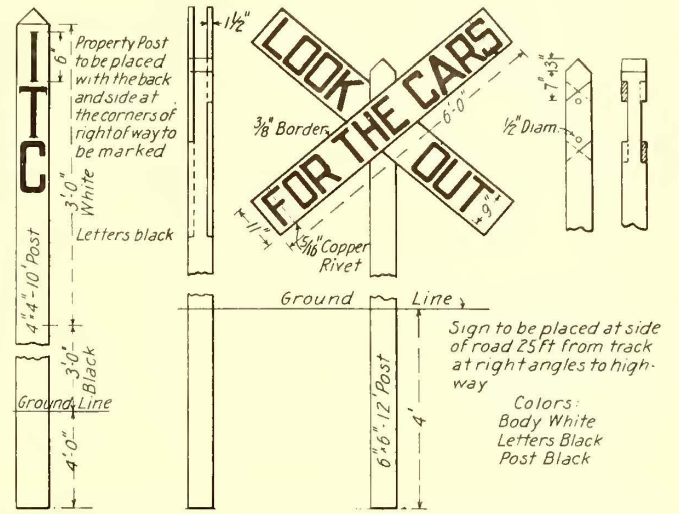
ported on 35-ft. poles by No. 312 Locke insulators mounted on 10-ft. four-pin fir cross-arms. The engineers required that the thimbles should be cemented in the insulators at the factory, and the truss pins, which were furnished by the Electric Service Supplies Company, are that company's special style No. 120 with 3/4-in. x 13-in. stud bolts.

The feed wire is No. 0000 bare copper and is supported 2 ft. below the mast arm on Chubbuck brackets. Feeder taps are made every 2000 ft., and Westinghouse A M P type lightning arresters are installed every 1000 ft. The trolley construction is the ordinary five-point suspension catenary type, supported on 9-ft. I-beam mast arms. It consists of a No. 000 grooved copper trolley wire with a 7/16-in. seven-strand galvanized messenger. Special feeder-tap insulators were used on all mast arms where feeder taps were made. The selection of the overhead line material received special attention. Practically all the supply houses were represented, and their various supplies were carefully investigated. The quotations made were all based on sherardized material, and the selection depended largely on the question of design, the simplest design in general being chosen.

The trolley is carried on mast arms except on curves, at sidings and on fills over 7 ft., where span-wire construction is used. The poles are spaced at 140-ft. intervals throughout the entire line, and are given a 6-in. backward rake if they support the trolley. The methods used in stiffening and protecting the trolley line against severe operating conditions are interesting. Steady braces of the long wood strain and goose-neck trolley-ear type were applied on every

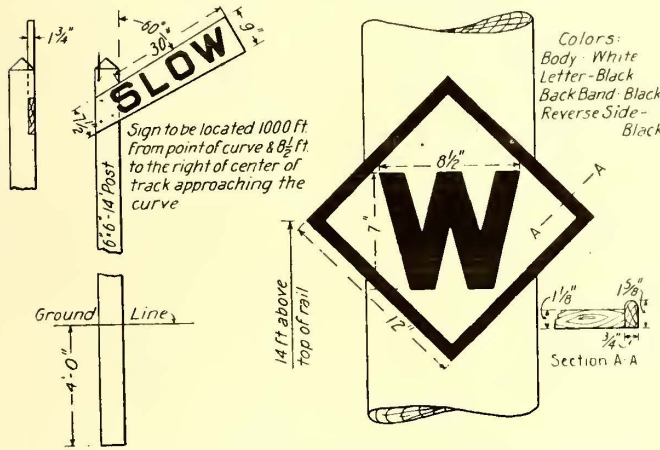
4 in., and the line was strain-guyed and tied in from all directions at all summits.

On the tops of the poles carrying the trolley brackets are two complete metallic return telephone circuits, built of No. 10 hard-drawn copper wire. The wires are supported



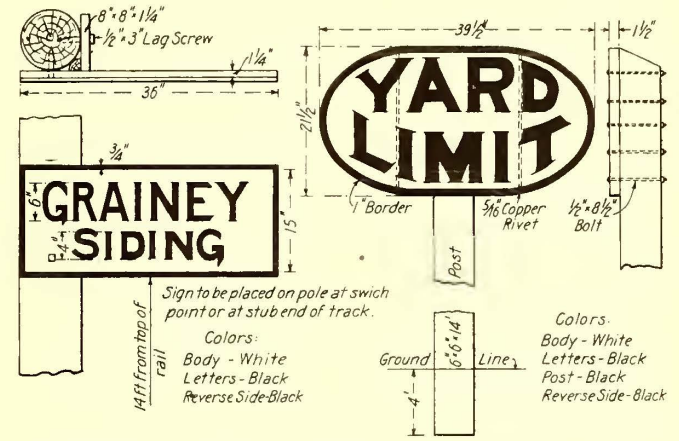
Joliet Extension—Standard Right-of-Way and Crossing Signs

on 5-ft. four-pin fir cross-arms with Western Union pins and porcelain pony insulators. Pierce transposition brackets were installed every fifth pole. In order properly to pro-



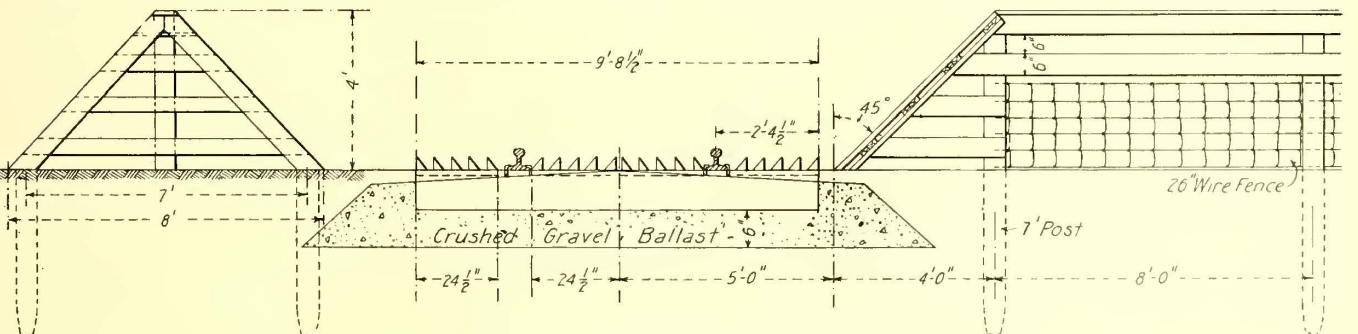
Joliet Extension—Standard Slow and Whistle Signs

sixth pole on tangent track and on every pole on curves. The line is strain-guyed every mile, using special anchor eyes and trolley ears. Considerable care was exercised in this work, particularly on high fills where slides and settle-



Joliet Extension—Standard Siding and Yard Limit Signs

ment might be expected. Here not only was span-wire construction used, but the poles were tied together at the sub-grade elevation with a double-line of 7/16-in. galvanized strand wire. All poles supporting the trolley are breasted just below the roadbed level with cedar blocks 6 in. x 8 in. x



Joliet Extension—Standard Cattle Guard

ment might be expected. Here not only was span-wire construction used, but the poles were tied together at the sub-grade elevation with a double-line of 7/16-in. galvanized strand wire. All poles supporting the trolley are breasted just below the roadbed level with cedar blocks 6 in. x 8 in. x

both the trolley and transmission lines, is not completed at this date, but the estimated cost of \$4,500 per mile will not be exceeded.

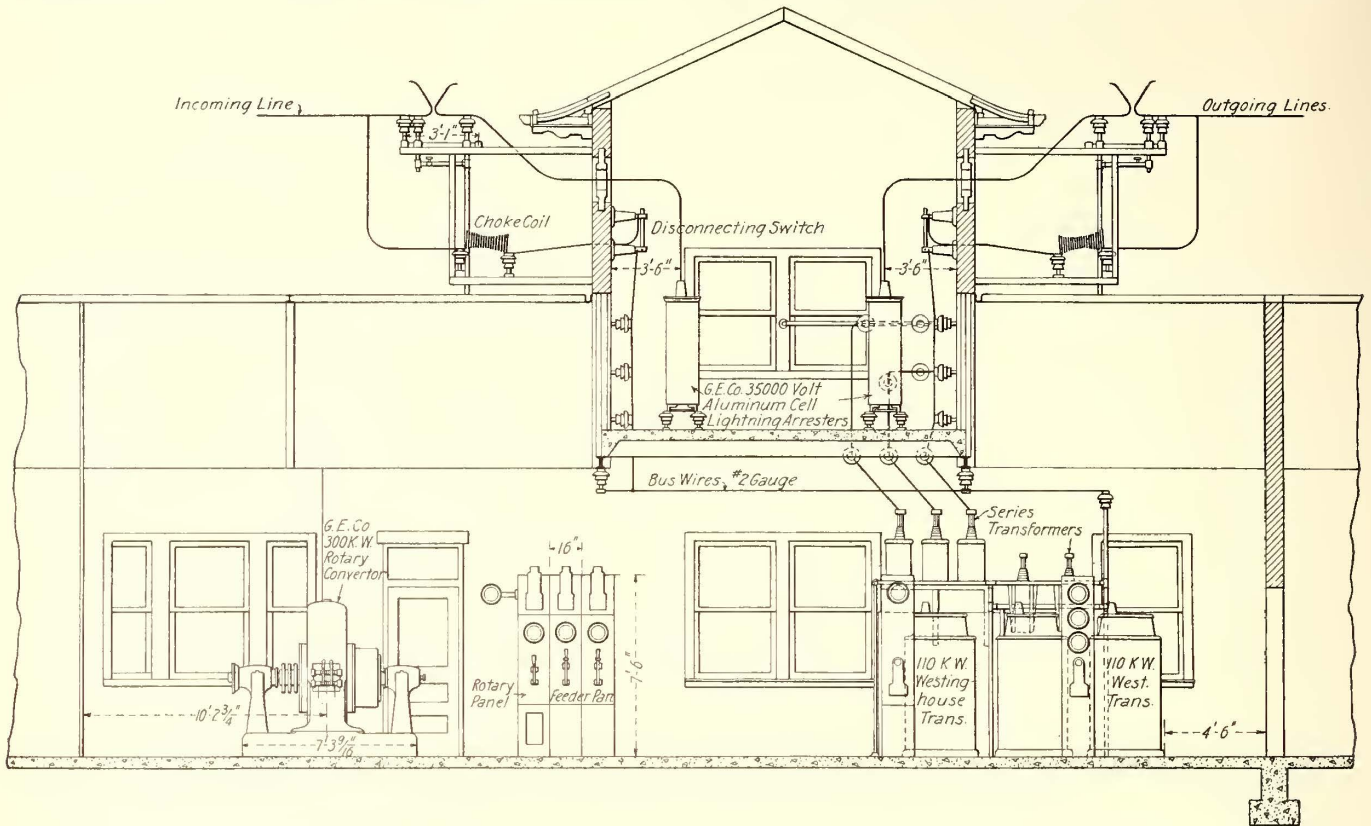
SUBSTATIONS

Illinois Traction System standard substations were built

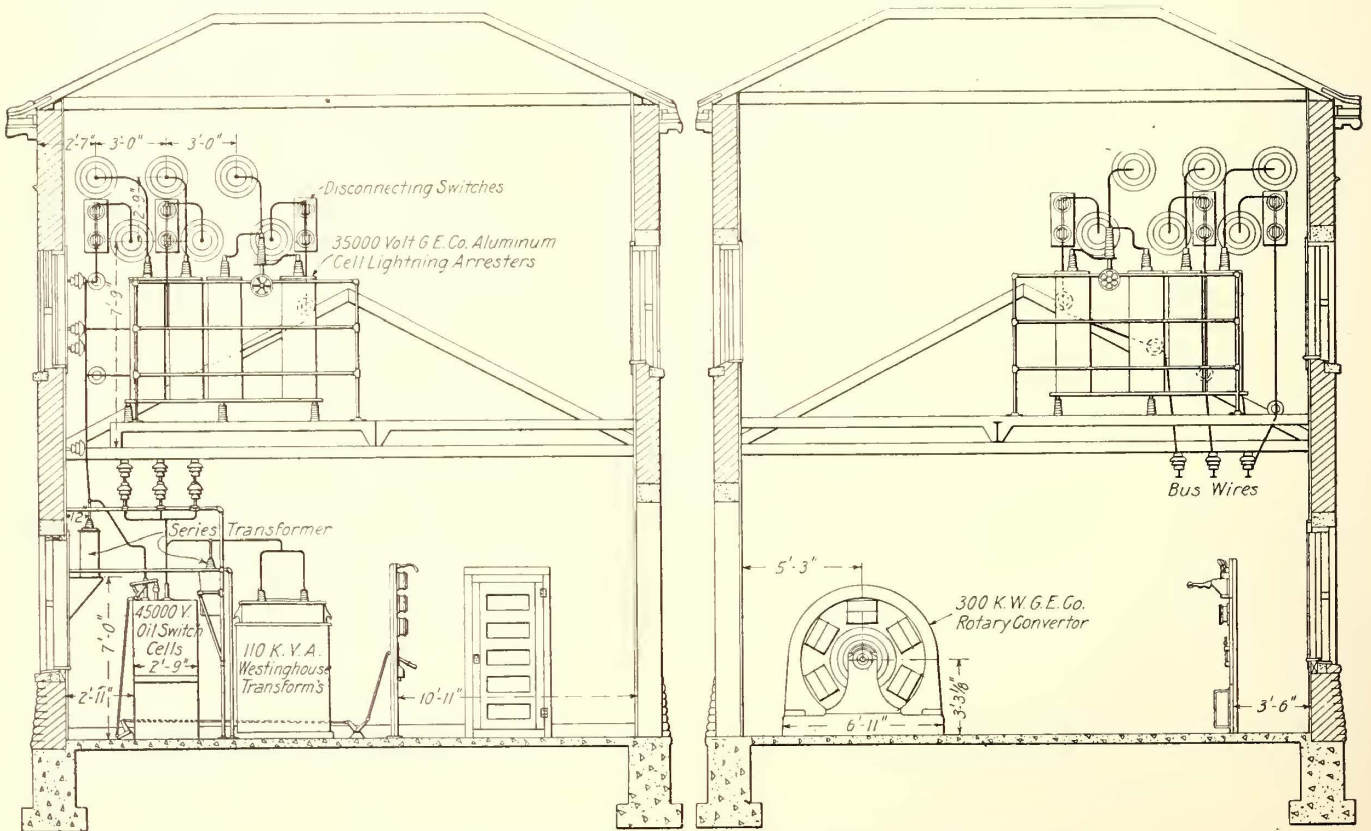


at Morris, Minooka and Rockdale. These locations give the usual 10-mile interval between substations. The substation at Seneca was enlarged to take care of the outgoing lines, as it was formerly the northern terminus of

including concrete platforms, brick coal-house and frame water-closet. The general character of these buildings is shown in the illustrations. They are combination substation, passenger and freight stations, built with a rock-faced



Joliet Extension—Longitudinal Section Through Substation



Joliet Extension—Cross-Sections Through Standard Substations

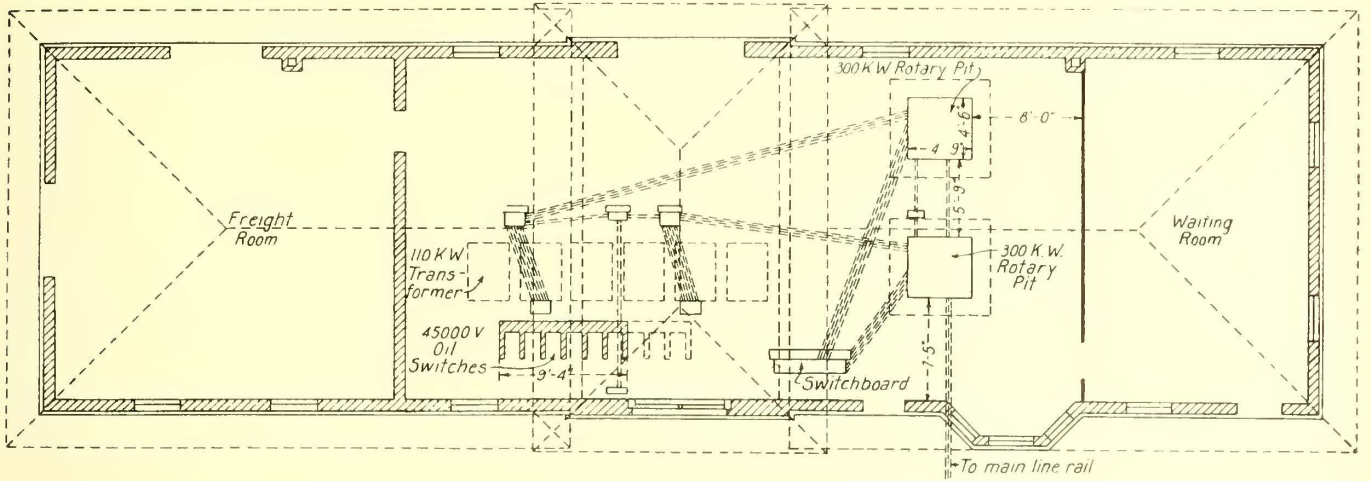
the transmission line before the extension was constructed. These standard substations are of the same type of architecture as those described in the ELECTRIC RAILWAY JOURNAL for April 17, 1909, page 720, and cost \$26,000 complete,

dark red paver base, buff face brick and a red French "A" tile roof. The exposed woodwork in the buildings is painted with the Illinois Traction standard colors, buff and olive green.



The buildings are one story high with a tower for the incoming and outgoing transmission lines and are 93 ft. long by 26 ft. 8 in. wide. The passenger waiting room is 16 ft. 4 in. x 25 ft. 2 in. and is separated from the machinery room by a wooden partition built of beaded ceiling with a slat grille running the full width of the building. The freight room is located in the opposite end of the building from the waiting room and is 25 ft. x 25 ft. 2 in. The

trical department of the Illinois Traction System, and particular care was exercised in locating equipment so as to reduce the copper and allow for ventilation and free access to the machinery. The apparatus was installed by common labor with the assistance of one expert. It required about ten days to make a complete installation, and the cost, which was \$300 per station, was very low, as the labor was cheap. Up to the present time the existing line



Joliet Extension—Plan of Combination Passenger, Freight and Substation

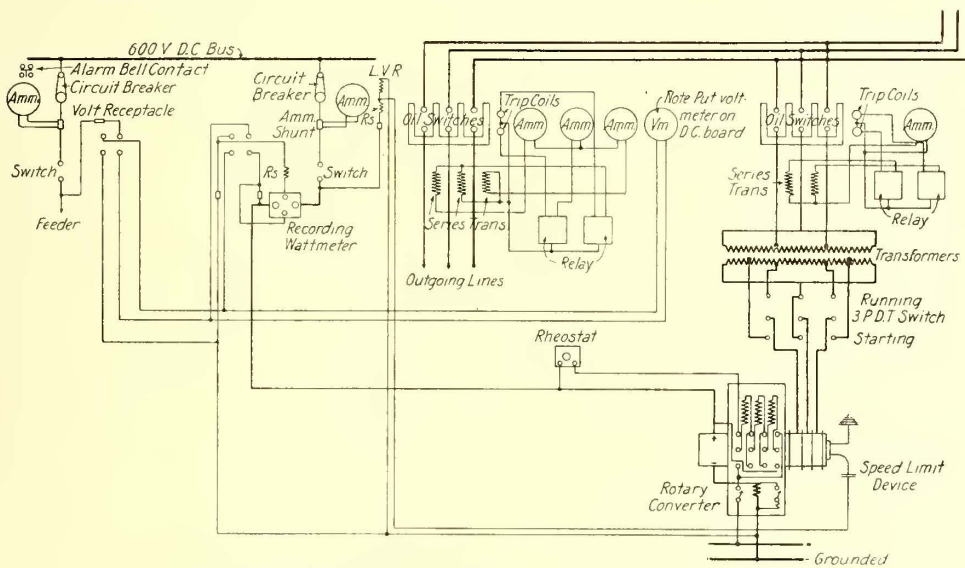
machinery room or substation proper takes up the central portion of the building and includes the tower, which is 16 ft. x 25 ft. and 15 ft. high.

The machinery is so arranged that the kilowatt capacity can be doubled. Two rotary pits have been built and sufficient area provided to take care of the additional transformers and other electrical equipment necessary.

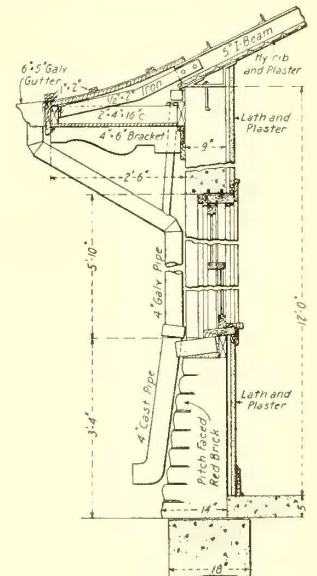
The apparatus installed at this time is located as shown in the accompanying illustrations and consists of three oil-insulated, self-cooled transformers; one oil-insulated circuit breaker with automatic overload and remote mechanical control for the 33,000-volt line and bell alarm contacts;

has received its energy from a central power station located at La Salle. Extensions to this plant are difficult owing to property restrictions and the fact that it is located on Illinois River bottom land where it is almost impossible to construct first-class heavy foundations. A new hydroelectric plant is being completed at Marseilles, Ill., which will furnish energy for the entire line and serve some small city lighting properties along the road. The present La Salle plant will be used as an auxiliary when anchor and slush ice prevent the operation of the hydroelectric station at Marseilles.

In connection with this Joliet extension the transmis-



Joliet Extension—Wiring Diagram of Standard Substation Containing One Rotary Converter



Section Through Substation Wall

one 300-kw, 600-volt, 25-cycle rotary converter and one three-cell lightning arrester complete with horn gaps located on the tower floor. The equipment is controlled from three panel switchboards provided with the necessary knife switches, voltmeters, ammeter and wattmeter, which are located near the agent's desk in the bay window. All wiring where possible was carried under the concrete floors in fiber conduit. The plans were furnished by the elec-

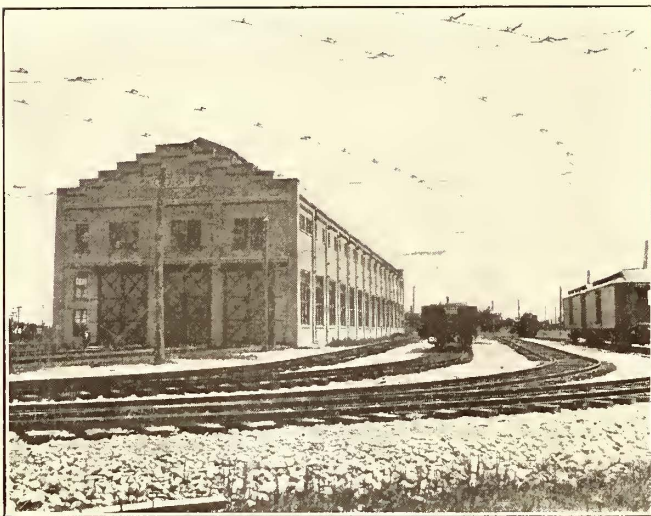
sion system for the entire line has been rebuilt so as to carry 33,000-volt current instead of 15,000-volt current, which is now used on the old part of the line. A new copper telephone line has been built from Ottawa to Joliet, so as to put the general superintendent's office, which has been moved from Ottawa, in close touch with the shops and offices at Ottawa and to replace the old iron-wire dispatching lines which were formerly used.



About the time the new extension was built extensive improvements were made at Utica, Ill. Some very sharp curves were eliminated, and the main line was moved from the street to a private right-of-way. This necessitated the purchase of about one mile of right-of-way 60 ft. wide along the north edge of the town and the removal of the overhead lines, which included trolley, telephone and three-phase transmission wires. Extensive improvements also

The ultimate scheme is to connect the Chicago, Ottawa & Peoria division with the Illinois Traction System proper, either by way of Maekinaw Junction or Peoria, and to make the Ottawa shops the point for general repairs on the northern division. About two years ago a line was constructed from Ottawa to Streator, 18 miles south, and the connection with the Illinois Traction System will probably be made from this point.

F. E. Fisher was superintendent in charge of construction of the Joliet extension and is now general superintendent of the entire line. H. E. Chubbuck is vice-president executive of the road.



Joliet Extension—Repair Shop Yard

were made in the streets of La Salle and Peru, where the tracks and special work were laid with heavier rails, and a number of side tracks in the streets were extended.

#### SHOPS AT OTTAWA

A large building which will contain the car repair shop, storeroom and offices has been erected at Ottawa, Ill. The building is of practically fireproof construction. It is brick and steel with a high monitor type roof. The building is provided with large and closely spaced windows, so that it is well lighted in the daytime. In plan the building is 60 ft. wide by 300 ft. long. The side walls are 35 ft. high. A runway for a 60-ft., 15-ton crane and steel wall brackets for supporting the shafting and motors necessary to drive



Joliet Extension—Interior of Repair Shop

the repair shop tools are provided. The building contains three repair tracks, with full-length pits under two of them. In one end of the building a paint shop is partitioned off with corrugated iron, and a small storeroom for repair parts is provided on the ground-floor level. Above the storeroom are two floors of large well-lighted offices. These are occupied by the heads of the maintenance and transportation departments.

### STRIKE AT TEXARKANA

Texarkana is a city on the border line of Arkansas and Texas, and its electric lighting and gas service is supplied by the Texarkana Gas & Electric Company. This company is owned largely in Chicago and operates some fifteen cars. The manager is W. L. Wood, Jr., who is also president of the Board of Trade. Up to last October no attempt had been made to unionize the line. The men were seemingly content, and their wages had been increased twice during 1911. The last increase went into effect Oct. 1 and amounted to 10 per cent. On Oct. 14, however, a delegation of employees called on Mr. Wood and submitted for his signature a proposed agreement, consisting of six articles, the gist of which was that a branch of the Amalgamated Association should be recognized. Mr. Wood declined to sign, and a strike was immediately called.

During the first day or two there was little hostility, but as the railway company gradually increased its working force and the number of cars in operation attempts at violence began. On the whole, these were not serious, as the police protection provided by the city was good and the cars were well manned with guards. But on several occasions the strikers attempted to pull the new men from the cars, and one attempt was made to dynamite the carhouse. This, however, was discovered and frustrated. On another occasion, as a car was returning from the earhouse to a downtown hotel one night, loaded with strikebreakers, it was fired into from ambush, but no one was hurt, although all the sashes on one side of the ear were broken. Several rioters were arrested during the strike, but no conviction was secured.

In addition to this open violence, a very strong attempt was made to subject the line to a boycott and to extend this boycott to merchants and others who patronized the cars. "Walking badges" were issued, and there was the usual attempt on the part of the strikers to establish a competing stage line. One or two mass meetings were held by the strikers to create a sentiment against the company. But at these meetings the lawlessness advocated by the speakers went very far to alienate the best public sentiment in the city, as the company had always possessed a good reputation for enterprise and public spirit. Letters were published in the daily press from prominent citizens in support of the company, the editorials became more favorable to it, and on Nov. 28 the strike collapsed.

During the first ten days or two weeks the traffic on the lines showed a considerable loss, but before the strike was declared off business had gone back to about 70 per cent of normal, and soon after the conclusion of the strike the company was enjoying a considerable increase over that of the previous year. The confession of the McNamara brothers in Los Angeles undoubtedly had considerable to do in strengthening the company in public opinion.

The officials of the company upon whom the burden of conducting the fight against the strike principally rested were W. L. Wood, Jr., manager; H. L. Harris, superintendent of the railway department, and W. M. Dunn, superintendent of transportation.



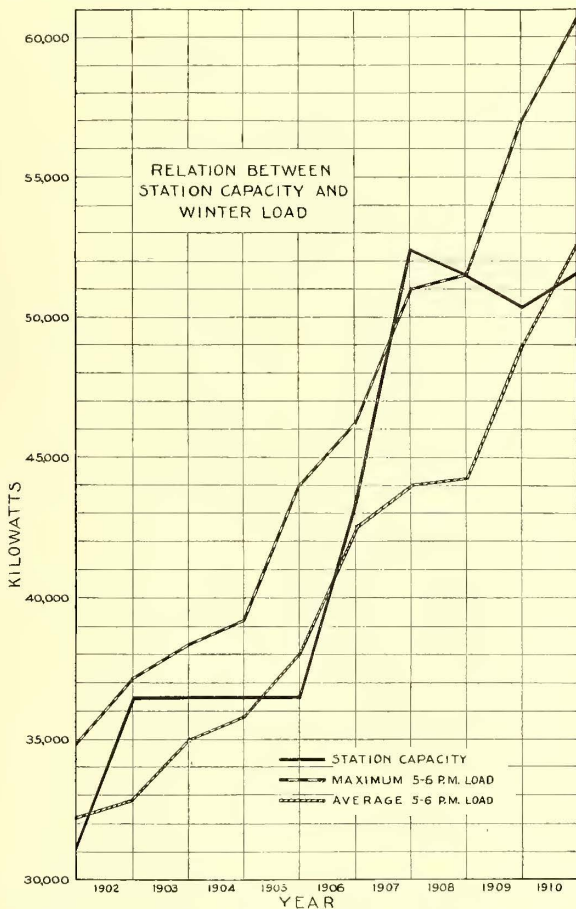
# Power Generation and Distribution System of the Boston Elevated Railway

Analysis of Load Conditions—Reasons for Adopting Alternating-Current Generation and Transmission for Future Power Requirements—Six New Substations of Large Size Have Been Built

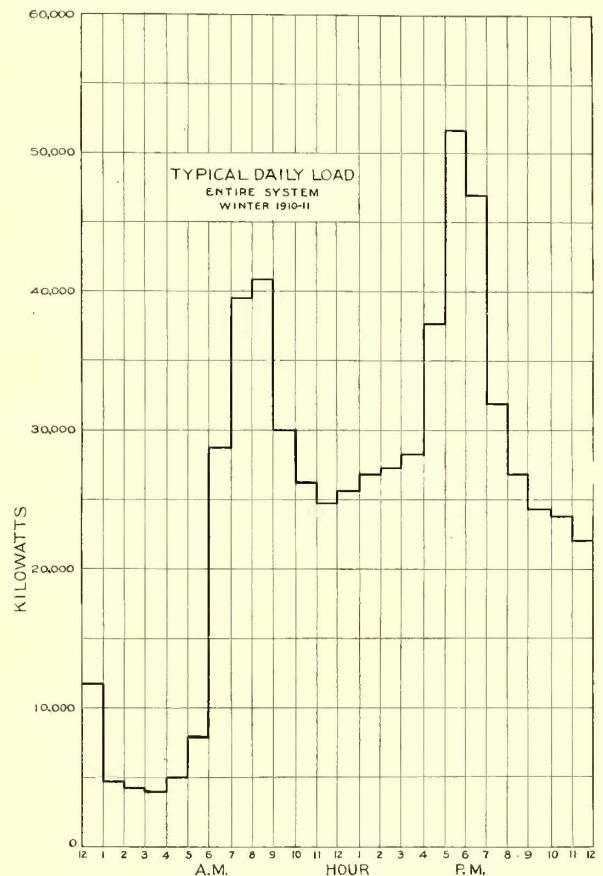
The Boston Elevated Railway, serving a metropolitan district of over 100 square miles and a population of approximately 1,500,000 people with nearly 500 miles of track, has long afforded a notable example of the economical use of direct-current power generation and distribution. With the exception of two converter substations in the southwestern section of the territory served, all power for the elevated, subway and surface lines has been generated in eight widely separated steam stations and two small gas-engine stations in the northern district. Owing to the configuration of Boston and its suburbs it has been possible to locate all but one of the steam stations on tidewater,

### STUDY OF THE POWER SITUATION

In 1908 the Stone & Webster Engineering Corporation was engaged to investigate and report on the whole power situation. A careful analysis of the first cost and producing cost of both systems of generation and distribution was made by these engineers. The metropolitan district is, roughly, in the form of two-thirds of a circle with the business district and area of maximum load in the center. A map was made on which the existing and proposed direct-current steam stations were located, and the costs of power delivered at the cars at varying distances from the several stations were drawn on the map as concentric circles surrounding each station. A similar map was prepared for an alternating-current generating station and substations, and



Boston Elevated Power—Increase in Load and Station Capacity in Eight Years



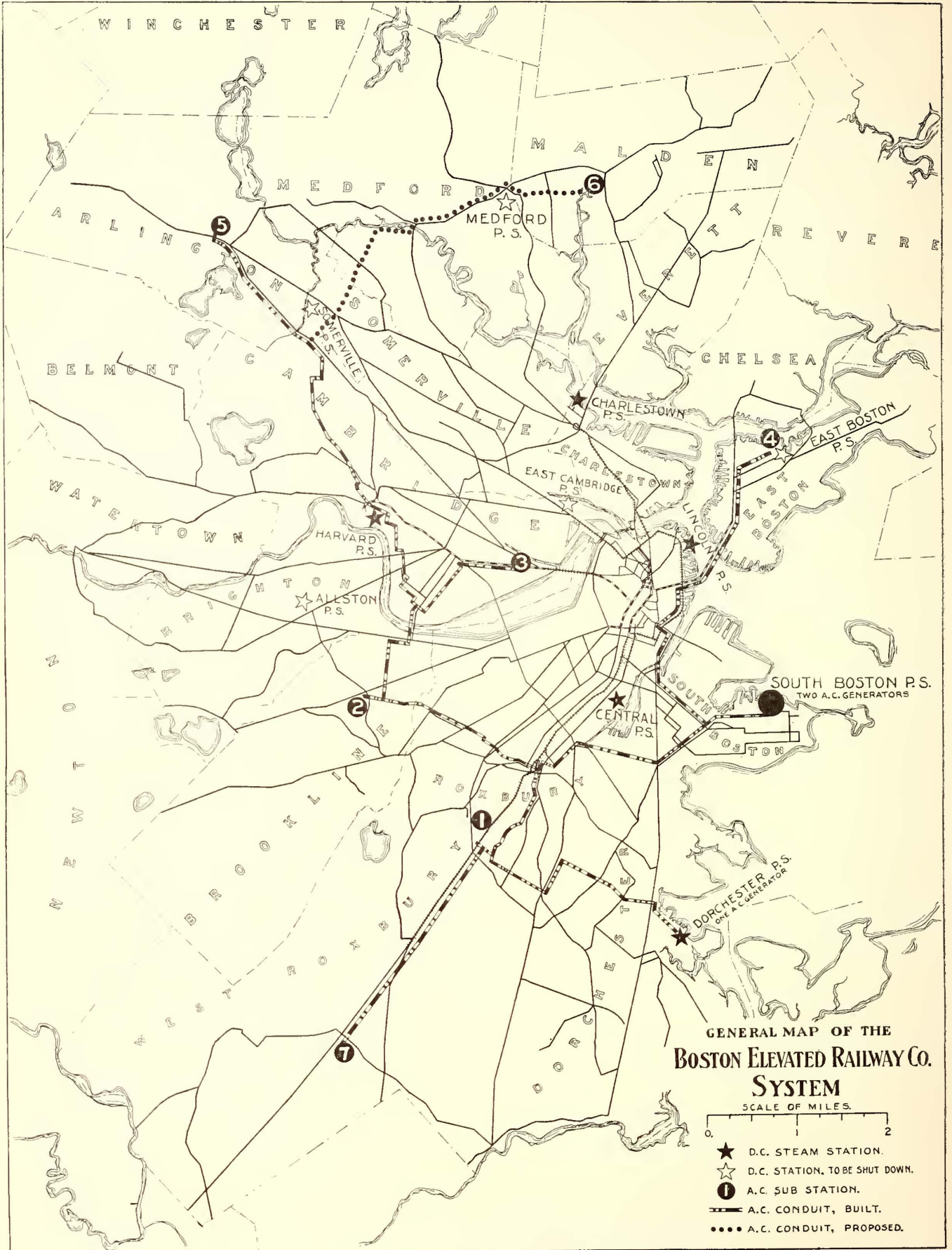
Boston Elevated Power—Typical Daily Winter Load Curve for the Entire System

and this, together with favorable load factors and skilful management of all stations, has contributed to an exceptionally low cost of producing direct current.

During the last five years the demand for power has increased rapidly owing to the extension of elevated and surface lines into the suburban districts and the use of larger and heavier rolling stock. The company therefore faced the problem of building several new direct-current stations of moderate size near the new load centers on the outskirts of the system or building one large alternating-current generating station at a favorable location on tidewater and distributing high-tension current in underground cables to several converter substations from which energy could be fed to the trolley wires.

by superimposing one map on the other the economic limits of direct-current generation and distribution were obtained as the loci of the points of intersection of the circles representing equal costs for alternating current and direct current. This method showed that alternating-current distribution was more economical for the rapidly developing districts lying beyond an approximate circle having a radius of 3 miles, with its center in the business district. The engineers therefore recommended the construction of a complete new alternating-current generating station of large size located on tidewater in South Boston; building an underground transmission line in the form of a loop about 8 miles in diameter, and installing for immediate needs six new substations connected through the trans-





Boston Elevated Power—Map of System, Showing Power Stations, Substations, High-Tension Transmission Lines and Trolley Distribution

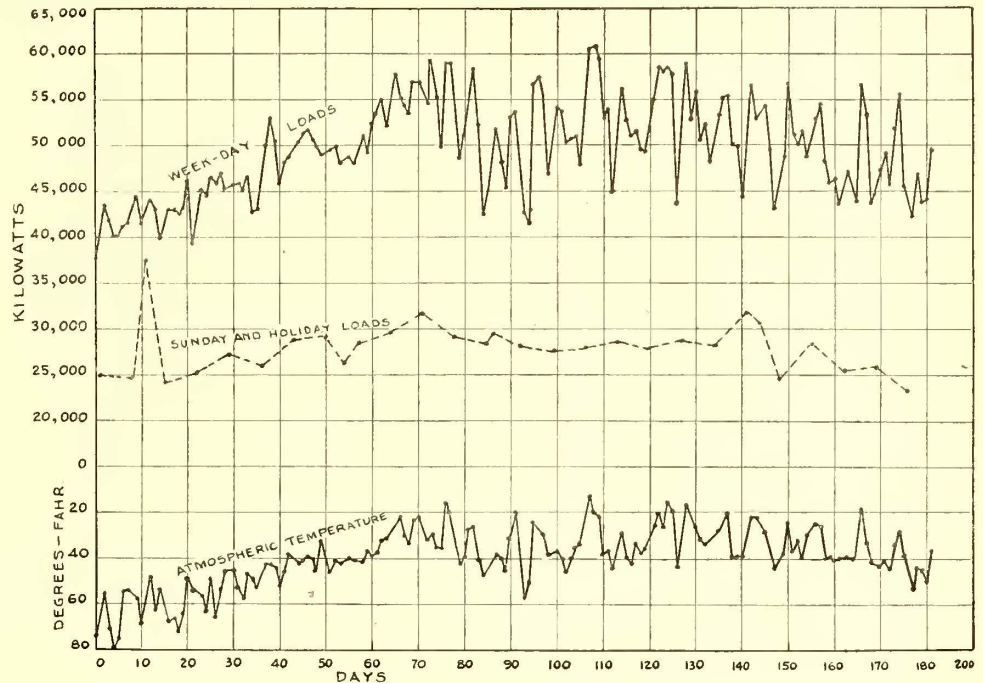


mission line with the new station. Late in 1910 the directors of the Boston Elevated Railway authorized the expenditure of nearly \$3,750,000 to carry out these recommendations. The Stone & Webster Engineering Corporation was retained as designing and constructing engineer, and on Jan. 26, 1911, ground was broken for the new power station in South Boston. This station, which contains two 15,000-kw Curtis turbo-generators, has been completed, five of the six new substations have been built, and 85 per cent of the transmission-line ducts and cables have been installed during the present year.

**DIRECT-CURRENT POWER GENERATION**

The oldest power station of the company is the Allston station in the town of Brighton, which was built in 1888 to supply current for the first electric line in the Boston district, opened between Brookline and Boston in January, 1889. This station has been enlarged and remodeled from time to time, but has never been modernized. At the present time it contains eight 80-kw generators and four 62-kw generators belt-driven by high-speed, compound, non-condensing engines. For several years it has been operated only in the winter, when the heaviest loads are carried. Since the substation at Coolidge Corner, Brookline, has been started up, this old station will be shut down and entirely dismantled.

The East Boston power station supplies power for the lines in East Boston and Chelsea which use the tunnel under the harbor. It contains three 200-kw generators direct-connected to horizontal, cross-compound, condensing engines. A new substation has been built on adjoining prop-



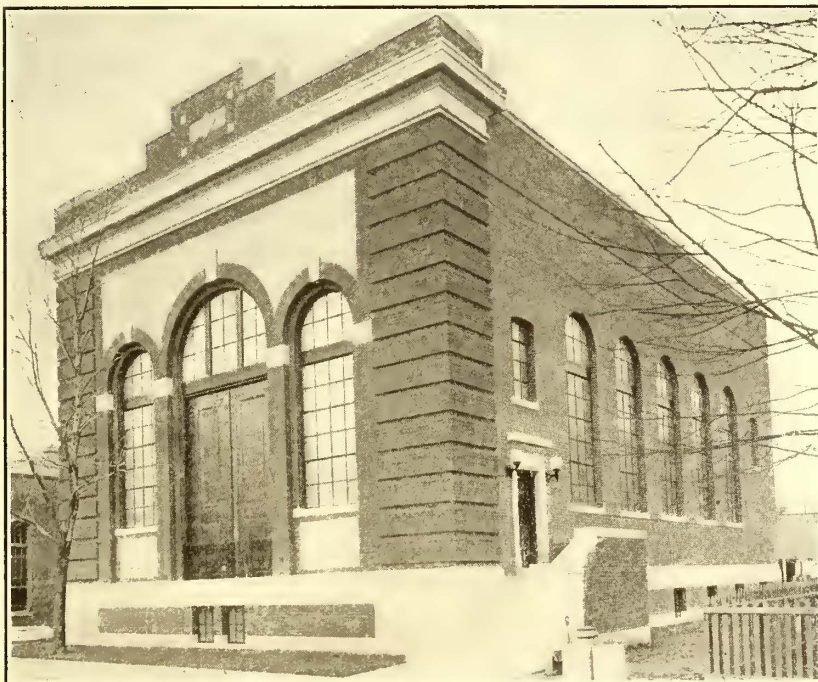
**Boston Elevated Power—Effect of Temperature on Power Station Load**

erty, and the steam station will also be shut down at once. The Charlestown power station is situated near the Sullivan Square terminal of the elevated division. It has been enlarged several times and now contains two 800-kw generators direct-connected to horizontal, cross-compound, condensing engines and two 2700-kw generators direct-connected to vertical cross-compound condensing engines. The second of these units was installed three years ago.

The Central power station is located on Albany Street, south of Dover Street and close to the South Basin, from which its supply of condensing water is drawn. It is one of the older stations, but on account of its central location it has been enlarged and remodeled a number of times and to-day is the second largest direct-current generating station of the system. It contains two triple-expansion condensing engines direct-connected to generators of 1200 kw capacity each; six horizontal cross-compound condensing engine units of 1200 kw and 1500 kw capacity each, and one vertical cross-compound condensing engine direct-connected to a 2700-kw generator, making a total rated capacity of 12,900 kw.

The Harvard station in Cambridge is located on the north bank of the Charles River, and is a modern station of its kind in every respect. It originally contained three 1200-kw horizontal cross-compound engine units and three years ago was enlarged by the addition of one 2700-kw vertical cross-compound engine unit.

The Dorchester station, which is on the harbor, supplies current to the southeastern part of the system. Its original equipment consisted of two 1000-kw engine-driven units, but about five years ago a direct-current turbine unit was installed. The operation of this machine was not satisfactory, and in 1910 the generator was removed and



**Boston Elevated Power—Exterior of Coolidge Corner Substation**

The East Cambridge power station, which is situated on the river front, is the next oldest station. It contains six generators, each of 467 kw capacity, belt-driven from a jack shaft, which in turn is belt-driven from three horizontal, triple-expansion condensing engines. It will be shut down at once.



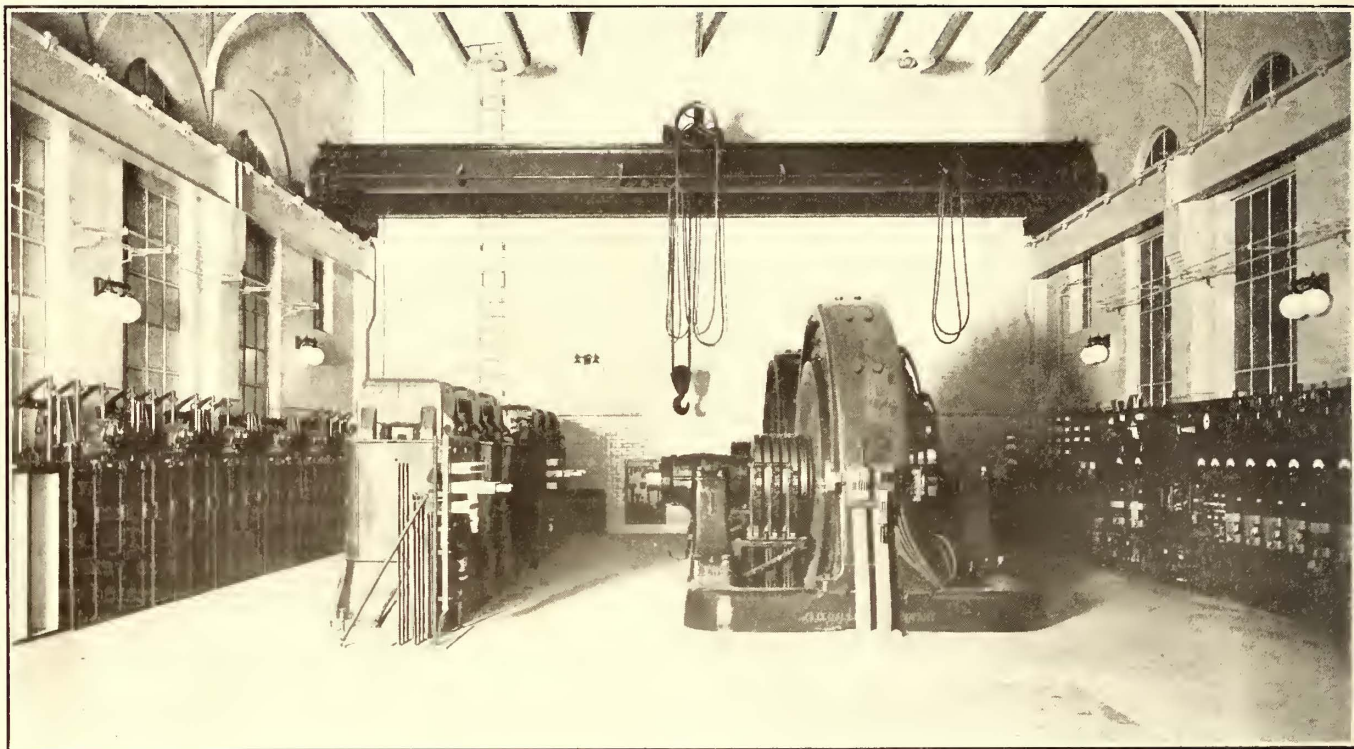
replaced by an alternating-current machine of 3500 kw rated capacity. The output of this alternating-current generator was transmitted a distance of about  $2\frac{1}{2}$  miles to a converter substation at Egleston Square, where three 1000-kw rotary converters were installed to supply the Forest Hills extension of the elevated road and surface lines in the surrounding territory.

The Lincoln power station is the largest and newest of the direct-current steam stations. It is situated on the harbor front, near the center of the business district of Boston, and was built in 1901 to supply current for the operation of trains on the elevated structure. Three 2700-kw vertical cross-compound, engine-driven units were first installed, and in 1908 two more units of the same size were added.

In 1906 the railway company built two small producer gas-engine plants in the northern district. The Somerville station contains two 350-kw units and the Medford station contains two 325-kw units. These two stations were built to relieve the Charlestown and Harvard steam stations dur-

the average hourly peak load had again risen in excess of the station capacity, while the maximum hourly load had increased to over 60,000 kw. The need of large additions to the power supply at the present time is apparent from the diagram.

The company now has a rated direct-current generating capacity in all stations, including the Egleston Square and Forest Hill substations, of 51,138 kw. By next spring the direct-current power station capacity will be reduced 5638 kw by reason of shutting down the Allston, East Boston, East Cambridge, Somerville and Medford stations, and another 800 kw of capacity will be taken off by shutting down the Forest Hills substation, where alternating current purchased from the Boston Edison Company is converted to direct current. The increase in substation capacity will be 20,000 kw, making the total rated direct-current capacity 64,700 kw. The total alternating-current generating capacity will be 33,500 kw, or 9500 kw in excess of the total connected rotary capacity. The new South Boston power station contains space for a third 15,000-kw generator, so



Boston Elevated Power—Interior of Coolidge Corner Substation

ing peak-load periods in the morning and evening, and they have been operated intermittently as required. Both stations are located in residential districts and the unavoidable noise of the exhaust has proved very objectionable to residents in the vicinity. For this reason and because of the small size of the gas-engine units both stations will be shut down as soon as the Arlington and Malden substations can be put in service. These two substations will have an initial equipment of two 1000-kw and two 2000-kw rotaries respectively, or a total of 6000 kw as compared with 1350 kw for the two gas-engine stations.

#### LOAD CONDITIONS

As will be seen from the diagram on page 1313 of loads and generating capacity of the entire system for the years 1902-1911, the generating capacity, although increased from 31,000 kw to 51,138 kw, or nearly 70 per cent, in ten years, has barely kept pace with the average hourly maximum load and has always been below the maximum hourly loads. An increase of 5400 kw in capacity in 1902 sufficed for only three years, when a further increase of 16,000 kw, or 45 per cent, was found necessary, being spread over a two-year period. In another three years at the end of 1910

that without building any other new power stations the generating capacity of the system can be raised to 90,200 kw. An additional 80,000 kw could be added by enlarging the South Boston station to the ultimate size for which it is designed, so that the power requirements of the future have now been provided for far in advance.

#### PEAK LOADS

The peak load on the system occurs between 5 p. m. and 6 p. m. during the winter months. Last winter the average load for the evening rush hour was from 5 per cent to 10 per cent in excess of the total station rated capacity, while on certain days the load exceeded the rated capacity of the stations by 20 per cent. The morning rush-hour peak load is normally about 90 per cent of the evening load.

The summer peak loads are between 70 per cent and 75 per cent of the winter peaks. This is accounted for largely by the use of light open cars on many lines and the fact that there is no demand for heat, and also by the fact that the car resistance in warm weather is less than in cold weather. The last two factors produce a striking relation between the load of the system and the atmospheric temperature, which is well illustrated by the diagram on



page 1315. An increase of approximately 400 kw in the total load on the system results from a decrease of 1 deg. in the atmospheric temperature.

The night load between 1 a. m. and 5:30 a. m. averages about 3000 kw in the summer months and 5000 kw in the winter months. This load normally is carried by two of four favorably located stations, the other stations being shut down during this period.

DIRECT-CURRENT DISTRIBUTION

The network of overhead trolley wires, consisting of more than 465 miles, at the present time is divided into seventy-six feeder sections, of which thirty-eight are fed from a single generating station or substation. The remaining sections are fed jointly by two or more generating stations. These jointly fed sections permit all the direct-current power stations to be operated in parallel. If any

Somerville and Medford. In the outlying districts they are carried on the poles above ground. The total length of feeder and return cable now installed (in 500,000 circ. mil

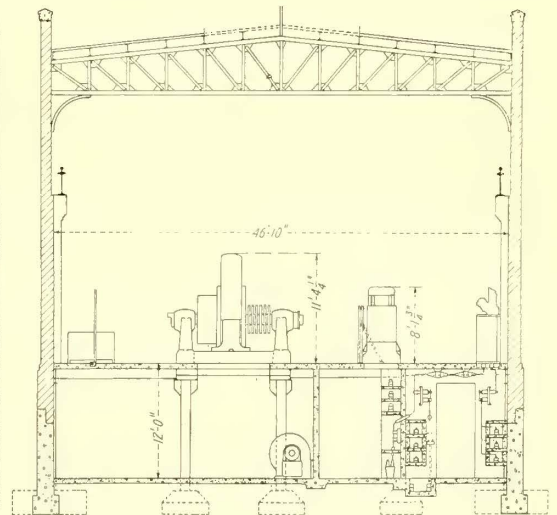
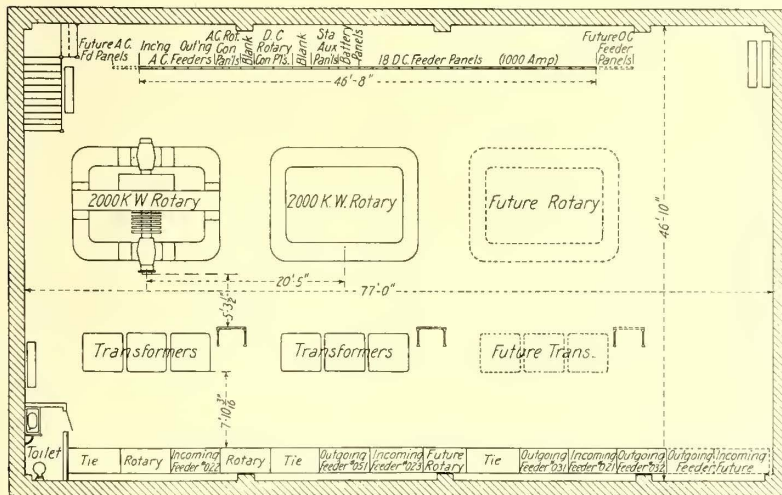
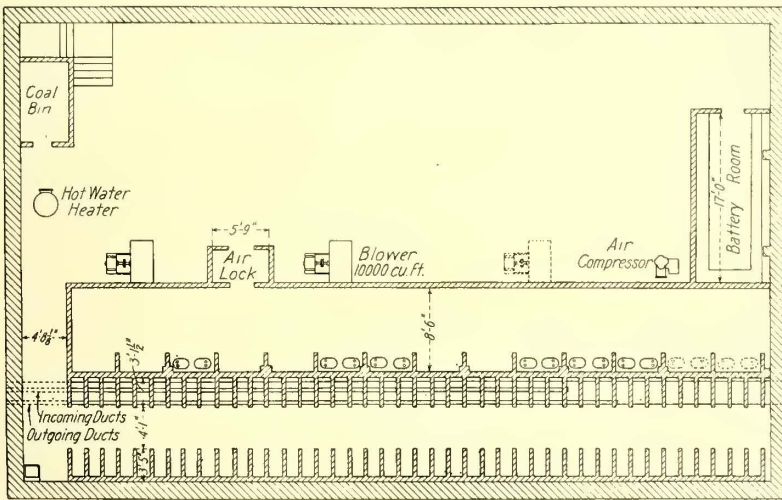
Station.	Maximum Distance, Average Distance,	
	Miles.	Miles.
Central .....	3.98	1.28
Lincoln .....	3.67	1.38
Charlestown .....	5.02	1.38
Harvard .....	4.84	2.05
East Cambridge .....	2.75	1.19
Dorchester .....	5.00	1.66
Allston .....	2.58	0.97
East Boston .....	1.70	1.06
Somerville (gas engine) .....	3.31	1.13
Medford (gas engine) .....	3.30	1.47
Egleston square (substation) .....	1.91	0.84
Forest Hills (substation) .....	4.61	2.23

equivalent) is 1187.03 miles, of which 719.12 miles is overhead and 467.91 miles is underground.

Now that the new substations are placed in operation and the Allston, East Boston, East Cambridge, Somerville and Medford power stations are shut down, an extensive rearrangement of the distribution system in the sections affected will be necessary and is in progress. The same general plan of operating the substations and direct-current power stations in parallel through tie sections of trolley will be followed. The feeder copper released by shutting down the five small generating stations is being used at the new substations.

NEW SUBSTATIONS

The six new substations which will be supplied from the South Boston power station are located respectively at Coolidge Corner in Brookline, Kendall Square in Cambridge, Arlington, Malden, East Boston and Roslindale. The capacity of the present substation at Egleston Square has been increased and



Boston Elevated Power—Plans and Cross-Section of Coolidge Corner Substation

station is overloaded, the generator voltage at that station is lowered, the result being that the other stations take more of the load of the tie sections, thus relieving the load on the station previously overloaded. In this way the load is fairly evenly distributed over all the stations and a high load factor is obtained for each station. All feeders are controlled by switches and circuit breakers at the stations from which they emerge.

In general the direct-current transmission distances are short. The following table shows the maximum distances power is normally transmitted from each station and also the average distances from the stations to the electrical centers of gravity of the feeder sections supplied from each station.

Feeder and return cables are led out underground from all stations except East Cambridge, Allston, East Boston,

the substation utilizing Boston Edison energy at Forest Hills will be abandoned.

The Coolidge Corner substation will have an initial equipment of two 2000-kw rotaries and feeds the lines in the Brookline and Brighton districts at present supplied from the Central, Harvard and Allston power stations.

The Kendall Square substation is located on the route of the new Cambridge subway and will supply the subway in addition to the surface lines formerly fed from the East Cambridge power station. It also will contain two 2000-kw rotaries.

The Arlington substation is the farthest from the South Boston power station. It will replace the Somerville gas-engine station and relieve the Harvard station of a part of its load which is now being transmitted long distances. The initial capacity of this station will be two 1000-kw rotaries.



The Malden substation, which is the only one of the new substations not yet completed, is designed to feed the lines in Malden, Medford and Everett and will replace the gas-engine station in Medford. It will relieve the Charlestown station of a heavy load which is being transmitted for distances up to 5 miles. The initial equipment will be two 2000-kw machines with room for two additional units of the same size.

The East Boston substation is located on property adjoining the East Boston power station which has been shut down. It has an initial equipment of two 1000-kw rotaries.

On the south side of the city only one new substation has been built, at Roslindale, about 1¼ miles beyond the Forest Hills terminal of the elevated road. This station will have the longest average distributing distance of any of the new plants. It will be equipped with two 1000-kw rotaries.

SUBSTATION BUILDINGS

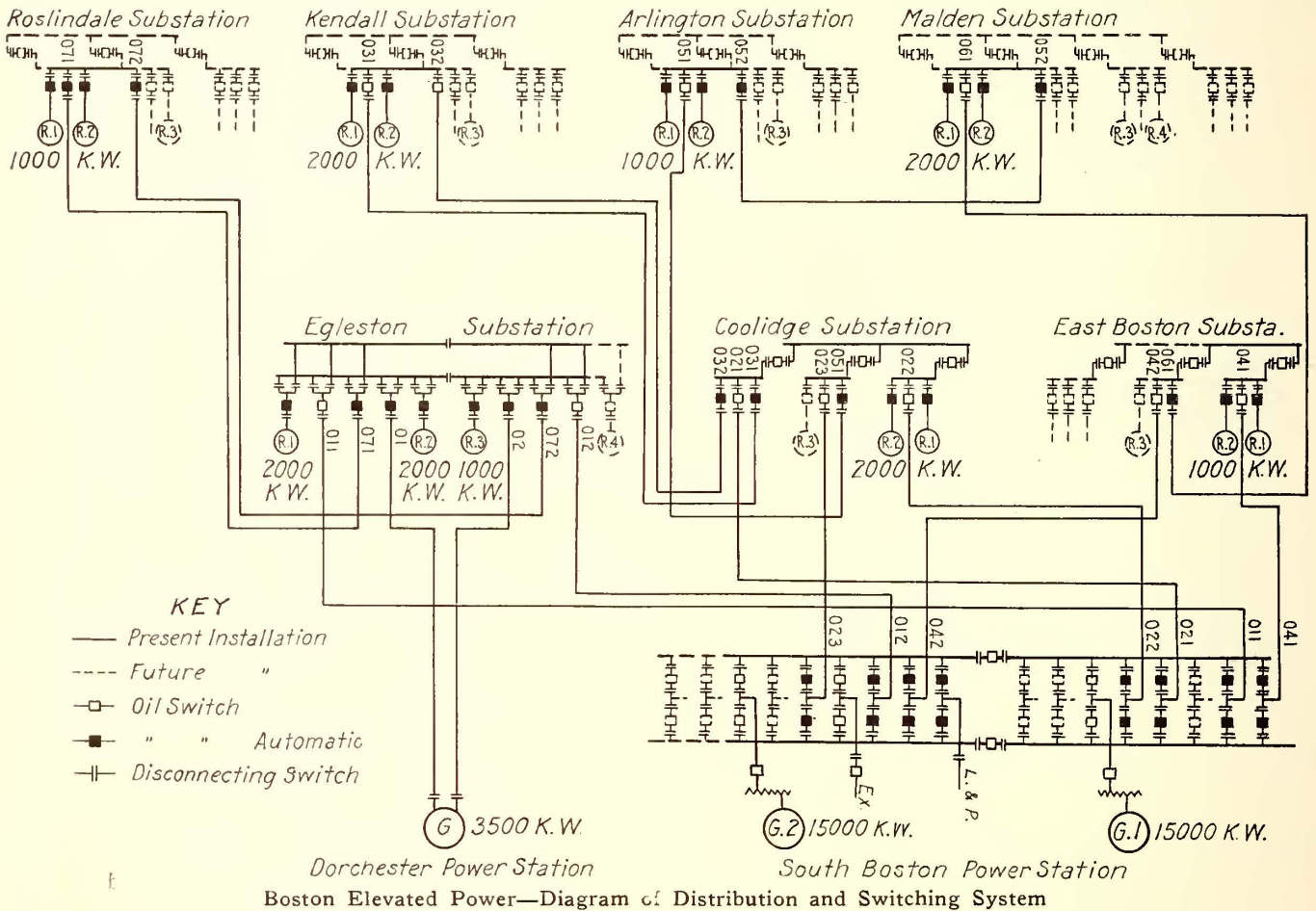
The new substation buildings are of substantially similar design and arrangement, although there are slight varia-

surmounted by a stucco panel and a wide stone coping relieve the plainness of the front wall. The interior walls have a wainscot of tile-glazed bricks and above the wainscot the walls are faced with buff pressed bricks.

The rotaries, transformers, oil switches and the operating switchboard are mounted on the same floor, while the high-tension bus compartments are in the basement. An interesting detail of the building design is the use of four structural steel columns set on large concrete footings for the rotary foundations. This leaves the basement floor clear and free and is less expensive than heavy concrete foundations. The operating room is spanned by a 25-ton hand-operated traveling crane.

ALTERNATING-CURRENT TRANSMISSION

Three-phase, 25-cycle alternating current will be generated at 6600 volts at the South Boston power station and stepped up to 13,200 volts through compensators. The 3500-kw alternating-current generator in the Dorchester station generates 25-cycle, three-phase current at 13,200 volts direct and when necessary it may be operated in



Boston Elevated Power—Diagram of Distribution and Switching System

tion in the exterior architectural treatment. They are designed to accommodate three rotaries each with the exception of the Malden station, which will have an ultimate capacity for four rotaries. The rotary foundations in all cases are built to take either a 1000-kw or a 2000-kw machine, so that wherever 1000-kw rotaries have been installed for initial service they can be replaced when required by 2000-kw rotaries.

Illustrations are presented of the Coolidge Corner substation in Brookline, which is typical of the others. The building is 46 ft. 10 in. x 77 ft. long inside and is constructed with brick walls on concrete foundations. The roof is formed of reinforced-concrete slabs supported by latticed steel trusses. The side and rear walls are built of plain bricks with stone sills, but the front wall is made of rough-faced bricks with troweled joints. A large doorway for taking machinery in and out and two high windows

parallel with the South Boston generators through the busbars of the Egleston Square substation, to which it is already connected by a duplicate cable underground transmission line.

The high-tension cables leave the South Boston power station in underground conduits composed of 3½-in. square vitrified-clay ducts and continue west under East Second Street to the corner of Broadway and Dorchester Street. One line of ducts branches north under Broadway at this point and continues under Fort Point Channel, which is crossed by submarine cables. The transmission line then runs in ducts under Atlantic Avenue to the East Boston tunnel, through which it is carried in vitrified ducts. From the east portal of the tunnel it continues in underground ducts to the East Boston substation. In the near future it will be extended under the river to Chelsea and thence in underground ducts to the Malden substation. This line



consists of two cables from South Boston to East Boston and one cable from East Boston to Malden.

The other line continues under Dorchester Avenue, Southampton Street and Albany Street to Dudley Street. Here it branches to the south and to the west. The south branch runs under Warren Street and Walnut Avenue parallel with Washington Street to Egleston Square substation. It then continues under Washington Street a distance of about 3 miles to Roslindale substation. The west branch runs under Roxbury Street and Longwood Avenue to the Coolidge Corner substation in Brookline. From this substation the line turns north and crosses the Charles River into Cambridge over the Essex Street bridge. A branch then turns north to the new Cambridge subway, where it enters ducts in the subway walls and runs east to the Kendall Square substation. The main transmission line continues northwest past the Harvard power station to Arlington substation. In the near future a branch from the Arlington substation will be built north and west to the Malden substation, thus completing the loop.

Three cables are run from South Boston direct to the Coolidge Corner substation and two to the Egleston Square substation, from which they are continued on to the Roslindale substation. From the buses at Coolidge Corner one cable runs direct to Arlington and two to Kendall Square. A single cable will connect the Arlington line with the Malden substation.

The complete transmission system has a total length of about 25 miles and 60 miles of high-tension cable has been installed. The length of high-tension duct constructed for present and future use is 142.7 miles. All cables in ducts are three-conductor, No. 0000, paper-insulated and lead-covered, and were furnished by the American Steel & Wire Company. The cables were installed in the ducts by the maker. The armored submarine cables required for crossings under water were furnished by the Waterbury Company.

#### SWITCHING ARRANGEMENTS

The incoming and outgoing high-tension feeders and the switching and busbar arrangements at the South Boston power station and each substation are shown in the diagram on page 1318. It will be seen that the duplicate buses in the South Boston power station are sectionalized into two parts, each pair of half buses being connected to one generator. The transmission lines from South Boston to each side of the main loop and to the Egleston Square substation are in duplicate, one cable of each line being connected to one half bus at the power station and the other cable to the other half of the bus. Either or both generators can feed any or all substations from either or both halves of the station buses.

Provision has been made in all substations for installing a common bus in addition to sectionalizing buses for the rotaries. In general the bus and switching arrangements in all substations are the same. One incoming feeder is connected to a sectionalized rotary bus supplying two machines. Where two feeders enter a station the second incoming feeder is connected to a second sectional bus and the outgoing feeder is connected to the same bus. Each sectional bus is connected to the common bus through suitable disconnecting and oil switches.

The 3500-kw generator at the Dorchester station is connected with the Egleston Square substation by two cables which are tied in to the two halves of the substation buses.

#### LOAD DISPATCHING

Up to the present time the load dispatching of the system has been directed from the central power station by a chief dispatcher and two assistants, who receive hourly reports from all stations. In emergencies the dispatcher on duty gives the necessary instructions to all the power stations to regulate the voltage so as to equalize the loads. These dispatchers will be moved to the South Boston station and from there they will order the direct-current generating

station and substation operation as well as the alternating-current generation.

The new substations and the South Boston power station will be run in two eight-hour shifts and will be shut down at night. As will be seen from the daily load curve, on page 1313, the maximum load from 9 p. m. to 5 a. m. does not exceed 25,000 kw and between 3 a. m. and 4 a. m. is less than 5000 kw. Such light loads cannot be handled as economically by one of the 15,000-kw units at South Boston, including substation conversion, as by operating a few smaller direct-current generators in two or three of the older power stations.

#### SOUTH BOSTON POWER STATION

A description of the new South Boston power station will be published in an early issue of this paper.

### DETROIT FRANCHISE SITUATION

In view of the rumors in reference to the proposed Detroit United Railway franchise, J. C. Hutchins, president of the company, has written the following letter to stockholders:

"There is now pending before the people of the city of Detroit an ordinance which is intended to settle all existing differences between the company and the city. This ordinance, if adopted, will very considerably reduce the income of the company, but the company's resources outside and inside of Detroit will still be sufficient to protect your holdings. The probabilities are that the people will ultimately adopt this ordinance, because it gives to them the rates of fare for which they have long contended and which the company, by reason of the extension of its operations, is only now able to give; but whether the ordinance is adopted or not, or whether or not the city acquires the part of your property which lies within its limits, as the ordinance provides it may do, you need not worry, for the reason that the property your stock represents, covering, as it does, equities in more than 750 miles of well-appointed electric railways, is worth more than the face of the stock.

"My purpose in issuing this circular is to warn you not to be misled by sensational newspapers or designing persons into any needless sacrifice of your holdings."

#### STATEMENT OF A. B. DU PONT

A. B. du Pont, who was consulted by the city officials of Detroit in reference to the franchise before the general terms of the settlement were announced publicly, has made the following statement in reference to the proposed ordinance requirements at the request of Mayor Thompson of Detroit:

"Viewed from either the standpoint providing a plan to facilitate municipal ownership or as an ordinance providing for private ownership, I consider it the best settlement in the interest of the public that has as yet been proposed in Detroit and better than any that has been adopted by any other city.

"First: From the standpoint of municipal ownership this ordinance binds the railway company effectively to sell and deliver all of its property within the city limits at a just price to the city in as short a time as is practicable after the city determines to buy the same.

"Second: Viewed as an operating ordinance it provides for the lowest rate of fare that any street railway has contracted to operate in the United States and in addition provides for the regulation of the service as the traffic demands.

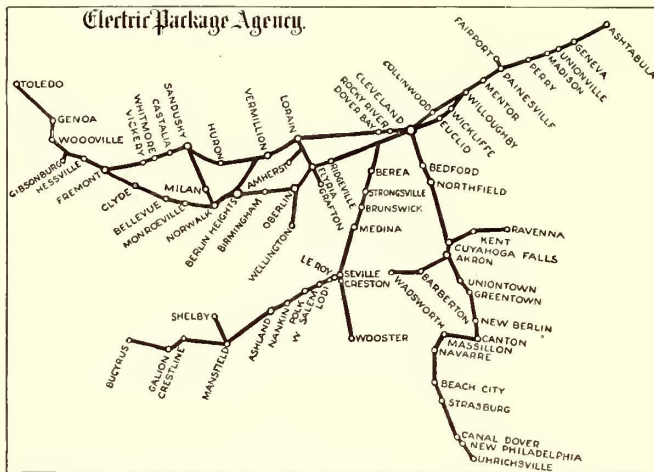
"It also is the only ordinance that I know of anywhere that binds the railway company properly to provide for additional tracks to be constructed and operated where the city designates.

"I believe that the limitation of 5 per cent of the then existing tracks that must be built at the city's election each year is ample to secure for the city the full length of the proposed adequate street railway facilities."



**AGENTS' LIST OF POINTS REACHED BY ELECTRIC PACKAGE AGENCY**

For the information of agents in billing shipments Edgar H. Hyman, general manager of the Electric Package Agency, Cleveland, has issued a list of offices and other points. This list was filed with the regulating commission of Ohio. The agency is agent for the Lake Shore Electric



Map Showing Stations Reached by the Electric Package Agency

Railway, the Cleveland, Southwestern & Columbus Traction Company, the Northern Ohio Traction & Light Company, the Cleveland, Painesville & Eastern Railroad and the Cleveland, Painesville & Ashtabula Railroad.

The list shows on one page the graduated charges for packages weighing less than 100 lb. The list of offices is given alphabetically. It shows the name of the office, the stop number, the name of the railroad, the division of the railroad on which the office is located and spaces for the rates.

Another alphabetical list is given of points (cross-roads and stops) where no regular agencies are maintained. All shipments made to these points must be prepaid and receipted for at the risk of the owner. This alphabetical list shows the name of the point, the stop number, the name of the railroad, the name of the division of the railroad and spaces for the rates. The names of the points on which the agents are to make the waybills are also published. The accompanying illustration is a reproduction of a map which is published on one page in order to give agents a clear understanding as to the point on which the waybills are to be made out. For instance, if a shipment is made to Beach Park, located on the Lake Shore Electric Railway between Dover Bay and Lorain, the waybill would be made on Lorain on a westbound shipment or on Dover Bay on an eastbound shipment.

**COMMITTEES OF THE ACCOUNTANTS' ASSOCIATION**

President P. S. Young, of the American Electric Railway Accountants' Association, has made the following appointments of committees for the current year:

Committee on a statistical unit for car operation: C. H. Lahr, chairman; E. L. Kasemeier and C. S. Mitchell.

Committee on prepayment car operation: M. R. Boylan, chairman; H. J. Davies and C. D. Huggins.

Committee on physical valuation: R. N. Wallis, chairman; A. R. Patterson and H. E. Weeks.

Joint committee on engineering accounting: F. B. Lasher, co-chairman; C. E. Thompson, A. F. Elkins, J. C. Collins and H. M. Grafton.

Committee on destruction of records: H. S. Swift, chairman; R. Morrison and J. M. Kee.

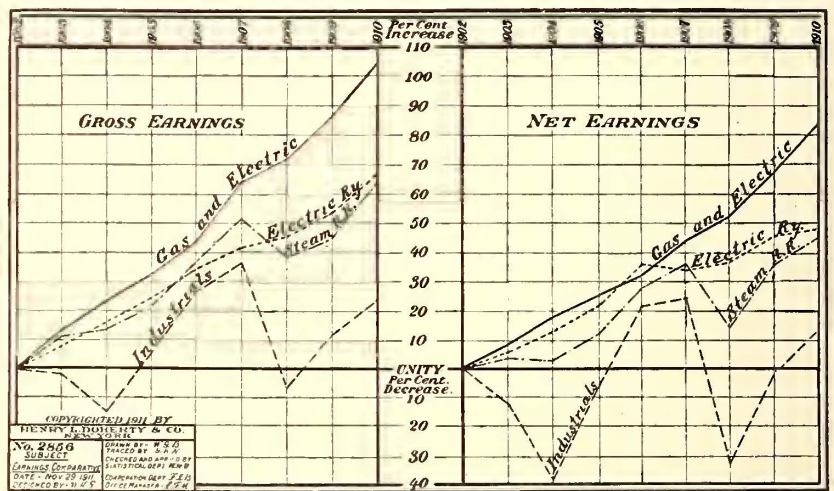
**COMPARATIVE EARNINGS OF PROPERTIES**

Henry L. Doherty & Company, of New York, have compiled charts showing the relative increases and decreases in gross and net earnings of steam railroads, electric railways, gas and electric companies and industrials for the years from 1902 to 1910. The charts are reproduced herewith.

In the compilation of these charts the gross and net earnings of all steam railroads in the United States were used. For the electric railways the gross and net earnings in most of the larger cities of the country, exclusive of New York City, were taken. The gas and electric lighting returns were based on a similar selection of properties and New York City was also excluded in this case. The industrial figures are of operating companies whose securities are listed on the New York Stock Exchange and whose records could be traced back to 1902. The gross earnings of the latter group of properties in 1902 amounted to about \$1,250,000,000.

In making the charts public Doherty & Company call attention to the fact that the gross and net earnings from the gas and electric business increased the most rapidly and that they were practically unaffected in their rate of increase even by such panic conditions as those of 1907 and 1908. The gas and electric properties alone experienced no decrease for any year in net earnings; while the gas and electric and street railway properties are the only classes of properties which showed no decrease in gross earnings.

The rate of increase in gas and electric companies de-



clined in 1908. Mr. Doherty states that this decline in the rate of increase of gas and electric company gross earnings in 1908, while net earnings were unaffected, was due to the fact that many managers of lighting plants made the mistake of curtailing their business-getting expenditures during the period of panic conditions.

The electric railway earnings, both gross and net, are much steadier than are those of the steam railroads.

The Railroad Commission of Nevada has sent to the representatives of that State in Congress a petition for the abolition of the Commerce Court and the enactment of a law designed to expedite the passage of all public service commission cases in the federal courts.







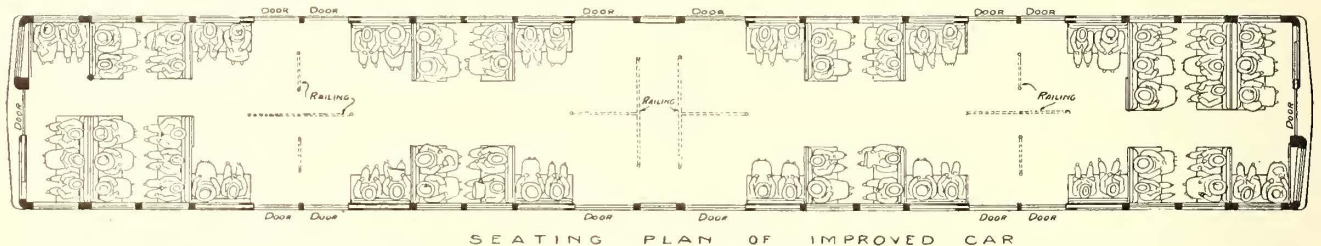
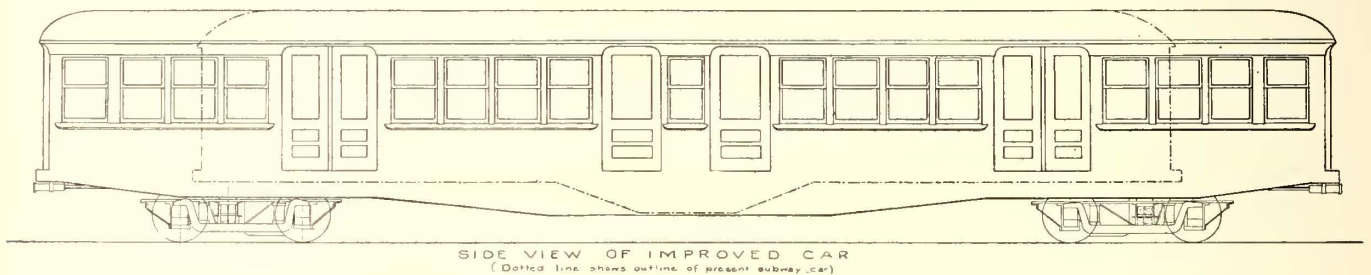
## CAR PROPOSED BY BROOKLYN RAPID TRANSIT SYSTEM FOR SUBWAY SERVICE

The Brooklyn Rapid Transit System is preparing to submit to the Public Service Commission of the First District, New York, a new type of car which is proposed as the standard rolling stock equipment for the rapid transit lines which were allotted to the Brooklyn Rapid Transit System in July, 1911, by the Public Service Commission and by the New York City Board of Estimate.

The car is somewhat like the new Cambridge subway car of the Boston Elevated Railway, and its two most striking features, as compared with the present type of subway car operated in New York, are its greater length and its greater facility of entrance and exit by means of six doors on each side. The present subway car in New York is 51 ft. long and when used in express service has a door at each end and one in the middle. The proposed

## MID-YEAR BANQUET ON JANUARY 26

The executive committee of the American Electric Railway Manufacturers' Association has issued a circular letter to its members calling attention to the mid-year meeting of the American Electric Railway Association on Jan. 25-26, 1912. Following an established custom, the executive committee of the Manufacturers' Association has extended an invitation to the street railway delegates in attendance at the mid-winter meeting to dine on Jan. 26, 1912. This invitation has been accepted by President McCarter on behalf of the delegates. Arrangements have been made to have speakers of national prominence talk on live, interesting subjects. The circular continues: "Owing to the unusually large attendance last January, which will in all probability be greatly exceeded at the coming dinner, the committee on arrangements has reported that the dinner will be held in the grand ballroom of the Hotel Astor at



Plan and Side Elevation of Brooklyn Rapid Transit Company's Proposed Subway Car

car will be 67 ft. long, and, as shown in the accompanying side elevation and plan, it will have a pair of doors in the center and a pair midway between the center and each end of the car. End doors will also be provided to permit access from one car to another.

The increased length and the partial use of cross seats and of folding seats alongside the doors will give a seating capacity of seventy as compared with the forty-two to forty-four of the present subway cars. An increase in seating capacity up to eighty-four will be possible during the non-rush hours, when only part of the doors will be required. It is proposed to have the guard stand on a platform opposite the center panel to watch and control all doors. The standing load of this car is estimated at 102 persons. The aggregate capacity of the car with all doors in use would be 60 per cent greater than that of the New York cars. A train of eight cars constructed according to the new design would be only 26 ft. longer than the present ten-car trains, but would carry 30 per cent more passengers. Railings will be provided opposite the doors as shown to separate the opposing streams of passengers and also to give standing passengers a better support than would be afforded by straps.

The design described has not yet been worked out fully in its mechanical and electrical details. It is intended, however, that trains should consist only of motor cars which are to carry one motor per truck. This arrangement will give sufficient tractive effort, despite the fact that the truck bolsters will be offset to secure the equalization of weight on all axles.

7 o'clock sharp Jan. 26, 1912, and the price per plate has been fixed at \$10. The committee also wishes to announce that any member, upon procuring the necessary tickets, may invite other guests, including any representatives of any railway company, who are not delegates to the mid-winter meeting. All applications for tickets must be made to the secretary-treasurer on or before Jan. 19, 1912, on the application blank inclosed and must be accompanied by check for the full amount."

## COASTING CLOCK SAVINGS ON THE THIRD AVENUE RAILROAD, NEW YORK

During the month of October, 1911, the Third Avenue Railroad, New York, operated seventy-five out of about 125 cars on its Forty-second Street and Broadway line with coasting clocks furnished by the Railway Improvement Company, New York. According to an investigation made by Thomas F. Mullaney, chief engineer of the railway company, the apparent saving effected by installing these clocks was equivalent to \$568.50. The brakeshoe cost was also lowered appreciably. To obtain the figures quoted, the railway company compared the energy consumption and mileage for October with the average energy requirements per car mile for May, June and July.

The Pensacola (Fla.) Electric Company has decided to adopt green as the standard color for its cars, instead of yellow.



# News of Electric Railways

## Transfer Order of New Jersey Board Upheld

The Supreme Court of New Jersey on Dec. 26, 1911, sustained the State Board of Public Utility Commissioners in ordering the Public Service Railway to issue transfers upon all lines operating in Newark. The court held that the order, which was attacked in certiorari proceedings brought by the company, does not violate any of its contract rights. Justice Bergen, by whom the decision was rendered, stated briefly the ruling of the court in the syllabus of his opinion, which follows:

"An ordinance granting to a company the right to construct and operate a street railway along the public streets of a city which provides for a system of transferring passengers, subject to any future regulations of the board, does not stop the municipality from subsequently requiring that a transfer ticket be given upon request to any passenger who has paid his fare, entitling him to a continuous ride in either direction on any railway intersecting or connecting with the line upon which such transfer is to be given."

Justice Bergen reviewed briefly the substance of the complaint lodged with the Utility Board by William Mungle, through his counsel, Joseph G. Wolber, together with the subsequent order of the board, which among other things directed the Public Service Railway to "desist from refusing to give transfers upon any street railway line intersecting or connecting with the line upon which such transfer was originally given."

The court says: "The precise question argued was, Must a passenger wait for a particular car which will carry him to his destination without change, or can he take any of prosecutor's cars with the right to a transfer at any connecting or intersecting points to another of prosecutor's cars which will carry him to the same point he would have reached by taking a car not requiring him to transfer?"

"The first point made by the prosecutor is that the questions relating to transfers had been dealt with by previous ordinances, which became contracts not subject to future regulations relating to transfers, although such ordinances contained the condition 'subject, however, to any future regulations of the board.'"

"The first ordinance relating to transfers was adopted on Dec. 29, 1892, and required the predecessors of the prosecutor to establish and maintain a system of transfers for a continuous ride within the city limits for a single fare and to give and receive like transfers from the lines of other railways, and also provided that the ordinance should not be construed to require transfers to be given to or from lines running in the same direction and substantially parallel."

"If we assume that the ordinances are contracts between the city and the prosecutor, the company is nevertheless subject to any future regulation of the board, and the point is made by the prosecutor that such reservation is not broad enough to cover any change in the transfer requirements."

"I am of opinion that the requirement relating to transfers is a regulation which appertains to the sale of tickets and the operation of the railway concerning its method of carrying passengers to their destination for a single fare of 5 cents. What the prosecutor claims the right to do in such operation is to compel passengers to enter only such cars as would carry them to their destination without change, and this order requires it to so operate its railway as to allow passengers to take any car going in the required direction with the privilege of transferring at intersecting points, and this is not invasion of any contract right, but a further regulation of the system of transfers."

"The objection that the stopping of the cars at intersecting points to permit these transfers results in unnecessary cost and waste of power is more fanciful than real, for in practice these cars usually stop at intersecting points. The order under review does not violate any contract right of the prosecutor, because the giving of transfers and the efficiency to be given them were within the reservation 'subject to any future regulation of the board.'"

## Study of Traffic Congestion Urged by Mayor of Boston

Mayor Fitzgerald of Boston, Mass., has sent the following letter to the Boston Transit Commission asking the commission to study the question of lessening the congestion of traffic in the business section of Boston and particularly the feasibility of constructing sidewalks under Washington Street and Tremont Street, between Boylston Street and School Street, and under West, Winter, Bromfield and School Streets and Temple Place:

"The congestion of traffic in the business section of Boston has brought about a condition which in the crowded hours of the day amounts virtually to a blockade. With the holiday season upon us, when pedestrians are forced into the middle of the streets and over the car tracks, and even then are able to make little headway through the intermingling throngs, it has seemed to me that responsible officials should put their wits together in an effort to find a solution for conditions that are rapidly becoming intolerable. I would ask the Rapid Transit Commission, therefore, to interpret broadly its power under the acts of the Legislature and to utilize its admirable resources for the study of this question. In particular, I would ask your commission to consider the suggestion of sub-sidewalks in the main arteries of travel downtown. The congestion here is a sidewalk congestion, as the heavy teaming does not take these routes and a considerable portion of the car service has been diverted to the subway and the tunnel. Unless there are engineering obstacles the sub-sidewalk would seem to be the cheapest and most effective remedy that has been proposed. It consists of a passageway from 8 ft. to 10 ft. below the surface walk, with entrances leading from it into the stores at one side and stairways to the surface at moderate intervals. The plan does not involve any legal difficulty, as the use of this space for cellars or areaways is merely a revocable easement, subject to the right of the city to enter and resume control of the space for public purposes. Nor, as I understand it, is the city obliged to award compensation to the owners dispossessed. I suggest that your commission confer with the street commissioners, and, in so far as it may properly do so, apply itself to this problem, which is as pressing as any that has engaged the attention of the municipal authorities and civic organizations in recent years."

## Decision in New Jersey Franchise Tax Case

The Supreme Court of New Jersey has rendered a decision upholding the constitutionality of the Voorhes franchise tax levied upon the basis of gross receipts as applied to street railways engaged in interstate commerce. The decision was announced by Justice Trenchard in the suit brought by the Phillipsburg Horse Car Railroad against the State Board of Assessors to set aside the franchise tax levied for the year 1910. The road owned by the company is located in Hopatcong Township and Phillipsburg in New Jersey. Two divisions of the line meet at Union Square in Phillipsburg, and cars from both divisions cross the Delaware bridge on tracks owned by the bridge company and then proceed on tracks owned by the Easton Transit Company to Centre Square in Easton, Pa. The company is a New Jersey corporation having no franchises of any kind in Pennsylvania, but operating in that State upon tracks owned by the Easton Transit Company. Each corporation accepts transfers of the other, so that the question of gross receipts is not affected by this exchange. In making its return to the State Board, the Phillipsburg Horse Car Railroad sought to apportion the receipts between intrastate and interstate traffic and insisted that the franchise tax should be ascertained by taking 4 per cent of the receipts derived from intrastate traffic only. In deciding against this view Justice Trenchard said:

"The laws of 1906 require the State Board of Assessors to levy an annual franchise tax upon such proportion of the



annual gross receipts of a street railway as the length of its line in this State upon any street, highway, road, lane or other public place bears to the length of its whole line. The annual franchise tax which the laws of 1906 require the Board of Assessors to levy upon such proportion of the annual gross receipts of a street railway as the length of its line in this State upon any street, highway, road, lane or other public place bears to the length of its whole line is not levied on the gross receipts of the corporation nor on the business of the corporation, but is merely an excise tax on the franchise of the corporation, namely, the franchise to exist and the franchise to occupy the streets, which is measured in part by the gross receipts. Therefore such franchise tax is not a regulation of interstate commerce, and the act under which it is levied is not in conflict with the clause of the Constitution of the United States giving to Congress power to regulate commerce among the several states."

#### Progress of Negotiations in Toledo

Pending the meeting of the directors of the Toledo Railways & Light Company on Dec. 28, 1911, the people of Toledo have been discussing the new proposition for a settlement of the franchise question which has been made by the company.

F. R. Coates, president of the Toledo Railways & Light Company, returned to Toledo on Dec. 22, after conferring in New York with the bondholders on the request of the city that a rate of seven tickets for 25 cents be made pending the settlement. Mr. Coates gave no information as to what transpired at the conference, but reports have gained circulation that the bondholders and creditors' committee feels that the rate should start at six tickets for 25 cents and universal transfers.

#### Progress of Plans for Terminating Receiverships in New York

The reorganization committee of the Third Avenue Railroad, New York, N. Y., filed a petition with Judge Lacombe of the United States Circuit Court on Dec. 26, 1911, asking that F. W. Whitridge be discharged as receiver and the property be turned over to the Third Avenue Railway on Jan. 1, 1912. James N. Wallace, Adrian Iselin, Harry Bronner, James Timpson, Frederick H. Shipman, W. E. Roosevelt, John W. Platten, Joseph H. Seaman, George W. Davison, Edward A. Maher, Franklin L. Babcock and Milton Ferguson are directors of the Third Avenue Railway. On Dec. 27, 1911, the following announcement was made: "Mr. Whitridge has been elected president of the Third Avenue Railway by the sub-committee of directors appointed to effect a permanent organization. Mr. Whitridge will be formally elected president by the full board at a later date; he will be elected a director of the company at the same time."

It was announced on Dec. 26, 1911, that practically all of the \$37,560,000 consolidated 4 per cent bonds of the Third Avenue Railroad had been deposited with the Central Trust Company for participation in the reorganization. The exact percentage of deposited bonds is 99 $\frac{3}{4}$ , while 95 per cent of the \$15,995,800 of stock has been placed with the Central Trust Company, New York. The period for depositing the securities ended on Dec. 23, 1911. The owners of stock were required to pay an assessment of \$15 per share at the time of depositing their holdings, while further assessments of the same amount are required on Jan. 15 and Feb. 15, 1912. The Central Trust Company has agreed to take the place of stockholders who do not assent to the terms of reorganization and to guarantee the difference between the funds raised by the assessment and the \$7,200,000 necessary to carry out the plans.

Announcement was made on Dec. 27 that the bondholders' committee of the Metropolitan Street Railway, which will be sold under foreclosure on Dec. 29, 1911, had appointed E. S. Marston, of Blair & Company, A. J. Hemphill, president of the Guaranty Trust Company, and G. E. Tripp, of Stone & Webster, as a committee to bid in the property. It was also announced that the board of directors of the new company will consist of nine members. At present six

of these will be elected by the bondholders' committee and three by the stockholders, but when final reorganization is effected the bondholders will elect four of the directors and the stockholders five.

Theodore P. Shonts, president of the Interborough Rapid Transit Company and the Interborough-Metropolitan Company, will, it is said, be elected executive head of the surface system, as soon as the property is turned over to the shareholders, which probably will be immediately after the foreclosure sale. As the holder of 90 per cent of the Metropolitan Street Railway's \$52,000,000 stock, the Interborough-Metropolitan Company will be called upon to pay an assessment of \$5,500,000, or \$12.90 per share, for which \$14.13 will be received in new bonds and \$30.91 in new stock.

On Dec. 27 A. J. Hemphill, president of the Guaranty Trust Company, issued the following statement: "Holders of Metropolitan Street Railway general and collateral trust 5 per cent gold bonds who have not up to this date deposited their bonds under the bondholders' agreement, and the plan and agreement for the reorganization, may deposit such bonds, without penalty, with the Guaranty Trust Company, as depository, provided their bonds, with all coupons maturing after Aug. 1, 1907, are deposited with the depository on or before Dec. 29, 1911. After that date no further extensions can be promised by the reorganization committee, and if the time is extended after that date, in any event, a penalty will be imposed. This is the last call for the few bondholders who have failed to take advantage of the opportunity of deposit."

**California Utility Bill Passed.**—The public utility bill introduced into the Legislature of California was passed by the Senate on Dec. 16, 1911, and is before the Governor for his signature. The principal provisions of the measure were referred to briefly in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1911, page 1253.

**Meeting of Canadian Society of Civil Engineers.**—On Dec. 14, 1911, Guy M. Gest, New York, N. Y., addressed the members of the Canadian Society of Civil Engineers on underground conduit construction. The speaker described conduit systems in use in the United States and in England and in Montreal, Can.

**Municipal Railway Proposed in Pasadena.**—Petitions are being circulated for an initiative ordinance providing for the construction of a municipal street railway in Pasadena, Cal., to be 1 $\frac{1}{2}$  miles long and to be operated with power from the municipal light plant. The petition requests the City Council to submit the question to the voters of Pasadena at the election to be held in that city early in 1912.

**Appraisal of Twenty-eighth and Twenty-ninth Streets Crosstown Railroad.**—Henry Floy, New York, N. Y., consulting engineer, has been engaged by J. B. Mayer, receiver of the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad, New York, N. Y., to appraise the property of that company for use in connection with the reorganization of the company and at the hearings before the Public Service Commission, First District.

**Columbus Rioter Guilty.**—George W. Brady, alias Gerald O'Leary, was found guilty in the Common Pleas Court at Columbus, Ohio, recently on the charge of assault and battery after having been on trial for shooting Mrs. Catherine Kelley. Mrs. Kelley was wounded during the strike of the employees of the Columbus Railway & Light Company. Brady left Columbus during the strike, but was brought back for trial. The court fined him \$1,742, the amount of the costs, and he was liberated under his old bond so that he could arrange to pay the fine.

**Public Be Pleased Policy.**—E. M. Mills, who was recently elected president of the Seattle, Renton & Southern Railway, Seattle, Wash., has announced the policy of the company under his direction as follows: "The policy of the new management will be to improve the service, rehabilitate the property and in every way possible co-operate fully with the residents and property owners of Rainier Valley in promoting the welfare of that section of the city. New equipment has already been ordered and many betterments will be undertaken to assure the patrons of the line effective service. It will be the policy of the company to meet the views of its patrons so far as can be done in the way of frequent and satisfactory service."



**Electrolysis Danger Slight in Chicago.**—Addressing the Chicago Real Estate Board at a recent luncheon, Ray Palmer, the consulting engineer who reported to the commissioner of public works of Chicago on the subject of dangers to underground metallic structures from corrosion due to the electrolytic action of stray electric currents, said that there was no cause for apprehension as to the result of electrolysis in Chicago. The city authorities were taking the necessary steps to meet the condition by requiring the electric railways to improve their return-circuit conditions to such an extent that the drop in the return circuit would not exceed a maximum allowable drop of 12 volts. Mr. Palmer explained the electric "drainage" system which he recommended.

**Another Public Utility Bill for Washington, D. C.**—Representative Oldfield of Arkansas, a member of the House committee on the District of Columbia, has introduced into the House a bill to create a public utilities commission to supervise the affairs of the public service corporations which operate in the District of Columbia. This is the second bill of the kind to be introduced. The other measure was put before the Senate by Senator Gallinger, chairman of the District committee of the Senate, and was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 23, 1911, page 1289. The principal difference between the measures introduced by Representative Oldfield and Senator Gallinger is in the method proposed for appraising the value of the physical property of the public service corporations.

**Mr. Mitten's Work in Chicago.**—In commenting editorially on the resignation of T. E. Mitten as president of the Chicago (Ill.) City Railway, the *Chicago News* said: "T. E. Mitten belongs to the new type of public utility manager. He believes the public utility corporation official best serves the company whose policy he directs when he cultivates cordial relations with the public at large. Mr. Mitten came to Chicago when traction matters were in a critical stage. Throughout his career in this city Mr. Mitten has been noticeably fair in his dealings with public questions affecting his corporation. Mr. Mitten believes in good service. He has been progressive in introducing improvements. It has been most fortunate for Chicago that he was in direct charge of one of the principal companies during an important period in the development of the transportation policy of the city. His retirement from the local traction field at this time is a loss to the community."

**Seattle's Proposed Municipal Railway.**—More than a year ago the citizens of Seattle, Wash., voted to issue \$800,000 of bonds to purchase the Seattle, Renton & Southern Railway or build a new system. As the Seattle, Renton & Southern Railway was worth much more than the total of bonds which had been voted, it seemed to be necessary to build a new system. When the city tried to sell the bonds in the Eastern market the lawyers for the bond houses refused to pass them. Notwithstanding this, the Council decided to sell \$300,000 of the bonds to the citizens of Seattle. The bonds bear interest at the rate of 4½ per cent, and, as the citizens of Seattle are accustomed to a return of from 8 per cent to 12 per cent on their money, even this scheme seemed likely to move slowly. Desirous of building the road at once, the Council then proposed to borrow \$300,000 temporarily from the general funds. This has met with considerable opposition and it may prove to be legally impossible.

**Valuing the Chicago Elevated Railways.**—The work on the valuation of the elevated railways in Chicago will be taken up at once. The valuation commission received its instructions on Dec. 26, 1911, from Alderman Reinberg, chairman of the committee on local transportation. The commission is to value only tangible property. At a conference held in the Mayor's office on Dec. 26 it was decided to send a communication to John Ericson, chairman of the valuating committee, informing him that all questions of overhead charges will be dealt with by a sub-committee of aldermen. The sub-committee already is on record as opposing any values being placed on franchises and other intangible assets. Alderman Reinberg in a recent letter to the companies said that the valuating commission would be instructed to place a value on the intangible property without committing the city in any way to recognize such a valuation.

**Report of Annual Dinner of Railway Business Association.**—The Railway Business Association has just published in pamphlet form the speeches made at the third annual dinner of that association, held in New York on Nov. 22, 1911. The speakers at that dinner were Hon. Emmet O'Neal, Governor of Alabama; Walker D. Hines, chairman executive committee Atchison, Topeka & Santa Fé Railway; A. C. Rulofson, president California Home Industry League, and H. J. Pettengill, Texas Commercial Secretaries and Business Men's Association. George A. Post, president of the association, was toastmaster. The general subject discussed by all of the speakers was "Government Responsibility for Railway Progress." Many of the invited guests were officials from the chambers of commerce or other prominent civic bodies from some twenty of the larger cities of the country. The addresses at the meeting should form very interesting reading for those who were unable to be present at the dinner.

**Contract Signed for Building St. John Valley Railroad.**—The contract for building the St. John Valley Railroad has been signed by H. F. McLeod, provincial secretary, representing the Province of New Brunswick, and A. R. Gould, president of the St. John & Quebec Railway, representing the company. The contract provides for a steam railroad from St. John, N. B., to Grand Falls, N. B., 208 miles, the Province guaranteeing bonds to the amount of \$25,000 per mile. The undertaking is to be financed by F. J. Lisman & Company, New York, N. Y. The promoter, A. R. Gould, Presque Isle, Me., is general manager of the Maine & New Brunswick Electric Power Company, Ltd., and president and general manager of the Aroostook Valley Railroad, a freight-carrying electric railroad which runs into the country from Presque Isle. The Aroostook Valley Railroad has a charter for an extension westward across northern Maine to the border of Canada, in Casgraine Township, L'Islet County, Quebec. Mr. Gould also procured from the Maine Legislature last March a special permit to purchase and electrify the Presque Isle branch of the Canadian Pacific Railway. Charter rights would be needed from the Aroostook Valley Railroad to the proposed St. John Valley Railroad, a distance of 12 miles to 30 miles, according to the route selected, in order to connect the roads.

## PROGRAMS OF ASSOCIATION MEETINGS

### American Society of Civil Engineers

The fifty-ninth annual meeting of the American Society of Civil Engineers will be held at the house of the society, 220 West Fifty-seventh Street, New York, N. Y., Jan. 17 to 20, 1912. The business meeting will be held at 10 a. m. on Jan. 17. On Jan. 19 and 20 three technical meetings will be held at which the general subject for discussion will be "Road Construction and Maintenance." An elaborate program of entertainment and excursions to points of engineering interest has been arranged.

### Wisconsin Electrical Association

The annual meeting of the Wisconsin Electrical Association will be held in the clubroom of the Pfister Hotel, Milwaukee, Wis., on Jan. 18 and 19, 1912. An unusually attractive program has been arranged for this meeting. It will include papers and discussions on twelve or more subjects connected with the electric lighting and railway business.

The association dinner will be held on Thursday evening at 7 o'clock. The principal speaker will be the Hon. J. Adam Bede, of Minnesota, who is said to be one of the best entertainers on the platform to-day.

The preliminary announcement of the meeting, issued by President Wheeler, says that every electric utility in the State, whether a member of the association or not, is cordially invited to send its representatives to this meeting. Those who come for the first time will be so impressed with the value of the meetings and the need of the work that they will permanently ally themselves to the association.

The officers of the association expect to issue a formal program about Jan. 1. Information in regard to hotel reservations and rates, etc., should be addressed to the secretary, George Allison, Stephenson Building, Milwaukee, Wis.



# Financial and Corporate

## New York Stock and Money Markets

Dec. 27, 1911.

The New York market was practically inert on Wednesday until the closing hour, when trading became brisk. Disappointing earnings of Western railways for November and favorable reports on the steel trade were the items of import in financial circles during the day. The money market is exceedingly easy for the period of the year. Quotations for loans to-day were: Call, 3½@4 per cent; ninety days, 4 per cent.

### Other Markets

Chicago Railway Series 2 certificates made a fractional gain in to-day's market, and were the only traction issues attracting any interest. Prices in general showed an upward tendency.

The Philadelphia market to-day was almost without feature, and many of the usually active issues were not traded in.

Copper shares advanced in the Boston market to-day, and many less important issues shared in the forward movement.

Baltimore prices were fairly well maintained to-day, but the market was very quiet.

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

	Dec. 19.	Dec. 26.
American Brake Shoe & Foundry (common).....	a90¼	a90¼
American Brake Shoe & Foundry (preferred).....	a129¾	a131
American Cities Company (common).....	a25	a25
American Cities Company (preferred).....	a81	a78
American Light & Traction Company (common).....	a295	a295
American Light & Traction Company (preferred).....	a108	a108
American Railways Company.....	a45¼	a45
Aurora, Elgin & Chicago Railroad (common).....	a40¼	a39½
Aurora, Elgin & Chicago Railroad (preferred).....	a83¼	a86¼
Boston Elevated Railway.....	a130¼	a130¼
Boston Suburban Electric Companies (common).....	a14	a15
Boston Suburban Electric Companies (preferred).....	a76	a74
Boston & Worcester Electric Companies (common).....	*12	*12
Boston & Worcester Electric Companies (preferred).....	a56	a55
Brooklyn Rapid Transit Company.....	a77¼	76¾
Capital Traction Company, Washington.....	a124½	124½
Chicago City Railway.....	a180	a190
Chicago Elevated Railways (common).....	a31	a31
Chicago Elevated Railways (preferred).....	a92¼	a93
Chicago Railways, ptcptg., ctf. 1.....	a99	a100½
Chicago Railways, ptcptg., ctf. 2.....	a37¾	37¾
Chicago Railways, ptcptg., ctf. 3.....	a11½	a11½
Chicago Railways, ptcptg., ctf. 4.....	a6½	a6½
Cincinnati Street Railway.....	130½	*130½
Cleveland Railway.....	a103¾	*103¾
Cleveland, Southwestern & Columbus Ry. (common).....	*478	*478
Cleveland, Southwestern & Columbus Ry. (preferred).....	a33¾	*33¾
Columbus Railway & Light Company.....	*37½	*37½
Columbus Railway (common).....	*83	*83
Columbus Railway (preferred).....	*90	*90
Dayton Street Railway (common).....	a25	*25
Dayton Street Railway (preferred).....	a101	a101
Denver & Northwestern Railway.....	*145	*145
Detroit United Railway.....	*85	*85
General Electric Company.....	155	154
Georgia Railway & Electric Company (common).....	a150	a148
Georgia Railway & Electric Company (preferred).....	a90½	*90½
Interborough Metropolitan Company (common).....	15¾	15¼
Interborough Metropolitan Company (preferred).....	48¾	*48¾
International Traction Company, 4% notes, rcts.....	69½	*69½
Indiana Union Traction Company.....	12	*12
Kansas City Railway & Light Company (common).....	*20½	*21
Kansas City Railway & Light Company (preferred).....	*52	*52
Lake Shore Electric Railway (common).....	*7	*7
Lake Shore Electric Railway (1st preferred).....	*83	*83
Lake Shore Electric Railway (2d preferred).....	*25	*25
Manhattan Railway.....	134	a137
Massachusetts Electric Companies (common).....	a227¾	a22¼
Massachusetts Electric Companies (preferred).....	a96	a95¼
Metropolitan Street Railway, New York.....	*8	*8
Milwaukee Electric Railway & Light (preferred).....	*105	*105
Norfolk Railway & Light Company.....	26	26
North American Company.....	a73¾	a74¾
Northern Ohio Light & Traction Company (common).....	*57½	*57½
Northern Ohio Light & Traction Company (preferred).....	a105	a105
Philadelphia Company, Pittsburgh (common).....	a52¼	a52¼
Philadelphia Company, Pittsburgh (preferred).....	a43¾	a43¾
Philadelphia Rapid Transit Company.....	a23¼	a23¼
Portland Railway, Light & Power Company.....	*99½	*99½
Public Service Corporation.....	a110	a110
Seattle Electric Company (common).....	a115	a115
Seattle Electric Company (preferred).....	a101	a101¾
Third Avenue Railroad, New York.....	576	*576
Toledo Railway & Light Company.....	a4	*4
Twin City Rapid Transit, Minneapolis (common).....	a108	*108
United Ry. & Electric Company (Baltimore).....	18½	18½
United Rvs. Inv. Co. (common).....	32½	32½
United Rvs. Inv. Co. (preferred).....	60	60¼
Virginia Railway & Power Company (common).....	a39½	*39½
Virginia Railway & Power Company (preferred).....	82	82
Washington Ry. & Electric Company (common).....	a49½	a50¼
Washington Ry. & Electric Company (preferred).....	a89	a89
West End Street Railway, Boston (common).....	a87½	*87½
West End Street Railway, Boston (preferred).....	a103¼	a102¼
Westinghouse Elec. & Mfg. Co. (common).....	a63¾	a66¼
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a117½	a117½

aAsked. \*Last sale.

## Earnings of Philadelphia Rapid Transit Company for November and Five Months

The report of the Philadelphia (Pa.) Rapid Transit Company for November, 1911, and for the five months of the fiscal year to Nov. 30, 1911, follows:

	November, 1911	Five Months Ended November
Earnings:		
Gross passenger earnings.....	\$1,804,353	\$8,971,466
Receipts from other sources.....	77,622	408,670
	\$1,881,975	\$9,380,136
Expenses:		
Operating expenses.....	1,136,721	5,690,194
Net earnings from operation.....	\$745,254	\$3,689,942
Fixed charges.....	740,631	3,688,821
Surplus.....	\$4,623	\$1,121

## Massachusetts Companies with Bonds Eligible for Savings Bank Investments

The Railroad Commission of Massachusetts has transmitted to Bank Commissioner Chapin the following list of street railways which have annually earned and properly paid without impairment of assets or capital stock an amount in dividends equal to at least 5 per cent on their outstanding capital stock in each of the past five fiscal years, with the exception of 1910, when under a ruling of the Railroad Commission street railways reported for the nine months only, in view of the change in the fiscal years from Sept. 30 to June 30. The list follows: Boston Elevated Railway, Boston & Northern Street Railway, Boston & Revere Electric Street Railway, Citizens' Electric Street Railway, East Middlesex Street Railway, Fitchburg & Leominster Street Railway, Holyoke Street Railway, Springfield Street Railway, Union Street Railway, West End Street Railway and Worcester Consolidated Street Railway. The Dartmouth & Westport Street Railway has been withdrawn from the list on account of consolidation with the Union Street Railway, approved by the Railroad Commission in October, 1910. The list is submitted to the bank commissioner to aid him in preparing the list of Massachusetts street railway bonds eligible for Massachusetts savings bank investment.

**American Railways, Philadelphia, Pa.**—Bioren & Company and Newburger, Henderson & Loeb, Philadelphia, Pa., offer for public subscription the unsold balance of \$3,000,000 of American Railways refunding convertible 5 per cent gold bonds, due 1931, at 96½ and interest.

**Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.**—An initial quarterly dividend of 1½ per cent has been declared on the \$1,500,000 of 6 per cent preferred stock of the Augusta-Aiken Railway & Electric Company, cumulative after Jan. 1, 1912. The dividend is payable on Jan. 1, 1912, to holders of record on Dec. 23, 1911.

**Bangor Railway & Electric Company, Bangor, Me.**—An initial quarterly dividend of 1¼ per cent has been declared on the new issue of \$1,500,000 of 7 per cent cumulative preferred stock of the Bangor Railway & Electric Company, payable on Jan. 1, 1912.

**Bay State Street Railway, Boston, Mass.**—A syndicate composed of Perry, Coffin & Burr, Boston, Mass.; N. W. Harris & Company, Boston, Mass., and Merrill, Oldham & Company, Boston, Mass., has purchased \$1,235,000 of refunding first mortgage 4 per cent bonds of the Boston & Northern Street Railway and \$1,315,000 of refunding first mortgage 4 per cent bonds of the Old Colony Street Railway due in 1954.

**Birmingham Railway, Light & Power Company, Birmingham, Ala.**—A dividend of 4 per cent, payable on Dec. 30, 1911, has been declared on the \$3,500,000 of common stock of the Birmingham Railway, Light & Power Company, in addition to the semi-annual distribution of 3 per cent on the \$3,500,000 of preferred stock.

**Brunswick & Yarmouth Street Railway, Brunswick, Me.**—The Railroad Commissioners of Maine have approved the plan to incorporate the Brunswick & Yarmouth Street Railway, as the successor to the Portland & Brunswick



Street Railway. The new company is to be organized by Harry B. Ivers, Lewiston, general superintendent of the Lewiston, Augusta & Waterville Electric Railway, who bought the Portland & Brunswick Street Railway at the receiver's sale on Sept. 25, 1911. The other incorporators of the new company will be Edward M. Graham, Freeport, Me., and three officials of the Lewiston, Augusta & Waterville Electric Railway, Alfred Sweeney, Lewiston, assistant general superintendent; Sherman W. Dunn, Augusta, superintendent of the Augusta division, and Charles L. Andrews of Heath & Andrews, Augusta, general counsel. The Brunswick & Yarmouth Street Railway will be capitalized at \$300,000.

**Chicago City & Connecting Railways, Chicago, Ill.**—The payment of the fourth dividend on the Chicago City & Connecting Railways participation shares has been ordered for Jan. 1, 1912. These are the regular semi-annual disbursements of \$1 on the 150,000 of common shares and \$2.25 on the 250,000 of cumulative \$4.50 preferred shares. The initial payments on these participation shares were made on July 1, 1910, and similar payments have been made on Jan. 1 and July 1, 1911.

**Chicago (Ill.) Railways.**—The Chicago Railways will pay off on Feb. 1, 1912, at the office of the Union Trust Company, Chicago, Ill., the \$4,776,000 of five-year 6 per cent collateral trust notes dated Feb. 1, 1908, secured by \$6,767,200 of 5 per cent consolidated mortgage series "A" bonds, and the \$1,200,000 of five-year 6 per cent cumulative collateral trust notes of the same date secured by \$1,666,000 consolidated mortgage series "A" bonds.

**International Traction Company, Buffalo, N. Y.**—The semi-annual interest on the fifty-year 4 per cent collateral trust bonds of the International Traction Company which matured Jan. 1, 1911, will be paid at the office of J. P. Morgan & Company, New York, N. Y., on or after Jan. 2, 1912, together with 5 per cent interest on the coupons from Jan. 1, 1911, to Jan. 1, 1912. Payment of interest will also be made by the Manufacturers and Traders' National Bank, Buffalo, and the United States Trust Company, Louisville, Ky., sub-depositaries, under the reorganization plan. It is announced that more than 98½ per cent of the bonds have been deposited under the modified plan of reorganization.

**Knoxville Railway & Light Company, Knoxville, Tenn.**—The directors of the Knoxville Railway & Light Company have recalled \$500,000 preferred stock. It is to be replaced with common stock. The change was authorized by a charter amendment passed on Dec. 11, 1911, by the stockholders.

**Little Rock Railway & Electric Company, Little Rock, Ark.**—A semi-annual dividend of 5 per cent and an extra dividend of 10 per cent have been declared on the \$1,500,000 of common stock of the Little Rock Railway & Electric Company, payable on Jan. 1, 1912. These dividends compare with 4 per cent and 1 per cent extra declared in July, 1911.

**Middlesex & Boston Street Railway, Newtonville, Mass.**—The Board of Railroad Commissioners has rescinded the authority given the Newton Street Railway to issue \$185,000 of new capital stock under date of July 9, 1903, or at the time the Newton Street Railway was consolidated with the Middlesex & Boston Street Railway. Authority was, however, given to the Middlesex & Boston Street Railway to issue \$1,483,000 of coupon or registered bonds, payable twenty years from date and bearing interest at the rate of 5 per cent.

**Mississippi Valley Interurban Railway, Springfield, Ill.**—Stockholders of the Mississippi Valley Interurban Railway appointed Judge John Dryer, H. R. Crawford and George Watson as members of a committee to confer with John E. Melick, president of the company, regarding the four properties of which he is president. The Springfield, Clear Lake & Rochester Railway ceased operations temporarily recently because of an unpaid bill for power due the Springfield Light & Power Company. The Pekin & Petersburg Interurban Railway operates about a mile of track in Pekin, Ill., the Sangamon Valley Traction Company operates from the Hillsboro Court House to the depot of the Big Four Railroad, and the Mississippi Valley Interurban Railway runs northeast from Hillsboro. It is said that it was proposed to consolidate the companies.

**New York State Railways, Rochester, N. Y.**—The stockholders of the New York State Railways have authorized the issuance of \$1,502,300 additional common stock, the proceeds of which will be used to reimburse the company for money expended.

**Quebec Railway, Light, Heat & Power Company, Quebec, Que.**—Subscriptions are being received in Paris for approximately \$5,000,000 of 5 per cent mortgage bonds of the Quebec Railway, Light, Heat & Power Company, payable in thirty years from 1912. The bonds were created by the company to provide funds for extensions and additions, more especially the construction of the Quebec Eastern Railway, the development of the Quebec-Saguenay line and the construction of a power house on the Saguenay River.

**Rome Railway & Light Company, Rome Ga.**—A yearly dividend of 6 per cent per annum has been declared on the \$500,000 of stock of the Rome Railway & Light Company, payable in four quarterly instalments.

**St. Johns Light & Power Company, St. Augustine, Fla.**—The property of the St. Johns Light & Power Company, sold under foreclosure recently to the Inter-City Securities Company, has been transferred to the St. Johns Electric Company, of which W. D. Barnett is president.

**Scranton (Pa.) Railway.**—Bioren & Company and Newburger, Henderson & Loeb, Philadelphia, Pa., have purchased the remainder of a closed mortgage of \$800,000 of the Carbondale Railway general mortgage 5 per cent bonds, due Jan. 1, 1933. This is now a direct obligation of the Scranton Railway. A large part of those bonds has been sold privately.

**Springfield (Vt.) Electric Railway.**—H. H. Blanchard has been elected a director of the Springfield Electric Railway to fill a vacancy.

**Susquehanna Railway, Light & Power Company, New York, N. Y.**—A dividend of 1 per cent has been declared on the \$4,198,000 of common stock of the Susquehanna Railway, Light & Power Company, payable on Jan. 2, 1912, to holders of record on Dec. 21, 1911. An initial dividend of the same amount was paid in July, 1911.

**Union Traction Company of Kansas, Independence, Kan.**—The Union Traction Company of Kansas has called for payment at 105 and interest for the sinking fund \$6,000 of its first mortgage 5 per cent bonds.

**Utica & Mohawk Valley Railway, Utica, N. Y.**—A quarterly dividend of 2 per cent has been declared on the \$5,000,000 of common stock of the Utica & Mohawk Valley Railway, payable on Dec. 30, 1911. This dividend compares with 1 per cent paid in September, 1911, one-half of 1 per cent paid in June, 1911, and one-half of 1 per cent paid in March, 1911, making the total payments for 1911 4 per cent, as compared with 2 per cent in 1910, 8 per cent in 1908 and 4 per cent in 1907.

**Wheeling (W. Va.) Traction Company.**—A quarterly dividend of 1¼ per cent has been declared on the stock of the Wheeling Traction Company, payable on Jan. 15, 1912. The quarterly dividends declared in 1911 were of 1 per cent each.

#### Dividends Declared

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, 1¼ per cent, preferred; ¾ of 1 per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

El Paso (Tex.) Electric Company, 3 per cent, preferred.

Halifax (N. S.) Electric Tramway, quarterly, 2 per cent.

Holyoke (Mass.) Street Railway, 4 per cent.

Honolulu Rapid Transit & Land Company, Honolulu, H. I., 3 per cent, preferred; quarterly, 1½ per cent, common.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

Interstate Railways, Philadelphia, Pa., 3 per cent, preferred.

Louisville & Northern Railway & Lighting Company, New Albany, Ind., quarterly, ¾ of 1 per cent.

Manchester Traction Light & Power Company, Manchester, N. H., quarterly, 2 per cent.



Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

New England Investment & Security Company, Springfield, Mass., 2 per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Ottawa (Ont.) Electric Railway, quarterly, 2½ per cent; 2 per cent extra.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Reading (Pa.) Traction Company, 75 cents.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Seattle (Wash.) Electric Company, quarterly, 1¾ per cent, common.

Syracuse (N. Y.) Rapid Transit Company, quarterly, 1½ per cent, preferred; 1 per cent, common.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., quarterly, 1¼ per cent, preferred.

Union Railway, Gas & Electric Company, Rockford, Ill., quarterly, 1½ per cent, preferred.

Union Utilities Company, Morgantown, W. Va., quarterly, ½ of 1 per cent, common.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

**ELECTRIC RAILWAY MONTHLY EARNINGS**

**BATON ROUGE ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$10,593	\$6,582	\$4,011	\$2,042	\$1,969
1 " " '10.....	9,597	5,827	3,770	1,945	1,826
12 " " '11.....	117,065	71,950	45,116	24,095	21,021
12 " " '10.....	109,494	71,362	38,132	22,881	15,252

**BROCKTON & PLYMOUTH STREET RAILWAY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$9,336	\$7,355	\$1,981	\$1,488	\$493
1 " " '10.....	9,797	7,337	2,461	1,578	883
12 " " '11.....	118,743	85,139	33,604	18,463	15,140
12 " " '10.....	120,557	84,930	35,626	20,579	15,047

**CAPE BRETON ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$31,650	\$15,246	\$16,404	\$6,176	\$10,228
1 " " '10.....	30,496	13,447	17,049	6,160	10,888
12 " " '11.....	334,625	174,201	160,425	73,809	86,616
12 " " '10.....	320,975	170,322	150,654	73,933	76,720

**DALLAS ELECTRIC CORPORATION.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$182,459	\$100,849	\$81,611	\$29,546	\$52,064
1 " " '10.....	165,372	89,153	76,219	23,748	52,471
12 " " '11.....	1,599,684	996,569	603,115	319,559	283,556
12 " " '10.....	1,443,966	943,991	499,975	316,410	183,565

**EL PASO ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$62,011	\$34,111	\$27,900	\$8,427	\$19,473
1 " " '10.....	55,172	32,919	22,253	8,224	14,029
12 " " '11.....	680,583	388,414	292,169	98,845	193,324
12 " " '10.....	631,241	362,528	268,713	101,090	167,623

**GALVESTON-HOUSTON ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$132,645	\$76,728	\$55,917	\$25,547	\$30,370
1 " " '10.....	113,476	65,937	47,539	25,565	21,974
12 " " '11.....	1,487,435	871,168	616,267	301,585	314,682
12 " " '10.....	1,289,537	777,563	511,975	284,599	227,376

**JACKSONVILLE TRACTION COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$49,743	\$25,691	\$24,052	\$12,488	\$11,564
1 " " '10.....	48,366	27,088	21,279	9,346	11,933
12 " " '11.....	576,832	312,822	264,010	132,399	131,611
12 " " '10.....	566,403	302,028	264,375	112,295	152,080

**MONTREAL STREET RAILWAY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Nov., '11.....	\$409,397	\$260,576	\$159,900	\$35,318	\$124,582
1 " " '10.....	355,586	227,442	138,656	32,013	106,643
2 " " '11.....	835,513	492,778	370,091	71,015	299,077
2 " " '10.....	728,073	433,192	319,594	54,011	255,583

**NORTHERN TEXAS ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$168,512	\$78,517	\$89,995	\$25,010	\$64,985
1 " " '10.....	154,007	71,123	82,884	20,290	62,594
12 " " '11.....	1,593,749	826,774	766,975	293,042	473,933
12 " " '10.....	1,409,311	753,871	655,440	228,011	427,429

**PENSACOLA ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$24,415	\$14,832	\$9,583	\$5,592	\$3,991
1 " " '10.....	23,650	13,578	10,072	5,106	4,966
12 " " '11.....	286,793	168,807	117,986	68,966	49,021
12 " " '10.....	264,701	155,488	109,213	59,452	49,762

**SEATTLE ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$461,501	\$260,383	\$201,118	\$115,935	\$85,184
1 " " '10.....	469,033	239,639	229,393	109,914	119,480
12 " " '11.....	5,484,662	3,059,143	2,425,519	1,355,886	1,069,634
12 " " '10.....	5,558,439	3,249,493	2,308,946	1,301,744	1,007,201

**TAMPA ELECTRIC COMPANY.**

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Oct., '11.....	\$59,328	\$31,747	\$27,582	\$5,582	\$21,600
1 " " '10.....	43,254	23,999	19,255	6,130	13,125
12 " " '11.....	655,117	.....	308,428	77,690	230,739
12 " " '10.....	611,749	.....	271,903	61,583	210,320

\*Includes taxes.

**Traffic and Transportation**

**Accidents in Indiana for Quarter**

The Railroad Commission of Indiana has issued Accident Bulletin No. 17, covering the quarter ended Sept. 30, 1911. The summary of casualties on the interurban railways follows:

PASSENGERS			
WHERE:	1910	1911	
On passenger trains.....	100	24	
On station grounds.....	9	0	
CAUSES:			
Collisions.....	96	10	
Derailments.....	0	5	
Getting on and off moving trains.....	4	5	
Getting on and off trains after stops are made.....	0	0	
Miscellaneous.....	9	4	
RESULTS:			
Deaths.....	50	0	
Fractures or dislocations.....	4	3	
Sprains.....	6	1	
Cuts and bruises.....	47	20	
Miscellaneous.....	2	0	

TRAVELERS ON HIGHWAYS			
WHERE:	1910	1911	
Travelers on highways in vehicles.....	14	22	
On foot.....	2	1	
CAUSE:			
Struck on crossings.....	15	21	
Teams frightened.....	0	0	
Miscellaneous.....	0	2	
RESULTS:			
Deaths.....	5	5	
Sprains.....	1	1	
Cuts and bruises.....	9	11	
Miscellaneous.....	0	5	
Loss of limb.....	1	0	
Loss of finger or toe.....	0	1	

EMPLOYEES			
EMPLOYMENT:	1910	1911	
Conductors.....	4	3	
Motormen.....	9	4	
Laborers.....	3	4	
Brakemen.....	0	3	
CAUSES:			
Collisions.....	13	5	
Miscellaneous.....	5	6	
Derailments.....	0	1	
Use of tools and machinery.....	0	2	
RESULTS:			
Deaths.....	4	2	
Fractures or dislocations.....	0	1	
Sprains.....	5	1	
Cuts and bruises.....	9	7	
Miscellaneous.....	0	1	
Loss of limb.....	0	2	

**TRESPASSERS**

WHERE:	1910	1911
Trespassers on tracks.....	17	12
Miscellaneous.....	0	0
RESULTS:		
Deaths.....	12	7
Fractures or dislocations, cuts and bruises.....	5	5
Collisions, 1. Damage, \$1,100,000.		

**Fare Question in Edwardsville, Ill.**

The question of the local fare in Edwardsville, Ill., is before the State Railroad & Warehouse Commission as a result of a letter addressed to the commission by the Alton, Granite City & St. Louis Traction Company and the East St. Louis & Suburban Railway. The Alton, Granite City & St. Louis Traction Company owns a railway between East St. Louis, Mitchell, Edwardsville and Granite City, and the East St. Louis & Suburban Railway owns a railway via Collinsville and Maryville to Edwardsville. The two roads connect at Court House Square, Edwardsville. The companies have arranged what is known as a "loop service," the cars of the East St. Louis & Suburban Railway being operated via Collinsville to Court House Square, Edwardsville, where its cars are taken by the Alton, Granite City & St. Louis Traction Company and operated to East St. Louis via Granite City, and the cars of the Alton, Granite City & St. Louis Traction company are operated from East St. Louis via Granite City and Mitchell to Court House Square, Edwardsville, where said cars are taken by the St. Louis & Suburban Railway and operated via Collinsville to East St. Louis. This affords continuous service without change of cars. Each company charges fare to and from the point of junction of the lines, which results in a 10-cent fare in Edwardsville, although each company carries passengers a considerable distance beyond the city limits for a 5-cent fare from Court House Square.

The city of Edwardsville desires some arrangement whereby passengers can travel on the cars of the Alton,



Granite City & St. Louis Traction Company from East St. Louis or Alton into Edwardsville without paying additional fare in Edwardsville to any point on the lines of the East St. Louis & Suburban Railway within Edwardsville; also that through passengers from East St. Louis to Edwardsville on the East St. Louis & Suburban Railway be carried to any point in Edwardsville on the Alton, Granite City & St. Louis Traction Company's line without additional charge. The companies are willing to arrange matters so as to carry passengers as requested by Edwardsville, provided the arrangement shall apply only to through passengers who board cars at intermediate stations, for the reason that the haul from the station on either side of Edwardsville, on both lines, including the haul to any point in Edwardsville, would be too long for a 5-cent fare. This arrangement is satisfactory to Edwardsville and the companies, and the companies have written the commission that they will comply with the request of Edwardsville if the commission does not consider that such an arrangement would be unjust discrimination against intermediate points.

**Accident on Kansas Line.**—In a head-on collision between two cars on the Kansas City-Western Railway in a fog, near Wolcott, Kan., on Dec. 18, 1911, a motorman and a dispatcher of the company were killed and nine persons were injured.

**Improvements Recommended in Ithaca.**—The Public Service Commission of the Second District of New York has completed an investigation of street railway conditions in Ithaca and has recommended betterments to the tracks, overhead construction and equipment of the Ithaca Street Railway.

**Decision in Reading Ticket Case.**—Judge Endlich has handed down an opinion in favor of the city of Reading in the action to compel the Reading (Pa.) Transit Company to sell strip tickets at the rate of six for 25 cents on the system known as the "Loop." It is said that the company will appeal the case.

**Accident at Pottsville.**—On Dec. 25, 1911, one of the double-truck cars of the Eastern Pennsylvania Railways, Pottsville, Pa., ran off the track at a curve near Cape Horn, Mount Carbon, and fell into a creek. The cause of the accident is unknown. Of thirty-five people on the car twenty-five were not injured in any way and only three were seriously hurt.

**Re-routing Approved in Los Angeles.**—The Board of Public Works of Los Angeles, Cal., has granted the Los Angeles Railway Corporation permission to re-route its cars in the downtown district as a means of relieving congestion. The plan was suggested by C. A. Henderson, assistant general manager of the company, and was referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 23, 1911, page 1296.

**Agreement Between New York State Railways and Employees.**—The New York State Railways has made an agreement with its employees to run until May 1, 1914. It provides that in places where agreements with the local companies are in force they shall remain in operation until the date of their expiration unless changed by mutual agreement. Boards of arbitration are provided for and wage disputes will be arbitrated when the local agreements expire.

**Progress at Ft. Smith, Ark.**—The Ft. Smith Light & Traction Company, Ft. Smith, Ark., increased the wages of its employees approximately 11 per cent on Dec. 1, 1911. The company has fitted up part of a building on South Sixth Street as a club room for its 300 employees. The total amount of floor space to be devoted to club rooms is 2500 sq ft. In October the company handled 563,000 persons without an accident to passengers or equipment. During Fair Week the equipment was taxed to its utmost. Trains consisting of a construction car and trailer carried as many as 310 passengers to the fair grounds on a single trip.

**Service Order in Toronto.**—The Ontario Railway Board has approved an interim order directing the Toronto (Ont.) Railway to issue transfers from the Yonge Street, Carlton Street and College Street cars to Avenue Road, Dupont Street and Dundas Street cars and vice versa; an interim order directing the company to run the regular Queen

Street cars up Roncesvalles Avenue to the "Y" at Dundas Street, and returning down Roncesvalles Avenue to Queen Street, and an order directing the company to operate the regular Dundas Street service along Dundas Street as far west as the western limit of Keele Street, according to the contract with the city.

**Soliciting Traffic of Shoppers at Christmas.**—The Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company, New Albany, Ind., controlled by the same interests, inserted a full-page advertisement in the Louisville *Herald* of Dec. 16, 1911, calling the attention of the public to Christmas bargains offered by New Albany merchants. The companies included in the advertisement notices calling attention to the rapid, safe and cheap transportation afforded by their lines between the neighboring cities. "Take the big red car" was suggested, as the rolling stock of the two companies is painted a uniform color.

**Increase in Wages in Philadelphia.**—Following the meeting of the executive committee of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, Dec. 21, 1911, the following statement was issued: "Under the terms of the co-operative plan of August, 1911, which was established as the policy of the Stotesbury management, the wages of conductors and motormen, it was promised, would be increased on Jan. 1, 1912, as follows: First year men, 22 cents per hour; second year men, 23 cents per hour; third year men, 23½ cents per hour; fourth year men, 24 cents per hour. At the meeting to-day the executive committee took the necessary action to put into effect this promised increase of wages."

**Extension of Line Asked in Rochester.**—The Public Service Commission of the Second District of New York has received a complaint from manufacturers and land owners of the Lincoln Park district, west of Rochester, against the service afforded that district by the West Avenue line of the New York State Railways. The complaint states that the present terminal of this line is located at a considerable distance from the factories and business places, and that the officials of the company have declined to remedy the existing conditions except by proposing to build extensions which it is claimed will not afford satisfactory relief. The petition asks that the company be required to make such extensions and improvements as will give the people of the locality which is concerned suitable and convenient service.

**Regulating Cars at Crossings in Washington.**—Following a recommendation made by the Chamber of Commerce of Washington, D. C., about two months ago, the District Electric Railway Commission has issued the following order: "For the purpose of bringing under control of the members of the metropolitan police force the movement of street cars at street crossings, subjecting the cars to the same direction as all other vehicles using the streets, for the purpose of avoiding congestion and insuring the safety of passengers, it is ordered that the several street railways of the District of Columbia be, and they are hereby, required to give such directions to their motormen in charge of street cars as will conform to the requirements of the Commissioners of the District of Columbia as to the movement of street cars at street crossings."

**Changes in Operation in Philadelphia.**—E. T. Stotesbury, chairman of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, in his communication of April 10, 1911, addressed to the chairman of the financial committee of the Councils of Philadelphia, bearing upon the consent of the city to the proposed \$10,000,000 loan, promised that certain extensions would be undertaken at once. These extensions have all been practically completed and, as a result of the work which has been completed, certain changes in operation which were made public in detail by the company will go into effect on Jan. 1, 1912. The lines which have been completed on Twenty-second Street, from Montgomery Avenue to Ridge Avenue; Twenty-first Street, from Ridge Avenue to Montgomery Avenue, and Twenty-second Street, from Susquehanna Avenue to York Street, will not be put into operation for the present, as it is deemed unwise to make any temporary changes pending further progress in the company's plans for general re-routing in that section of the city.



## Personal Mention

Mr. Edwin Henderson has resigned as general manager of the Saginaw & Flint Railway, which operates 39 miles of line between Saginaw, Bridgeport, Frankenmuth, Clio, Mt. Morris and Flint, Mich.

Mr. James M. Ambler, chairman of the Maryland Public Service Commission, has been appointed to the Supreme Bench of Baltimore City by Governor Crothers to succeed Judge Niles.

Mr. W. H. Fledderjohann has been appointed general manager of the Ft. Wayne & Springfield Railway, with headquarters at Decatur, Ind., to succeed Mr. John H. Koenig, resigned.

Mr. Newton D. Baker, Mayor-elect of Cleveland, Ohio, is the subject of a biographical sketch in the "Who's Who—And Why" page of the *Saturday Evening Post* of Dec. 23, 1911. The title of the article is "Tom Johnson's Heir."

Mr. John H. Fisher, Redlands, Cal., has been appointed general manager of the Santa Barbara (Cal.) Consolidated Railroad and the Santa Barbara Gas & Electric Company, to succeed Mr. George W. Wilder, whose resignation is announced elsewhere in this column.

Mr. George W. Wilder has resigned as manager of the Edison interests for Santa Barbara, Cal., which include the Santa Barbara Consolidated Railroad. Mr. Wilder has been with the company two and one-half years. During this time he effected the consolidation of the Edison Electric Company and the Merchants' Mutual Light & Power Company, as the Santa Barbara Gas & Electric Company. The entire distributing systems of the two companies which were consolidated have been rebuilt, the power house of one of the companies has been enlarged, and the other plant has been dismantled. The gas plant has been rebuilt and the gas distributing system has been extended into the Montecito Valley. Negotiations are to be entered into with the city of Santa Barbara for an extension of the franchise of the Santa Barbara Consolidated Railroad, with the expectation that the system, which comprises 8 miles of line, will be rehabilitated.

Mr. E. C. Foster, associated with Sanderson & Porter, engineers, New York and San Francisco, has been elected president and director of the Manchester Traction, Light & Power Company, Manchester, N. H. Mr. Foster has been prominently identified with electric traction interests in the United States for many years. In 1903 he resigned as vice-president of the Old Colony Street Railway and the Boston & Northwestern Street Railway, the operating companies of the Massachusetts Electric Companies, to accept the position of president of the New Orleans Railway Company which, under his direction, was reorganized as the New Orleans Railway & Light Company. In January, 1909, he resigned as vice-president of the New Orleans Railway & Light Company to become associated with Sanderson & Porter, and since that time he has been actively engaged in consulting and advisory work and in making physical examinations and appraisals of public service properties for bankers.



E. C. Foster

Mr. Leonard A. Busby, general counsel for the Chicago (Ill.) City Railway, has been elected president of the company to succeed Mr. T. E. Mitten, whose resignation will take effect on Dec. 31, as previously noted in the *ELECTRIC RAILWAY JOURNAL*. Mr. Busby is a member of the law firm of Shope, Zane, Busby & Weber. He was appointed counsel for the Calumet & South Chicago Railway in 1905, and when that property was taken over by the Chicago City Railway he was made counsel for the Chicago City Railway.

If the negotiations which are in progress for the consolidation of the surface and elevated railways in Chicago are consummated a successor to Mr. Busby, who is not an operating man, as president of the company, may be elected at that time.

Mr. William F. Ham, who has been connected with the Washington Railway & Electric Company, Washington, D. C., for eleven years, first as comptroller and later as



W. F. Ham

comptroller and treasurer, has been elected first vice-president and a director of the company to succeed Gen. George H. Harries, who became connected recently with H. M. Byllesby & Company, Chicago, Ill. Mr. Ham's first connection with electric railroad work was from 1892 to 1895 in the New York office of the Lorain Steel Company, with Major H. C. Evans. In 1895 he became associated with Tom L. Johnson and Albert M. Johnson as secretary of the Nassau Electric Railroad, Brooklyn, N. Y., and continued in this position until the Nassau Electric Railroad was ac-

quired by the Brooklyn Rapid Transit Company early in 1899. Mr. Ham was then appointed auditor of the Brooklyn Rapid Transit Company and served until December, 1899, when he accepted the position of comptroller of the Washington Railway & Electric Company. In the following year he was also elected treasurer of the company, and has since occupied both positions. Mr. Ham was one of the organizers of the American Electric Railway Accountants' Association and at the first meeting of the association was appointed a member of the standard classification committee and has served on that committee continuously. When Mr. C. N. Duffy resigned as chairman of the committee in 1905, Mr. Ham succeeded him and is still serving in that capacity.

Mr. George Best, who has been assistant secretary of the Boulder Electric Light & Power Company, Boulder, Col., has been elected secretary and treasurer of the company to succeed Mr. A. S. Brooks.

Mr. W. A. Buttrick has resigned as local manager and claim agent of the Baton Rouge (La.) Electric Company to become identified with a group of properties known as the Hudson River Companies, Glens Falls, N. Y., which have recently come under the management of the Stone & Webster Management Association. On Dec. 27, 1911, the reorganization of these companies was effected and the companies are now known as the Adirondack Electric Power Corporation. For the present Mr. Buttrick will be connected with the company as contract agent. Previous to becoming manager of the Baton Rouge Electric Company he was superintendent of the Pawtucket (R. I.) Electric Company, and superintendent of the Columbia (Ga.) Railroad Company. The properties at Baton Rouge, Pawtucket and Columbia are all under the management of Stone & Webster, Boston, Mass.

Mr. C. E. Brown, who has been cashier and paymaster of the Washington Railway & Electric Company, Washington, D. C., for ten years, has been elected treasurer of the company to succeed Mr. W. F. Ham, whose election as vice-president and a director of the company is noted elsewhere in this column. Mr. Brown entered business with the Nassau Electric Railroad, Brooklyn, N. Y., as track timekeeper in June, 1898, and was promoted to cashier in January, 1899. He continued as cashier of the company until the Nassau Electric Railroad was taken over by the Brooklyn Rapid Transit Company, when he was made payroll accountant. Mr. Brown resigned from the Brooklyn Rapid Transit Company to accept a similar position with the Washington Railway & Electric Company in April, 1900. He was made paymaster and cashier of the company on July 1, 1911. This position he has held ever since and still retains.



Mr. J. Brodie Smith has resigned as vice-president, general manager and a director of the Manchester Traction, Light & Power Company, Manchester, N. H., to open an office in Manchester as an expert in matters pertaining to electric lighting and electric railways. Mr. Smith was born at Richville, N. Y., on April 6, 1861. He was educated in the Union Free School of his native village and subsequently pursued special studies to become an expert electrician. In 1878 he constructed a telegraph line between two small villages in New York. In 1880, Mr. Smith removed to Manchester, where he has since resided. At first he engaged in the drug business with his eldest brother, but in 1885 he was appointed superintendent of the municipal fire alarm telegraph service, a position which he held for about two years. The Manchester Electric Light Company was the pioneer in the electric light and power business in Manchester, but the Ben Franklin Electric Light Company was organized as a competitor, and Mr. Smith was its first superintendent. When the consolidation of the two companies was effected he became superintendent of the company. The property of this company was afterward sold to the Manchester Traction, Light & Power Company. Mr. Smith was superintendent of the Manchester Electric Light Company until 1896, when he resigned and spent several months in Europe. On his return he was chosen general manager of the company, and in 1901, when the Manchester Traction, Light & Power Company acquired control of the Manchester Electric Light Company, he was elected a director and general manager. In 1905 he was elected vice-president of the company in addition to general manager, and has since occupied these positions. Mr. Smith has also resigned as general manager, assistant treasurer and director of the Manchester Street Railway, Manchester & Derry Street Railway and the Manchester & Nashua Street Railway, all owned by the Manchester Traction, Light & Power Company.

Mr. C. M. Witt, who was elected secretary of the Central Electric Accounting Conference at the annual meeting of the conference on Dec. 16, 1911, is auditor of the Indianapolis, New Castle & Toledo Electric Railway, Indianapolis, Ind. Mr. Witt was born on a farm in Indiana thirty years ago, and was educated in the common schools and at high school. He began his railroad career twelve years ago as baggage and freight checker and ticket agent on a steam railroad in the Central West. Mr. Witt next became connected with the Lake Erie & Western Railroad as bill clerk and assistant cashier, and resigned from this company to enter the service of the Vandalia Railroad as clerk to the division freight agent. He entered electric railway work as chief clerk to the traffic manager of the Indiana Union Traction Company, and after serving the company four years in the traffic, transportation and mechanical departments he was appointed chief dispatcher of the Muncie & Portland Traction Company in charge of traffic and transportation matters. When the Indianapolis, New Castle & Toledo Electric Railway was placed in operation Mr. Witt was appointed auditor of the company. Mr. Witt has supplemented his public and high school work and the practical knowledge which he obtained while serving as electrician and car inspector for the Indiana Union Traction Company by recently completing the course of the International Correspondence Schools in electric railways and lighting.

#### OBITUARY

Arnold Tanzer, treasurer of the International Steam Pump Company, New York, N. Y., died at his home in New York on Dec. 21, 1911.

F. M. McKeon, traveling freight and passenger agent of the Spokane & Inland Empire Railroad, Spokane, Wash., died in San Francisco, Cal., on Dec. 11, 1911.



C. M. Witt

## Construction News

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

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

#### RECENT INCORPORATIONS

\*Meridian & Deepwater Railway, Meridian, Miss.—Application for a charter has been made in Mississippi by this company to build an electric railway between Meridian and Winona. Grading has been begun. Headquarters: Meridian. Capital stock, \$600,000. Common stock, \$400,000; preferred stock, \$200,000. Directors: S. A. Neville, C. F. Schofield and W. C. Stowell.

\*Northeast Railroad, El Reno, Okla.—Application for a charter has been made in Oklahoma by this company to build an electric or steam railway between El Reno, Woodward and Oklahoma City. Surveys have been begun.

\*Kirkland-Redmond Railway, Light & Power Company, Seattle, Wash.—Application for a charter has been made in Washington by this company to build an electric railway between Kirkland and Redmond and other points in Kings County. Headquarters: Seattle. Capital stock, \$200,000. Incorporators and first board of trustees are: C. A. Eaton, B. F. Gordon, William Perigo, Samuel G. Hepler and W. D. Gillis.

\*Rupert & Northeastern Railway, Rupert, W. Va.—Chartered in West Virginia to build an electric railway between Rupert in Greenbriar County to Fenwick in Nicholas County. Headquarters: Boston, Mass. Capital stock, \$5,000. Incorporators: H. L. Higginson, Josiah Hill, Seth T. Gano, H. L. Shattuck and C. A. Ellis, all of Boston.

#### FRANCHISES

Phoenix, Ariz.—The Salt River Valley Electric Railway has received a franchise from the City Council in Phoenix. This is part of a plan to build an interurban railway to connect Phoenix with all the principal towns of the Salt River valley. [E. R. J., Dec. 1, '11.]

Calistoga, Cal.—The San Francisco, Napa & Calistoga Railway, San Francisco, has asked the Board of Trustees for a franchise in Calistoga.

Los Angeles, Cal.—The Los Angeles Railway has received franchises from the Council to build two cross-town lines in Los Angeles.

Sacramento, Cal.—The Oakland, Antioch & Eastern Railway has asked the City Trustees for franchises to operate an interurban electric line into Sacramento across the Sacramento River and through a number of streets in Sacramento.

Willows, Cal.—The Sacramento Valley West Side Electric Railway has received a franchise from the Supervisors of Glenn County to build its lines through Glenn County. Yolo County has granted the company a franchise, and it is expected that franchises will be asked in Colusa County and Tehama County. This railway will connect Woodland, Colusa, Willows, Orland, Corning, Redding and Red Bluff. C. L. Donohue, Willows, president. [E. R. J., Nov. 25, '11.]

Pueblo, Col.—The Arkansas Valley Interurban Railway, Little Rock, has asked the County Commissioners for a twenty-year franchise on Santa Fe Avenue in Pueblo.

Forest Park, Ill.—The County Traction Company, Chicago, has asked the Village Board for a franchise in Forest Park.

Kewanee, Ill.—The Kewanee, Bradford & Henry Interurban Railway, Henry, will ask for franchises in the various towns through which the proposed line is to pass. The line will connect Bradford, Henry and Kewanee. John P. Code, Bradford, is interested. [E. R. J., Sept. 2, '11.]

Quincy, Ill.—The Quincy & Western Interurban Railway has received a fifty-year franchise from the Mayor to build over eleven streets in Quincy. This is part of a plan to build a 75-mile electric railway between Niota and Quincy. Henry Dayton, Quincy, president. [E. R. J., Dec. 16, '11.]

Miller, Ind.—The Indianapolis, Chicago & Meridian Railway, Indianapolis, has received a franchise from the Commissioners of Parker County to use the streets of Miller.



This completes the franchises for the entire railway's right-of-way to connect Indianapolis, Sheridan, Gary, Valparaiso, Hammond, Monticello and Warsaw. Contracts will be let and construction will be begun within a short time. M. J. Mooreland, secretary. [E. R. J., Dec. 16, '11.]

**Terre Haute, Ind.**—J. W. Ratcliff, Sugar Creek, has asked the County Commissioners for a franchise to build an electric railway from West Terre Haute to Clifton.

**\*Louisville, Ky.**—The cross-town car ordinance passed a few days ago by the lower board of the General Council of Louisville, Ky., has been approved by Mayor Head, and in the very near future the city franchise for operation of service through the southern residential section of the city will be offered for sale at an upset price of \$15,000. It is presumed that the privilege will be purchased by the Louisville Railway.

**Longmeadow, Mass.**—The Springfield Street Railway has asked the Selectmen for a franchise in Longmeadow.

**Marlboro, Mass.**—The Boston & Western Electric Railway, Boston, has asked the City Council for a franchise in Marlboro. [E. R. J., Mar. 18, '11.]

**\*Chihuahua, Mex.**—Carlos Lanches, Aldana, and associates have asked the City Council for a franchise to build a second electric railway in Chihuahua.

**Jersey City, N. J.**—The Public Service Railway has received permission from the Public Utilities Commission to construct connections between its tracks on several streets in Jersey City.

**Johnstown, N. Y.**—The Little Falls & Johnstown Electric Railway, Little Falls, has received a franchise from the Common Council to build a line on West Clinton Avenue in Johnstown to connect Little Falls, St. Johnsville, Ephratah and Johnstown. J. L. Hees, 103 Park Avenue, New York, N. Y., is president. [E. R. J., Dec. 9, '11.]

**\*Albemarle, N. C.**—James R. Moss, Albemarle, and associates have asked the City Council for a franchise to build a 2-mile electric railway from the Winston-Salem Station and extending over many streets in Albemarle and thence out Main Street to Crowell Mineral Springs.

**Akron, Ohio.**—The Akron, Canton & Youngstown Electric Railway, Canton, has received a franchise from the City Council in Akron. This line will connect Akron, Canton, Britain and Youngstown. F. E. Bissell, Canton, chief engineer. [E. R. J., Dec. 9, '11.]

**Coitsville, Ohio.**—The Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, asked the Council for a franchise in Coitsville.

**Grants Pass, Ore.**—The Grants Pass & Rogue River Railway has asked the City Council for a fifty-year franchise in Grants Pass. It will connect Grants Pass, Medford and Ashland. J. Arnold Doyle, president. [E. R. J., Dec. 9, '11.]

**San Antonio, Tex.**—The San Antonio Traction Company has asked the City Council for a franchise to build an extension in San Antonio to Los Angeles Heights.

**Richmond, Va.**—The Richmond & Henrico Railway has asked the City Council for a franchise to build a 2½-mile extension in Richmond.

**Bellingham, Wash.**—The Nooksack Valley Traction Company has received from the City Council an extension of its franchise until Oct. 1, 1914, in which to begin the construction of its line in Bellingham. This is part of a plan to build an electric railway to connect Bellingham, Sumas, Ferndale, Lyden and Blaine. [E. R. J., Nov. 25, '11.]

**Tacoma, Wash.**—The Seattle-Tacoma Short Line Railway has received a two-year extension of its franchise from the City Council in Tacoma on condition that the company expend \$20,000 on its line in Pierce County within six months.

**Wenatchee, Wash.**—The Wenatchee Valley Railway & Power Company, Wenatchee, has received a franchise from the Council to build through the Wenatchee Valley. This is part of a plan to build a 50-mile electric railway between Wenatchee and Leavenworth, via Cashmere. A. J. Linville, Wenatchee, president. [E. R. J., Aug. 26, '11.]

**Morgantown, W. Va.**—The South Morgantown Traction Company has received a franchise from the City Council over certain streets in Greenmont and South Park.

## TRACK AND ROADWAY

**Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.**—Work has been begun by this company on its line in Fresno. A branch line will be extended to Sanger.

**\*Hacienda (Cal.) Railroad.**—Grading has been begun by this company at the Hacienda end of its 14-mile electric railway between San José and Hacienda. This line is being built for the Almaden Quicksilver Mining Company. Two bridges will be built. Herman Brothers, San José, are the engineers.

**\*Redding & Red Bluff Railway, Redding, Cal.**—This company's plans call for a line from Redding to Red Bluff, about 35 miles. It is said that the line is to be built as an extension of the Northern Electric Company and the Vallejo & Northern Railway.

**East Shore & Suburban Railway, Richmond, Cal.**—Plans are being considered by this company to extend its Sixth Street line through the Santa Fe tract to Point Richmond.

**Peninsular Railway, San José, Cal.**—Work has been begun by this company on an extension of its line on University Avenue through Woodland Place and Ravenswood. The company is rebuilding its bridge across the San Francisco Creek which leads into Woodland Place.

**San José (Cal.) Railways.**—This company plans to build an extension from San José to Hollister. Another branch will be built from San José to Alviso.

**Tidewater & Southern Railroad, Stockton, Cal.**—The present plans of this company include an extension of its line to Fresno and Bakersfield via Madera.

**Canon City, Col.**—Plans are being made and construction will be begun in the spring on the projected electric line from Canon City to the top of Royal Gorge. Frederick B. Street, New York, N. Y., is the holder of the franchise. [E. R. J., Sept. 23, '11.]

**Uncompahgre & Gunnison Valley Railway, Montrose, Col.**—Plans are being considered by this company to begin soon the construction of its 45-mile electric railway from Montrose to Delta and Cedaredge. J. M. Pepper, Montrose, is interested. [E. R. J., Jan. 14, '11.]

**Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.**—Work has been begun by this company on the extension of its Main Street line in Pueblo.

**Shore Line Electric Railway, New Haven, Conn.**—This company is being urged to build an extension to Middletown.

**Elberton & Eastern Railway, Augusta, Ga.**—This company has secured the right-of-way and has awarded the contract for the construction work of its 21-mile electric railway from Elberton to Tignall to Ira L. McCord, New York, N. Y. The company announces that the bonds for \$300,000 authorized recently by the State Railroad Commission have been sold. W. O. Jones, president. [E. R. J., Oct. 28, '11.]

**Chicago (Ill.) Railways.**—During 1912 this company will construct 13.27 miles of track within the city limits.

**\*Freeport & Cedarville Traction Company, Freeport, Ill.**—This company has been formed to build an interurban railway from Freeport to Cedarville. Gasoline motor or storage battery cars will be operated.

**Hillsboro Electric Light & Power Company, Hillsboro, Ill.**—Plans are being made by this company for the construction of a 2-mile line between Hillsboro and Taylor Springs. J. J. Frey, Hillsboro, president. [E. R. J., Oct. 21, '11.]

**La Salle County Electric Railroad, Ottawa, Ill.**—This company is securing frontage permits for certain streets in Ottawa for its proposed electric railway from Mendota to Ottawa, a distance of 26 miles. G. H. Dodge, Chicago, president. [E. R. J., Sept. 16, '11.]

**Louisville & Southern Indiana Traction Company, New Albany, Ind.**—Plans are being made by this company to extend its Ekin Avenue line out Cherry Street to the old Vincennes Road in Louisville.

**South Bend & Logansport Traction Company, South Bend, Ind.**—This company will build the first section between South Bend and Lakeville in the spring.



**Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.**—Plans are being made by this company for an extension from Waterloo to Elk Run.

**Henderson (Ky.) Interurban Railway.**—It is reported that this company has secured financial backing for the construction of its line between Henderson and Owensboro. Malcolm Henderson, president. [E. R. J., Sept. 9, '11.]

**Louisville (Ky.) Railway.**—Construction of the South Louisville extension of the Sixth Street line in Louisville, so that it will connect with the plant of B. F. Avery & Sons, has been begun by the Henry Bickel Company, general contractors.

**Paducah (Ky.) Traction Company.**—This company has placed in operation its Tyler extension, which extends a little beyond the city limits.

**Hagerstown & Clear Spring Railway, Hagerstown, Md.**—This company has awarded contracts for all overhead equipment to the General Electric Company for its electric railway between Hagerstown, Middleburg, Greencastle and Mercersburg. L. N. Downs, Hagerstown, president. [E. R. J., Oct. 7, '11.]

**Massachusetts Northern Railways, Boston, Mass.**—This company, which was recently organized to control the present lines of the Connecticut Valley Street Railway, the proposed Miller's Street Railway, the Athol & Orange Street Railway, the Gardner, Westminster & Fitchburg Street Railway and the Templeton Street Railway, plans to build a line from Baldwinville to Winchendon. F. E. Marsh will superintend the construction of the proposed new line.

**Public Service Railway, Newark, N. J.**—This company's new line from Orange Road, Montclair, to Dodd Street, East Orange, has been placed in operation.

**Asheville (N. C.) Electric Company.**—Surveys will be made at once and grading soon be begun by this company on the extension of its Charlotte Street line to the site of the proposed Grove Hotel.

**Goldsboro, Seven Springs & Swansboro Railroad, Goldsboro, N. C.**—This company, recently chartered, has purchased the property and franchises of the Goldsboro Street Railway, and is planning for an immediate extension of the line from Goldsboro to Seven Springs, a resort to miles from Goldsboro. William A. Robertson, Goldsboro, is interested. [E. R. J., Dec. 23, '11.]

**Devil's Lake & Chautauqua Transfer Company, Devil's Lake, N. D.**—Plans are being made and contracts awarded by this company for reconstructing and equipping with electricity its 5-mile electric railway between Devil's Lake, Greenwood, Chautauqua grounds and the State Military Grounds. [E. R. J., Nov. 11, '11.]

**Columbus, Urbana & Western Electric Railway, Columbus, Ohio.**—S. H. Bracey, of S. H. Bracey & Company, Chicago, was in Columbus recently in connection with the proposed extension of this company's line from Fishingers to Findlay. Mr. Bracey stated that if the Public Service Commission approves the issue of \$5,500,000 bonds requested the line will be completed within one year and in operation if the equipment for the power house can be completed within that time. It was further stated that arrangements had been completed for new interests to enter the company if the bond issue is authorized by the State. The proposed extension would make an almost direct route between Columbus and Toledo and would also give Columbus a more direct outlet to the West.

**Johnstown (Pa.) Traction Company.**—Plans are being considered by this company to build an extension in Moxham.

**South Bethlehem & Saucon Street Railway, South Bethlehem, Pa.**—During the next eight weeks this company will award contracts to build about 7 miles of new track in South Bethlehem.

**Seattle, Wash.**—Bids will be received until Jan. 12, 1912, for the construction of the track of Division A of the municipal electric railway from Stewart Street and Third Avenue to Salmon Bay. Plans may be obtained from H. R. Dimock, Seattle, city engineer of Seattle. [E. R. J., Dec. 16, '11.]

## SHOPS AND BUILDINGS

**Pacific Electric Railway, Los Angeles, Cal.**—It is reported that this company will remove its repair shops, now located at Seventh Street and Central Street, in Los Angeles, to a site in the new town to be built between Los Angeles and San Pedro. It is also reported that the company will soon build new stations at San Dimas and at Irwindale.

**Aurora, Elgin & Chicago Railway, Chicago, Ill.**—This company has awarded the contract for the construction of its new passenger station at Wheaton to H. A. Wilson & Company, Chicago. The structure will be 35 ft. x 100 ft. The cost will be about \$25,000.

**Indiana Union Traction Company, Anderson, Ind.**—Plans are being considered by this company for the construction of a new station in Anderson. Until this new building is constructed the company will use the Princess Theater for its interurban station.

**Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.**—This company plans to build a new fireproof freight depot in Bluffton. The structure will be one-story and of brick, steel and concrete construction.

**Berkshire Street Railway, Pittsfield, Mass.**—This company plans to build a new freight station on New West Street, Springfield.

**Springfield Railway & Light Company, Springfield, Mo.**—It is reported that this company has completed its new carhouse in Springfield.

**Piedmont & Northern Railway, Charlotte, N. C.**—This company has secured the necessary property on Franklin Street between Broad Street and Main Street in Gastonia to build its new passenger and freight depots. Material has been ordered and construction will be begun at once.

**Ohio Electric Railway, Cincinnati, Ohio.**—This company will build a new carhouse the coming spring on the site of the old one at Lindenwald, near Hamilton, Ohio.

**Lehigh Valley Transit Company, Allentown, Pa.**—Plans are being considered by this company to build a new carhouse in Lansdale.

**Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.**—This company has purchased land back of its carhouse in Marietta, Ohio. It is thought the company will build new repair shops on this site. On the completion of this improvement it will use the present carhouse of the company on Nineteenth Street for storage purposes.

**Pan-Handle Traction Company, Wheeling, W. Va.**—Plans are being made by this company for the construction of a new carhouse in North Warwood.

## POWER HOUSES AND SUBSTATIONS

**Uncompahgre & Gunnison Valley Railway, Montrose, Col.**—Plans are being considered by this company to build a new power house in the coal fields near Delta. J. M. Pepper, Montrose, is interested. [E. R. J., Jan. 14, '11.]

**Georgia Railway & Electric Company, Atlanta, Ga.**—This company has purchased water rights and four acres of land in the northern part of Lagrange. It is expected that the company will soon build a new power house on this site.

**Hillsboro Electric Railway & Power Company, Hillsboro, Ill.**—It is reported that this company has completed its new power plant in Hillsboro. J. J. Frey, Hillsboro, president.

**Brunswick & Yarmouth Street Railway, Freeport, Maine.**—This company expects to purchase one 300-kw motor generator set from the General Electric Company to be installed by Jan. 15, 1912.

**Portland & Brunswick Street Railway, Freeport, Maine.**—The new motor generator set for this company's power station at Freeport is expected to be installed in January. The old power station equipment is to be kept for emergency use.

**Hagerstown & Clearspring Railway, Hagerstown, Md.**—This company has awarded a contract for the equipment of its power house to the General Electric Company.

**Lake Erie, Bowling Green & Napoleon Railway Company, Bowling Green, Ohio.**—At a meeting of bondholders and stockholders of this company in Bowling Green on Dec. 20 plans for building a power plant in that place from the proceeds of receivers' certificates were discussed.



# Manufactures & Supplies

## ROLLING STOCK

Ogden (Utah) Rapid Transit Company has ordered eight Brill 27-MCB-1 trucks without wheels from the American Car Company.

Brunswick & Yarmouth Street Railway, Freeport, Maine, expects to purchase from the Laconia Car Works three cars equipped with Taylor long wheel-base trucks and GE-203 motors.

Omaha, Lincoln & Beatrice Railroad, Lincoln, Neb., has ordered one quadruple equipment of 101-B motors with HL control from the Westinghouse Electric & Manufacturing Company.

Northern Ohio Traction & Lighting Company, Akron, Ohio, has ordered five suburban car bodies and seven 35-ft. 6-in. convertible car bodies from the G. C. Kuhlman Car Company.

Interurban Railway & Terminal Company, Cincinnati, Ohio, has ordered three 50-ft. combination, three 50-ft. freight and three 50-ft. excursion cars from the Cincinnati Car Company.

Lehigh Valley Transit Company, Allentown, Pa., has ordered one quadruple equipment of No. 307 direct-current interpole motors with HL unit-switch control from the Westinghouse Electric & Manufacturing Company.

New York, New Haven & Hartford Railroad, New Haven, Conn., has ordered twelve 113-ton articulated truck-type locomotives equipped with eight 409-C motors with type USB control from the Westinghouse Electric & Manufacturing Company.

Spokane & Inland Empire Railroad, Spokane, Wash., has ordered from the Westinghouse Electric & Manufacturing Company one double equipment consisting of 301-B-2 motors, equipped with a 337-B master controller, for use on a 50-ton locomotive.

## TRADE NOTES

Imperial Wire & Cable Company, Ltd., Montreal, Que., has acquired the business and undertakings of the Wire & Cable Company, Montreal, Que. The new company will continue to operate in Montreal without change in management.

Electrose Manufacturing Company, Brooklyn, N. Y., has opened a temporary office at 109 Broadway, Brooklyn, until permanent quarters can be secured to replace the company's plant in Brooklyn which was destroyed by fire recently. The company expects to resume operation by Feb. 15, 1912, or possibly earlier. It is expected that the new plant will be nearly 50 per cent larger than the old one.

John F. Stevens Company, New York, N. Y., has been organized by John F. Stevens and others with a capital stock of \$2,000,000 to engage in general railroad construction work. Mr. Stevens was formerly president of the United Railways and the Oregon Electric Railway, Portland, Ore., also president of the Astoria & Columbia River Railroad, Oregon Trunk Railway, Pacific & Eastern Railway and Spokane, Portland & Seattle Railway. Previous to his connection with these railways Mr. Stevens was vice-president of the New York, New Haven & Hartford Railroad.

Federal Storage Battery Car Company, Silver Lake, N. J., has made a number of extensive improvements to the plant which it recently acquired at Silver Lake for the manufacturing of the Edison-Beach battery car. A spur track has been built into the works from the Erie Railroad; a turntable and switching conveniences have been installed; a new blacksmith and forge shop has been erected, and the buildings have been improved and changed to conform to modern car-building conditions. The company owns thirty-five acres of ground adjacent to the plant. The trucks and car bodies are constructed entirely in the company's shops. The motors and controllers are built from the company's own design and specification by other manufacturers. The batteries, of course, are furnished by the Edison Storage Battery Company at West Orange, N. J. The company has at the present time twenty-three cars, with trucks complete, going through its shops—three for the United Railways, Havana, Cuba; two for Melbourne, Australia; two (repeat

order) for the People's Electric Railway, Muskogee, Okla.; one for the Municipal Railway, Kyoto, Japan; one for the Ephrata & Lebanon Street Railway, Ephrata, Pa.; two for the Billings (Mont.) Traction Company: two (repeat order) for the Charlotte (N. C.) Rapid Transit Company; two for the Washington, Spa Spring & Greta Railroad, Washington, D. C.; one for the New Castle & Delaware City Traction Company, New Castle, Pa.; one for the Lovgren Lumber Company, Portland, Ore.; one for the Towson & Cockeysville Railroad, Bel Air, Md., and two for Rockhill, N. C. Besides the cars now going through the shops, sixteen Edison-Beach battery cars are in daily service in different parts of the country and are reported to be giving entire satisfaction to the operators. Ralph Beach, of this company, reports a marked change in sentiment among electric railway officials and operators toward storage battery cars. They now consider them a practical, feasible and economic fact—no longer an experiment—and sales depend more on price and delivery than any other factor.

Ohio Brass Company, Mansfield, Ohio, has made the following announcement: On Jan. 1, 1912, the agency agreement for the sale of O-B overhead materials, rail bonds and car equipment specialties which has been in force between the Ohio Brass Company, Mansfield, Ohio, and the Pierson-Roeding Company, San Francisco, for a number of years terminates and will not be renewed, as it was mutually agreed that separate agency agreements for O-B "hi-tension" insulators and O-B electric railway equipment would eventually prove unsatisfactory and that the interests of all concerned would be better served by a single agency for the entire O-B line. On and after Jan. 1, 1912, the Holabird-Reynolds Company, San Francisco, which for some time past has been acting as exclusive agent for O-B "hi-tension" insulators only, will become the exclusive agent for the Ohio Brass Company for the sale of its entire line in the State of California. The Holabird-Reynolds Company will carry an adequate stock of O-B railway materials and "hi-tension" insulators at San Francisco, and business in Los Angeles and the southern part of the State will be handled by H. C. McCutchan, of its Los Angeles office, under the personal direction of R. D. Holabird. The business in the States of Washington, Oregon and Idaho and in British Columbia will be in charge of the Ohio Brass Company's own personal representative, F. V. Cook, who will make his headquarters in Seattle, at the office of the Holabird Electric Company. An intimate and friendly business connection between that company and the Ohio Brass Company will be maintained because of its California agency for O-B materials. Arrangements are being made to carry an emergency stock for quick delivery in Seattle. Every effort will be made to handle all orders and inquiries in such a way as to merit a continuance of patronage and to render O-B service eminently satisfactory to Pacific Coast customers from every standpoint of price, delivery and quality of materials furnished.

## ADVERTISING LITERATURE

Flood Concrete Tie Company, Bridgeport, Conn., has printed a booklet in which the Flood reinforced-concrete tie and improved rail fastening are described and illustrated.

Barrett Manufacturing Company, New York, N. Y., has issued a folder which calls attention to the fact that 95 per cent of the entire roof area of the important modern concrete buildings erected by the Turner Construction Company during the past nine years is covered with the Barrett specification type of roofs.

Goldschmidt Thermit Company, New York, N. Y., in its publication, *Reactions*, for the fourth quarter of 1911, prints among other illustrated articles "Toronto Meeting of the American Electrochemical Society," "Welding a Fourteen-Inch Rock Crusher Shaft," "Welding a Heavy Plate Shear," and "The Goldschmidt Reaction: Its Theory and Applications in Practice."

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4902, in which are listed direct-current switchboards of 125 and 250 volts for controlling three-wire generators up to 200-kw capacity and two-wire or three-wire feeder circuits up to 1200 amp. The bulletin contains connection and dimension diagrams of various panels. Bulletin No. 4897 illustrates and describes GE Edison Mazda lamps for standard train-lighting service.