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TRAFFIC LAWS AND MOTOR CARS

The recent appointment of a traffic and public safety committee by the International Travel Club, as announced in the Sept. 6 issue of this journal, marks the inauguration of a very necessary task, namely, the formulation of an effective and uniform code to regulate street traffic in the larger cities of this country. As the personnel of the committee embraces such traffic experts as Howard Elliott, president of the New Haven system, and Edward G. Connette, president International Railway, Buffalo, there is ample reason to feel that the work will be conducted in the most efficient way. It is obvious that the electric railway operator must take a most aggressive interest in this problem, for it is connected with the very existence of his business. In many English cities where the omnibus is well-nigh ubiquitous, the tramways have found that safe operation has become almost impossible owing to the autocar driver's pernicious habit of cutting in between the tracks and the curb just when a person is preparing to board or leave a car. This evil is not confined to England by any means. Whoever has tried to board a car in the business districts of large American cities can appreciate how this practice of taxicab and other chauffeurs is hazardous to the life of the citizen and to the treasury of the railway. No electric railway would dare to place an untrained man in charge of even its slowest car, yet our laws with regard to automobiles are so loosely drawn and so badly enforced that the most ignorant and reckless minors may be seen running amuck with trackless, high-powered vehicles at express train speeds. Certainly the city highways of to-day were never intended for this kind of traffic. Since lanes of travel for different classes of vehicles are practically impossible, the speed regulations should be as stringent with regard to the automobile as they have long been with regard to the trolley car.

BY TROLLEY TO THE CONVENTION

At a meeting of electric railway men of New England it has been proposed that the trip to the approaching annual electric railway convention at Atlantic City be made by trolley and boat, as outlined elsewhere in this issue. Although such a method of transporting delegates to a convention has often been employed by the Central Electric Railway Association and other bodies in the Central and Middle Western States, it is so far as the East is concerned a distinctly novel idea. It is possible to go all the way from Waterville, Me., to the convention city, a distance of say 600 miles, by trolley, and it is expected that some of the delegates will make the complete trip. The majority, however, will travel by radial trolley lines at least as far as New London. Some changes in equipment will be necessary in order that cars sent out with their different parties on different roads may go through without change, but these matters can readily be adjusted. It seems quite fitting that electric railway men should use this means of transportation to the convention. Beyond the evidence that it gives of the increasing nationalization of the trolley line, the trip is of intrinsic value to the delegate himself in broadening his vision and in putting him face to face with other conditions, problems and methods. It will give him a better idea of what the trolley transportation privilege and service means to the territory traversed, and no matter how traveled a man he may be, he can derive some value therefrom. Of course the element of time enters into the question, but each company will find that the time needed by the delegate will be a profitable investment.

SABOTAGE AND GOOD WILL

Accident prevention has been discussed from so many angles that a new expression on this subject is perhaps impossible, yet there are occasions when a particular phase deserves to be brought into more than usual prominence. This is the case with the remarks on accident prevention made by W. B. Rockwell, general manager Eastern Pennsylvania Railways, at the Sept. 16 meeting of the Keystone Railway Club. Good equipment and good maintenance practice were such obvious preventives of accidents, he said, that it was needless to offer arguments in their favor. It was vain, however, to hope that accidents could be reduced to a minimum unless the men were inspired with a feeling of loyalty to their company. If they were disgruntled, they could work much harm without showing any apparent animus. Mr. Rockwell's emphasis on this aspect of accident prevention is indeed a timely one, for a certain breed of agitators is now swarming over the land with a new slogan for winning labor demands, namely, sabotage. Sabotage may range from mere indifference to the interests of the employer to the delib-

erate destruction of his property. How many managers realize that the antitoxine for this poisonous doctrine lies in plain fair-dealing? The motorman who is treated like an automaton by his employer cares little whether or not his freshly varnished car is grazed by a wagonload of hay nor is his companion on the rear platform likely to show much concern when some idle passenger whittles at the seating. Such indifference, which is hardly open to detection and punishment, may cost the company as much in the long run as what are usually termed accidents. Let it be borne in mind, however, that where this spirit prevails the cause is due far more to "mechanical" ideas in management than to the rate of wages.

MEDICAL INSPECTION BUREAU FOR EMPLOYEES

The medical inspection bureau of the Brooklyn Rapid Transit System is a good example of welfare work which is carried on at the employer's expense for the benefit of the employees, yet which, if properly conducted, redounds greatly to the benefit of the employer. The free medical attention to the operating employees of the system, the compulsory medical inspection before the granting of sick excuses, the installation of local inspection offices, the use also of visiting physicians and the discipline administered in cases of feigned illness—these are but details of a general plan that in a six months' trial has proved both simple and efficacious. One result of the work of the bureau is the fact that all decisions concerning sick leave have been taken from the operating officials and placed in the hands of those who are peculiarly competent to judge such requests. The varied methods of dealing with sick excuses, as found in the several depots and terminals, have also been eliminated, and now through the work of the specialized inspection bureau absolute unanimity of action is brought about on this point. A more concrete result of the work of the bureau, however, may be found in the direct saving during the past six months of 23 per cent of the days lost for sickness as compared with the same period in the preceding year. This has been highly beneficial not only to the employees themselves but also to the company, for from the viewpoint of the men every day's sickness saved represents a gain in health and comfort as well as a gain in earning capacity, and to the company it means a more consistent and efficient operation of its lines. And it cannot be said that the public has been unaffected by this saving, for the general standard of health among the employees is intimately associated with the satisfactory operation of the lines. The continued and fullest success of the bureau depends, of course, on the sincere co-operation of the employees, and while here as in any company there may exist a certain malingering type of mind that counts a day stolen from the company under the excuse of sickness a thing of which to be proud, yet the great majority of the employees are sincere in their appreciation of the efforts of the bureau. The plans of the company to extend the service of the bureau to instructing men at the operating centers in first-aid work and to following up systematically minor ailments that men may have when they enter the employment of the company are meritorious, and it is to be hoped that the bureau in its now permanent organization will prove even more useful than during its time of probation.

PROJECTED ELECTRIC INTERURBAN RAILWAYS

With this issue the series of articles on the subject of the probable operating results and probable cost of construction of an electric interurban railway is brought to a close. As we look reflectively over the entire field, it seems to us that, although the work is a pioneer on a very complex subject, yet it has promulgated principles that will bear up under the test of actual use. Mr. Fischer's first article dealt authoritatively with the problems connected with the operating revenue of electric interurban lines, and from the experience of existing lines it was found that definite rules might be obtained as a result of an analysis of the terminal and intermediate town and village population and the probable traffic involved that would serve as a basis for fairly accurate estimates of the revenue to be derived from the operation of the proposed line.

In the treatment of the operating expense and cost of construction of a projected line the author has been equally explicit. Several points are brought out in a study of existing lines that should be of value not only to promoters but also to operators. For example, the author calls attention to the difference in the expenditures for maintenance of way and structures per mile of track between the average electric interurban railway and the steam road. While the lighter equipment and reduced car-mile movements of the electric line may account for some of this discrepancy, still, in view of the short average age at present of the electric line, it is undoubtedly true that a sufficiently high standard of maintenance of way and structures has not yet been adopted on the average electric railway, rather than that the steam railroad expenditures for this item are excessive. Then, again, the statistics show that the average interurban road is not yet employing sufficiently extensive organizations for the purpose of developing traffic, a point which will be altered as the electric interurban railway develops into the commercial electric railway in accordance with the demands of local conditions. These conclusions are some of the reasons which induced the author to specify allowances for operating expense higher than is the practice at present.

No less instructive were the figures for the probable cost of construction of normal electric interurban lines. While it is obvious that no fixed rule may be laid down for the amount of money to be expended for construction, yet the study has resulted in maximum and minimum estimates which certainly approximate the limits of outlay for a proposed line under average conditions. While some roads may cost less, owing to subsidies of money, right-of-way and the like, still, we believe that the conclusions reached hold true for average cases to such an extent that they should dispel any delusion that an electric interurban railway can be constructed for an insignificant amount. It should be borne in mind, however, that, as in the case of operating revenue and operating expense, the figures quoted are averages only, and that in any particular case a study of the surrounding conditions is necessary before the principles deduced by Mr. Fischer in the case of normal roads should be applied. This is pre-eminently the field of the expert because both experience and judgment are

necessary for one who wishes to distinguish properly all abnormal conditions and to make allowances therefor. The hypothetical cases used in the articles, it is true, clear up the general subject and cover the average variations of population and territory, but even at that the hazard of applying these results to all cases is great, and unless a projected line is readily seen by an intelligent layman to be within the limit set in the articles, it would better be left unconstructed unless expert judgment is called in and countenances it.

The conditions under which electric railways have been built in the past have been entirely altered during the last ten years, and it is no longer possible in most states for an ambitious and enthusiastic promoter to build a road on the bonds and take the stock for his services. Such a change is desirable for the electric railway interests as well as for those of the community at large, but it does not remove the necessity of a careful preliminary study of the possible traffic which a proposed line will secure before money is invested in its construction. Such a study is possible on the part of the investor, and if the plan was more generally practised more capital would be available for legitimate enterprises because less would be lost in undertakings doomed to failure from the start.

RUNNING SUBSTATIONS AT LOW COST

So long as direct-current motors are popular in railway work the substation, although an expensive feature of the electrical supply system, will be with us. In the two important items of fixed charges and labor costs will be found the largest opportunity to study economies; but, in addition, there are interesting methods of saving money along mechanical lines which deserve consideration. There is nothing new in the point that every dollar which can be saved in the first cost of a substation without sacrifice of safe and reliable service exerts a powerful influence in cutting down the yearly interest, depreciation, insurance and taxation charges, but it would be well if more study should be given throughout the engineering circles of the street railway industry to the problem of securing ideal designs.

Thus, we do not as yet know enough about the question of space required for a given capacity in transformers, rotaries and switching apparatus in installations designed to convert energy at different high voltages into energy suitable for trolley operation. The problem of substation fire protection at the lowest expense consistent with bed-rock insurance rates opens up another line of thought; and, again, the possibilities of the outdoor switching and transformer installation, even under the climatic conditions of the East, are not fully appreciated. The same sort of study that has given railway men a broad knowledge of the best ideas in carhouse design could with no small profit be applied to substations.

As for labor cost, the possibilities of economy appear to be chiefly in the direction of combining other duties with that of attendance in every reasonable instance, along the well-known lines of ticket selling, freight and express clerical work and light repairing of such apparatus as circuit-breakers, master controllers, headlights, car heaters, con-

tactors and other small equipment which can be easily assembled and transported at nominal cost on the company's own cars. There is room also for careful investigation of the relative yearly cost of locating a substation at a local repair shop and carhouse and of making up for the distribution losses by heavier feeders on certain sections of the line, and also of putting down the converting plant nearer the electrical load center. There is such a thing as too much centralization of light equipment repairs, and in cases where shop and substation must be separated the "working load-factor" of the substation attendant can easily be increased if he is encouraged to do such maintenance in his spare time. The cost of fitting up a small shop with suitable tungsten lighting and perhaps a few light tools driven by one or two motors is not large, and it releases space in the main shops often of value for other purposes, besides giving the substation force interesting and broadening tasks. In many small installations two daily shifts are enough, say of nine hours each, the rotaries being off the line at night except in the larger installations. A surprisingly good night service can be given over great distances from a single substation if the schedule is cut enough by the demands of a very thin traffic. Certainly it would seem possible to care for emergency conditions at most substations, even on a large system, by one or two specialized troublemen equipped with gasoline-driven track motorcycles.

Where water-cooled transformers are in service, the home-made cooling tower offers an attractive means of reducing expenses, either in pumping or in the direct purchase of water from municipal mains. Sometimes in the operating rooms of large substations heated in part by steam the fuel bill can be materially cut down by the simple but effective expedient of providing within the room a metal compartment perhaps 8 ft. square and 7 ft. high, with an insulated flooring and adjustable windows facing the switchboard and more important machinery. This would house the men doing desk work and they could do their telephoning in it, and the necessary warmth could be supplied by an electric heater or two at nominal cost in comparison with the expense of coal heating in the main building. In some installations hand-operated oil or water pumps which are seldom used for any length of time may be provided in the interest of economy, and in other cases the investment of good money in elaborate hoisting systems which may not be needed more than once in five years is of doubtful wisdom. The estimated value of the service to the company and to the community, taking into account the size and business activities of the latter, should be the criterion.

While it is true that local conditions will always determine the best course to follow in such work, substation practice is becoming more routine in its character and there is room for a much greater standardization of equipment and arrangement. The extension of the "knock-down" principle of design and assembly of substations from the central station into the railway field and the more extended use of portable substations are logical developments which will doubtless accomplish much in the near future toward paring down expenditures in this important but auxiliary branch of railway practice.

New Carhouse and Shops at Dayton, Ohio

A Combined Carhouse and Shop with Brick Walls and Reinforced Concrete Columns, Floor and Roof, Designed for a Maximum of Monitor Lighting—Operating Features Include an Inclosed Ladder Entrance Track and Unique Pit Construction

Immediately after a fire which destroyed its carhouse and shops in February, 1912, the Oakwood Street Railway Company of Dayton, Ohio, began the preparation of plans for a new thoroughly fireproof structure. At the same time other desired facilities were included in the design, namely, more economical location of building from an operating standpoint, increased shop efficiency to be gained by a proper arrangement of departments and machine tools, and improved departmental interrelations by housing the entire operating organization in a single building. The new combination carhouse, shops and office building, recently completed, was built in a residential district. Con-

stant loop in the outlying district. Consequently the building was constructed within two blocks of the National Cash Register Company's plant, and on property adjoining the right-of-way of the Dayton, Lebanon & Cincinnati Railroad. This permitted a steam railroad connection for the receipt of construction materials, fuel and current supplies. Future expansion in shop and car storage facilities was provided by the purchase of a site more than ample for the present building and track layout. A portion of the property on the east also has been reserved for a future generating station, and the storage and shop bays may be enlarged by extensions to the south.



Dayton Carhouse and Shops—General View Showing Office in Front and Entrance for Cars at Side

sequently the architectural treatment has been along artistic lines, and a modified type of Spanish mission style of architecture was employed. The various departments of car maintenance and repairs are so located relative to each other as to reduce lost motion to a minimum. Facilities for employees' welfare work, as well as spacious well-lighted office rooms, were also provided for the complete operating organization.

LOCATION

Two factors controlled the decision as to location—first, the desirability of reducing non-revenue mileage and, second, a steam railroad connection. Both of these requirements were lacking in the old location and had materially affected the cost of operation. To obtain a reduction in dead car mileage, the new carhouse site was selected as near the plant of the National Cash Register Company as possible, because traffic to and from this plant created the peak loads. As traffic to and from this plant moved largely from the business center of Dayton, it also was important that the site be at a point beyond the plant, thus making it unnecessary to turn the cars at some dis-

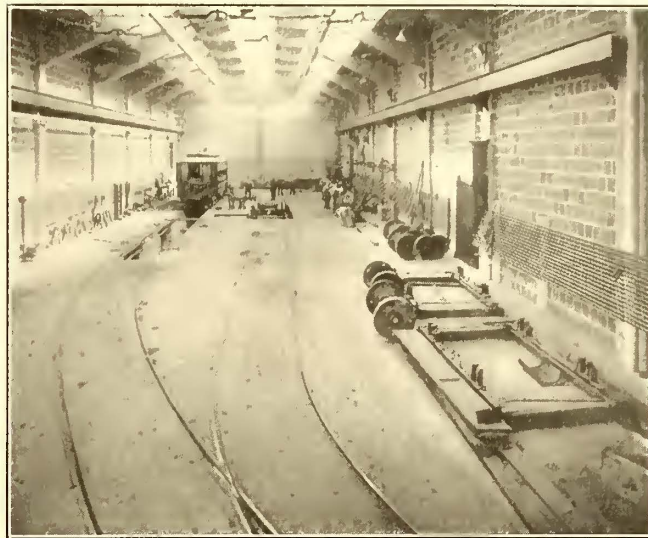
A peculiar condition in Dayton, Ohio, which is not found in many cities elsewhere in this country is that a number of competitive street railway companies operate within the city. These include the City Railway, Dayton Street Railway, People's Railway and the Oakwood Street Railway. In addition, two interurban companies, the Dayton, Springfield & Xenia Southern Railway and the Ohio Electric Railway, operate a street railway service over their lines entering the city. The latter company is a competitor of the Oakwood Street Railway for the National Cash Register Company's traffic; consequently each must maintain accurate schedules and have sufficient rolling stock close at hand to handle about 5000 people to and from the plant each day. This business requires that the rolling stock in regular service on the Oakwood Street Railway be doubled at the rush hours to permit the company to handle its proportion. Under average conditions fifteen cars are necessary to fill the regular schedules, and this number is increased to thirty cars in the morning and evening, when this company carries more than 2500 people to and from the cash register plant alone.

In the new shops the Oakwood Street Railway is building its own car bodies and making all the general repairs necessary. As this street railway is controlled by the same interests that own the Dayton & Troy Electric Railway, a 50-mile interurban line extending to the north of Dayton, considerable repair work to interurban cars

club room and waiting room. This section is two stories in height, the front portion being used for office quarters and club rooms and the rear portion as a mill room on the first floor and a cabinet shop on the second floor. The body or carpenter shop adjoins this bay, and next in order are the machine shop, paint shop and five car storage



Dayton Carhouse and Shops—Paint Shop Bay



Dayton Carhouse and Shops—Machine Shop Bay

will also be done at the new shops. For the present the site of the shops which were destroyed by fire in the spring of 1912 will be used as a car storage yard.

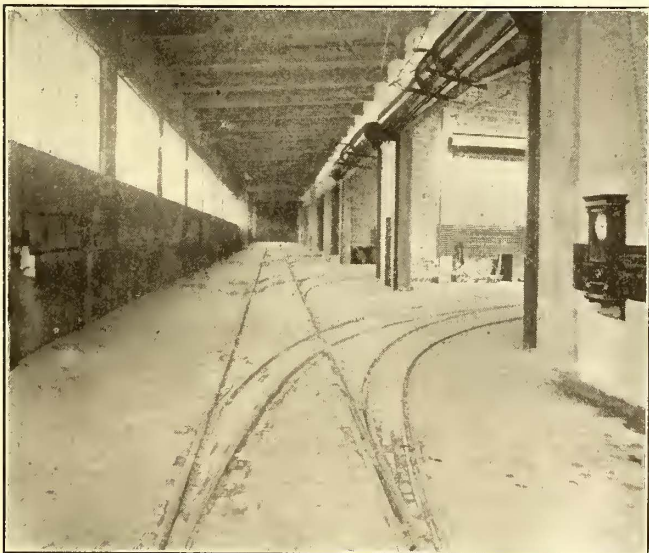
GENERAL LAYOUT OF THE BUILDING

In general outline the new carhouse conforms to the shape of the property, and it occupies that portion fronting on South Brown Street and the steam road right-of-way. The entrance is from South Brown Street by means of a single-track Y which leads into a ladder track within the building so as to avoid the necessity of cleaning around the special work during periods of heavy snow and ice. Two tracks lead from this ladder aisle to each of the eight storage and shop bays. Standard A. S. C. E. 70-lb. rail,

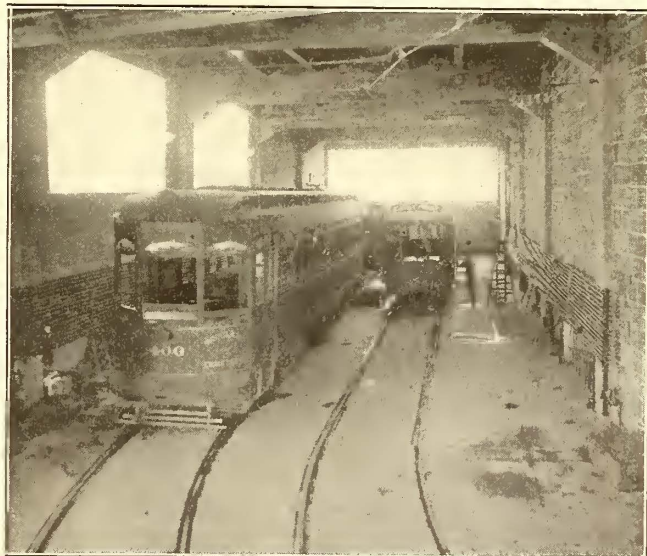
bays. The bay at the extreme east end of the building is used both as a car storage and a car washing room. The floor is provided with a drainage system leading to sumps which connect with the sewer system. It also contains steam heat, so that it is warm in winter.

CONSTRUCTION DETAILS

A basement has been provided under the two-story section of the building, extending under the sidewalk on South Brown Street. A portion of this basement space is utilized for the heating plant and the remainder for general storage purposes. A tunnel, 5 ft. x 7 ft. in section, extends along the outer foundation wall of the ladder aisle and connects the basement with the various shop and storage



Dayton Carhouse and Shops—Ladder Aisle



Dayton Carhouse and Shops—Car Washing Bay

with built-up special work, including tongues and mates designed for MCB wheels, was used in the entire track layout. The ladder aisle is paved with brick, and the storage bays, as well as the washroom, are paved with concrete.

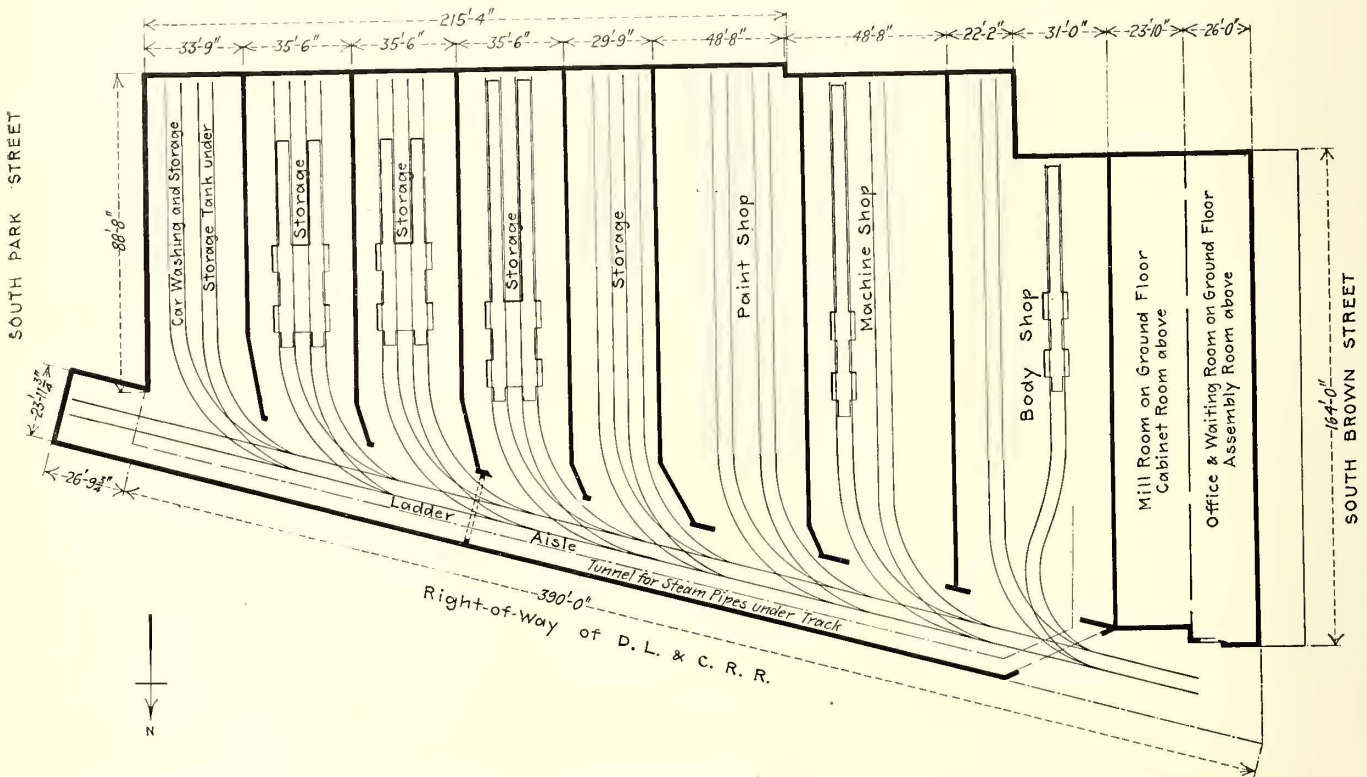
The South Brown Street section of the building is used as quarters for the general office force and trainmen's

bays. The pipes which return condensation to the heating plant have been laid in this tunnel, and are thus easily accessible in case repairs are required. All return pipe lines under the concrete floors are installed in vitrified pipe, which is laid on a grade so it will drain into the tunnel, which in turn is drained to the sewer system.

The entire building frame, floors and roof were constructed of reinforced concrete. The column schedule specifies rectangular sections 20 in. by 20 in. square in all but special cases, with a variation in the vertical core reinforcement, dependent upon the loads they are to carry. Those columns supporting the roof over the body shop, machine shop and paint shop are of special design. They are built with structural steel cores composed of angles and battens. This type of construction was used not only to provide sufficient stiffness to carry the double cantilever beams supporting the roof but also to supply a means of fastening the brackets which support the crane runway beams and rails. These brackets are riveted to the structural-steel cores of the reinforced concrete columns and are made up of plates and angles. The two rows of columns between the body shop and machine shop and between the machine shop and paint shop are provided with brackets of this character on both sides. Those columns

with 3/8-in. round bars spaced at 6-ft. centers. All water sheds, including ridges and valleys, are built of cinder concrete deposited on top of the reinforced concrete roof slabs and drain to the down-spout sumps. Over this cinder concrete a five-ply, Barret specification, tar and gravel roof coating has been laid. The roof over the two-story section of the building is of mansard design with a concrete slab and skylight well area forming the flat portion of the roof. Similar roof construction, namely flat slabs, beams and skylight wells, was employed over the storage bays.

The construction of the roof over the shop bays is such as to provide an especially large amount of natural illumination, owing to the size and number of glass areas. Two heavy cantilever beams, anchored to a concrete-cased structural-steel column, project 12 ft. 2 in. from the walls on either side of each bay. In general outline, these cantilever beams are in the form of a letter Z. The lower portions support a roof slab on concrete purlins between



Dayton Carhouse and Shops—General Plan of Building Showing Arrangements of Different Departments

in the walls opposite these two in the paint shop and body shop contain brackets only on one side. Details of this structural-steel core, as well as of the character of reinforcing in the cantilever beams which support the roof over the shop bays, are shown in one of the illustrations.

Simple reinforced concrete beams and girders support the floors and roof in the two-story section of the building and the roof over the five-car storage bays. Essentially, the second-floor construction consists of 3-in. x 10-in. beams, spaced at 15-in. centers and surmounted by a 2-in. reinforced concrete slab, all of which were cast as a monolith. A 3 1/2-in. layer of cinder concrete, containing longitudinal and transverse beveled nailing strips, was deposited on the 2-in. floor slab, and a 7/8-in. white maple or quartered oak floor is laid on this slab. This kind of floor construction assures a thoroughly fireproof barrier between the different floor levels.

The roof construction is quite unusual throughout, and generally speaking is of a monitor type supported on reinforced concrete beams with slab watersheds between the skylight areas. These slabs are 3 1/2 in. thick, reinforced

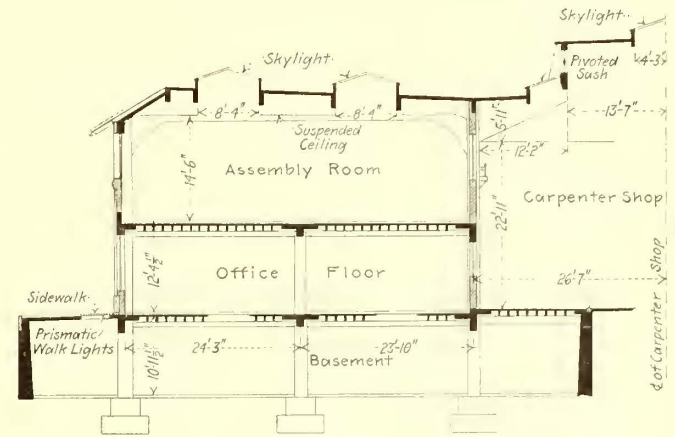
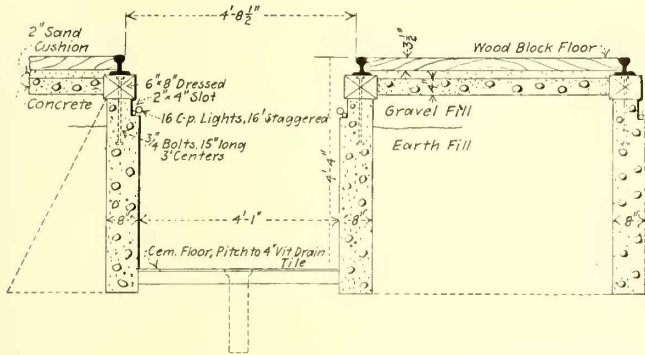
them and a skylight 4 1/2 ft. wide, and the vertical portion supports the monitor roof construction over the center of the bay on simple reinforced concrete beams, which rest on and were cast with two of these cantilever beams projecting from opposite walls. These vertical arms of the cantilever support skylights between them 3 ft. 2 in. in width, and the entire roof of the monitor, which is 8 ft. 6 in. wide, is also composed of glass.

This type of construction was necessary in order to provide the large glass areas in the roof, as the limited space on which the carhouse and shop building was constructed made it impossible to include any windows in the side or end walls of the shop and storage bays. A glance at the half-tone illustrations indicates how efficiently this natural illumination problem has been handled. In a similar way ventilation is obtained through the pivoted vertical sashes, which are manipulated by continuous operating mechanisms. In the views shown no white cold-water paint has been applied to the concrete beam and slab construction in the roof, yet the natural illumination appears ample. The company expects later to apply white cold-water paint

to all of these parts, as well as to the walls of each shop bay, to intensify the natural as well as the artificial illumination.

The reinforced concrete columns, floors and roof were built independent of the walls, the latter serving merely as curtain walls to inclose the whole. To give the effect of a solid brick structure, the exterior walls of the office bay were built with brick pilasters inclosing the reinforced

was nailed in place, however, all sub-floors constructed in this manner, including those in the offices, were covered with a single layer of waterproofed insulating paper. This character of floor construction has been used throughout the shop bays, except at points along the pits in the



Dayton Carhouse and Shops—Section of Pit—Cross-Section of Front End of Building

concrete columns, but the exterior walls of the rest of the structure are, strictly speaking, curtain walls with the concrete columns exposed. All interior partition walls are built of 4-in. and 6-in. fireproof hollow tile, laid between the building columns. The hollow tile partitions not only are fireproof but are so light as to make foundations other than the floor slabs unnecessary.

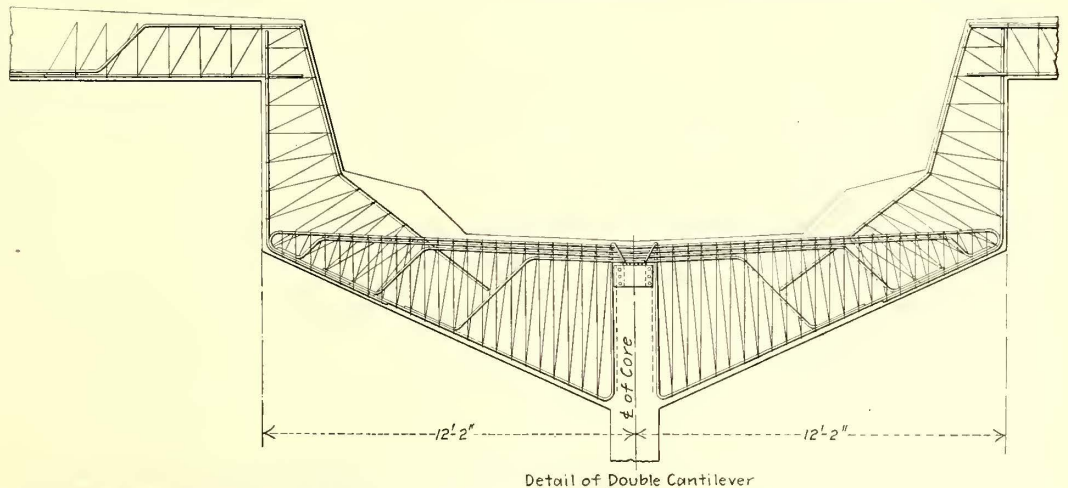
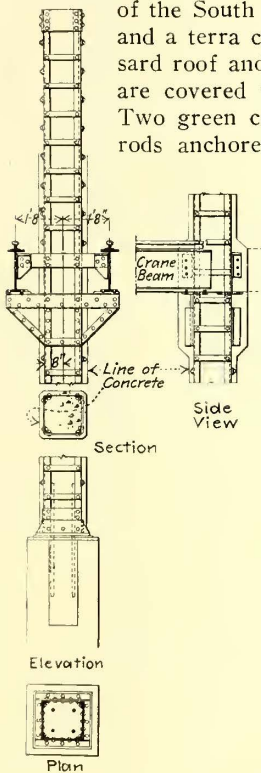
All exterior walls are faced with a gray wire-cut brick with wide raked joints. The trim in these walls includes a limestone base 2 ft. 3 in. in height, terra cotta panels outlining the four balconies in the two towers at each end of the South Brown Street front of the building, and a terra cotta cornice and coping. The mansard roof and the hipped roof on the two towers are covered with dark cherry red Spanish tile. Two green copper marquises, swung from truss rods anchored to the building columns, project over the two main entrances at the northwest corner of the office building.

To provide a resilient floor construction in the shop bays for

machine shop and carpenter shop where concrete jack blocks were installed at regular intervals along each side. The floors in the storage bays were paved with old brick.

The three shop bays and the car washing bay are provided with large corrugated iron rolling doors of the Kinnear type which separate them from the ladder aisle. The largest of these doors is 37 ft. 2 in. wide by 16 ft. high, which is an unusually large size for doors of this kind. To facilitate the work of raising these doors the usual chains and sprockets provided at each side of the opening are supplemented by heavy coil springs in the rolls on which the doors are swung. Each end of the ladder aisle is also provided with large corrugated iron rolling doors so that it may be inclosed. These doors and similar doors at the openings to the shop and washroom bays were installed to make it more easy to heat these rooms during very cold weather.

All sashes, including those in the exterior walls and in the skylights, are of pressed metal manufactured by the Trussed Concrete Steel Company. The glass in the skylight sash is held in place by Anti-Pluvius bars, and a number of the skylights are equipped with Kernchen ven-



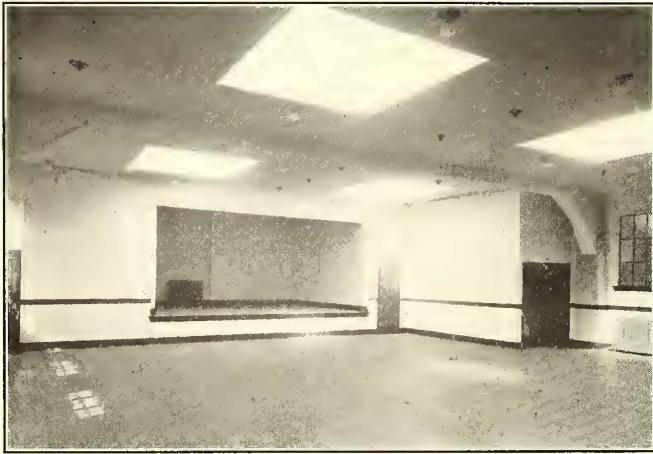
Dayton Carhouse and Shops—Section of Column and Double Cantilever Roof Beams

the comfort of workmen, maple flooring has been laid over a concrete sub-floor. This sub-floor consists of a 4-in. concrete slab, over which a 4-in. layer of cinder concrete with wood grounds or bevel strips has been spread and tamped compactly in place. Before the wooden flooring

tilators. The operating mechanisms in connection with the pivoted sashes in the monitors, as well as the dampers in each ventilator, are arranged to be operated with cords from the floor level.

Appliances included in the design of the repair shop

bays to facilitate the handling of material are a pair of 18-in., 48½-lb. crane runway beams in each of the shop bays. Bridge cranes will be installed on these runways as soon as necessity warrants their purchase. An electric freight elevator has also been placed in the corner of the mill room adjacent to the partition between it and the



Dayton Carhouse and Shops—Assembly Room

carpenter shop. This elevator is arranged to be operated between the basement and the second floor and is used to facilitate the handling of materials between the various floors from the stockroom and cabinet shop, respectively above and below the mill room.

Inspection and repair pits were installed under each track in three of the car-storage bays, and there is one pit long enough for two cars in both the carpenter and machine shop bays. Unusual features in the design of these pits include an 8-in. pit foundation wall under each track rail, designed with 8-in. buttressed walls which project 2 ft. at the bottom and are spaced at 9 ft. 10-in. intervals. Each pit is provided with two cross-pit connections, 9 ft. 10 in. in width, arranged with removable rail sections so that wheels or trucks may be dropped from under a car. The track rails over the pit are 70-lb. A. S. C. E. section, spiked to a 6-in. x 8-in. dressed yellow pine stringer, which in turn is anchored to the pit walls by ¾-in. x 15-in. bolts, spaced at 3-ft. centers. A 2-in. x 4-in. slot in the concrete walls just below the track stringer provides a recess for the electric wire conduit leading to the 16-cp lamps staggered on each side at 16-ft. centers. In addition to the general illumination which is provided with this location and spacing of lamps, an intense light is directed to the trucks where it is most desired. A cross-section through these pits is shown on page 453.

HEATING AND PLUMBING

The offices, shops and washroom sections of the building are equipped with a direct-radiation heating system. The plant includes two 100-hp horizontal-return tubular boilers installed in a pit at the rear of the basement under the mill room. These boilers are served by a steel stack 40 in. in diameter and 90 ft. high. Essentially, the piping includes a complete system of steam supply and condensation return with drips and air connections to and from the boilers. All live steam and return pipes are incased in 1-in. magnesia pipe insulation. In the offices and club-rooms standard cast-iron radiators were installed, while in the shops built-up coils were used and are supported on the building walls on brackets or swung from the ceilings on expansion hangers. Each shop bay contains lavatories and toilets. The trainmen's quarters on the first floor of the office section of the building are equipped with a number of shower baths. Each shower is inclosed in slat partitions, and the concrete floor is sloped to drains at the center of the inclosure.

In addition to the trainmen's waiting and locker room, there is a large assembly room on the second floor of the office bay used for social gatherings of employees. This auditorium is to be equipped with a moving picture machine to be used by the company in instructing the trainmen in regard to the elimination of accidents. In connection with its welfare work the Oakwood Street Railway has organized the Oakwood Aid Association, to which all employees are invited to belong. The purpose of this association is to offer a means whereby employees may assist themselves when in need and also to promote *esprit de corps*.

Artificial illumination in the offices and shops is obtained by a liberal installation of tungsten lamps. The lamps in the office are equipped with Opalux shades, and those in the shop departments have Abolite shades. There is yet some question as to the manner in which the lamps will be permanently installed in the shop bays, and experiments are being conducted to solve this problem. In one of these tests one row of lamps has been swung from drop cords about 8 ft. out from the partition walls, and in the other special reflectors have been set at an angle on the building columns just above the crane runway. The purpose of these tests is to determine the location and spacing of lamps so that the most efficient lighting may be obtained in each department.

All wiring in the shop and storage bays is being done by the company's own forces. The trolley wire entrances to the various shop and storage bays are attached by span construction to eye-bolts embedded in the concrete building frame. The trolley wire installation at the rolling door is of the usual form, with an overhead connection to the trolley wires which are dead-ended on each side of the opening. Sheet metal V-shaped clips attached to the bottom flange of each rolling door close the gaps in the



Dayton Carhouse and Shops—Mill Room

insulated section between the dead ends of the trolley wire when the door is open.

The building described was designed by Pretzenger & Musselman, architects, Dayton, Ohio, under the general direction of C. B. Clegg, president; H. P. Clegg, vice-president, and Henry Gebhart, general manager, Oakwood Street Railway Company.

Following out a plan for the beautifying of its stations along its lines in Virginia, the Washington Utilities Company has had the grounds at the Arlington Junction station graded and covered with sod, and a bed of flowers has been placed in front of the station. It is said to be the intention of the company to improve the stations and grounds at the important points along the lines of the Falls Church and Fairfax divisions, as well as on the line between Washington and Alexandria and Mount Vernon.

Newark-Trenton High-Speed Line

The Public Service Railway Has Recently Inaugurated a High-Speed Service Between Newark and Trenton, N. J., by the Construction of Long Sections on Right-of-Way in Place of Former Highway Routes

At a meeting of the Public Service Railway's section of the American Electric Railway Association, held at Newark, N. J., on Thursday, Sept. 18, D. C. MacDougall, division engineer, and J. W. Brown, assistant general superintendent of the company, described respectively the engineering and operating features of the new high-speed line between Newark and Trenton. Their talk was illustrated by lantern slides which included every step in the operation of a train from terminal to terminal. The following is an abstract of the data presented at this meeting, including a map and views of the line.

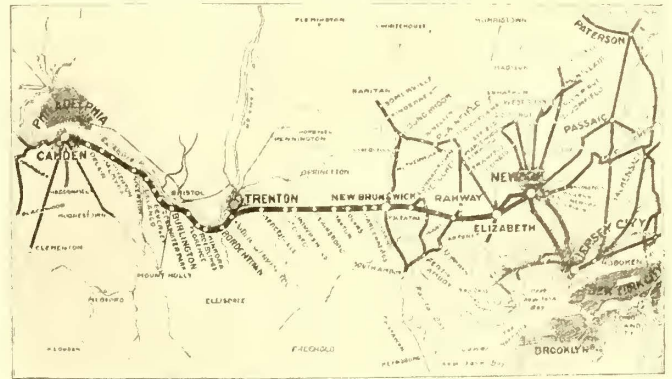
THE ROUTE

For a number of years there has been a call for a high-speed trolley line between the two principal cities of New Jersey, Newark and Trenton. In 1902 the Trenton-New-Brunswick Railroad built and operated a line between Milltown and Fair Grounds, near Trenton. In the following year the same company extended the line to connect with the Trenton Terminal Railroad, a road less than 1/2 mile long, operating from the end of the Camden & Trenton Railroad, which in turn operated on Liberty Street, Trenton, from what was then known as New York Junction to the Trenton city line. Hence, in 1903, by operating over the Public Service Railway's tracks from Milltown to New Brunswick, a continuous service was secured between New Brunswick and Trenton, a distance of 27 1/2 miles, of which 23 miles were on private right-of-way.

The original project was to build a line between Trenton and Elizabeth to connect with the existing lines to Newark. To that end the New Jersey Short Line Company was incorporated to continue the line from Milltown to Elizabeth. During 1904 and 1905 a right-of-way was laid out between Milltown Junction, Middlesex County, and Bayway, Elizabeth, a distance of 19 miles, which this company partly graded and furnished with bridges between Bonhamtown, near New Brunswick, and Bayway, Elizabeth.

In 1904 the Public Service Railway operated cars between Jersey City and Trenton over the circuitous route of the main line through Bound Brook and New Brunswick, then

went into the hands of a receiver. In 1912 the Trenton-New Brunswick Railroad and the New Jersey Short Line were purchased by the Public Service Corporation, and on Aug. 12, 1912, under the name of the Trenton Terminal Railroad, construction was started at what is known as



Newark-Trenton Line—Map of Route, Including Camden

Woodbridge Junction, which was the point about midway of the section then under construction.

RIGHT-OF-WAY, GRADING AND BRIDGES

The right-of-way between Elizabeth and Bonhamtown is 12 miles long. Throughout its length it is generally 100 ft. wide, thus allowing ample room for the future construction of a double track. Some of the cuts and fills along the line are from 15 ft. to 20 ft.

Shortly after leaving Bayway there is a stretch of meadow land about 2 miles long. The bottom was found to be of a soft, spongy mass on which it was very difficult to hold the track to line and grade. To obviate this difficulty, a heavy layer of cinder ballast was placed about 4 ft. deep. This has proved to be very effective in that it has formed a compact mass.

Rock excavation was comparatively small and consisted



Newark-Trenton Line—Bridge Over Lehigh Valley Railroad Near Metuchen

of Milltown Junction; from there over the private right-of-way to Trenton. This route was 72 miles long. However, this latter project was abandoned after a short trial, so that the only way, except by steam railroads, left open was by the long route of the main line through Bound Brook, and this necessitated two changes of cars.

On March 1, 1908, the New Jersey Short Line Railroad

of a red shale which, while very difficult to dig into, could be crumbled in the hand soon after exposure.

Of the fifteen bridges on the line, three are undergrade crossing bridges. Many of them were constructed by the New Jersey Short Line. One was the Strauss bascule drawbridge over the Rahway River, as illustrated. This bridge is of the "jack-knife" type, constructed for double

track and weighted with a hollow concrete counterweight, filled with pig iron. It is rapid in operation, taking but fifty seconds for opening or closing, while its motor uses only 16 amp at 575 volts. The clear span is 84 ft.

The bridges over the smaller creeks are of the wooden pile bent construction, built for double track, and were in



Newark-Trenton Line—Bascule Drawbridge Over Rahway River

a very favorable state of preservation. The bridge over the Port Reading Railroad has three steel spans of 30½ ft., 73 ft., and 30½ ft. The middle span is of the half through-plate girder type and the others are of the deck I-beam construction. The bridge weighs 194,000 lb. Work was begun from below—that is, the derrick car was placed on the Port Reading tracks and from there the girders were raised to their positions on the steel towers. The first girder was placed without a mishap, but while attempting to raise the second one to its position, the steel boom of the derrick failed and bent in the shape of a bow. As this method was not reliable, a "gin pole" was erected, namely, a steel boom was placed in an upright position, the tackle fixed to its upper end and the hoisting engine installed on the tracks above. The other girders were raised and placed in their positions on the steel towers. This method, while successful, was very lengthy and tedious, as it necessitated the erection and lowering of the "gin pole" before and after the placing of each girder.

The bridge over the Lehigh Valley Railroad is constructed for double track. There are five steel spans of the half through-plate girder type, three of which have 42-ft. spans and two have 16-ft. spans. The timber approaches to this bridge are 106 ft. long on the easterly side and 770 ft. long on the westerly side. A small bridge was constructed over a stream at what is known as Station 534. This is of the deck I-beam construction with concrete abutments. The other bridges were in such a good state of preservation that very little repairing had to be done. Of the three undergrade crossing bridges, the one at the Amboy Branch of the Pennsylvania Railroad was constructed by the New Jersey Short Line.

The New Jersey Terminal Railroad, at Station 230, was on a solid cinder fill and in order to get under it and hasten the construction of the road a temporary bridge with timber bents was erected for use until such time as the steel for the permanent bridge arrived. This bridge is of the half through-plate girder type with the latest improved water-tight concrete floor system and a span of 50 ft. A temporary bridge at the westerly city line of Elizabeth is being replaced by a half through-plate girder type, having a solid concrete floor system and concrete abutment walls.

TRACK

The rails are 80-lb. T-section with a 10-in. copper cealed bond and a short bond brazed to the outside of the head of the rail.

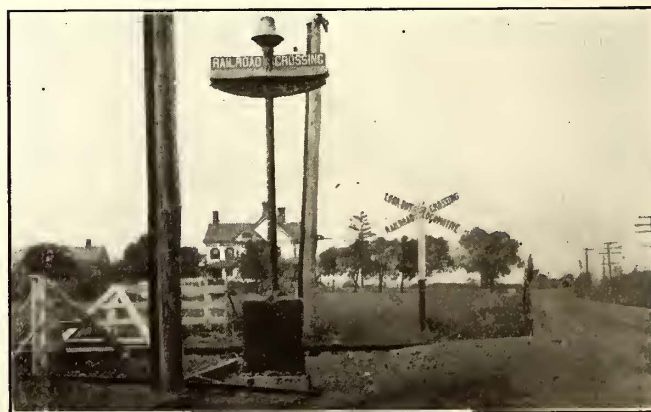
The 12 miles of new construction do not include 3 miles of sidings. The longest are Woodbridge siding, 1 mile long; Drummond's, 2641 ft.; Lehigh, 2895 ft.; Drawbridge, 2687 ft.; Tremly, 522 ft., and Port Reading, 1084 ft. They are so located that they will allow fifteen-minute headway if desired. The distance between track centers is 13 ft., as in steam railroad construction. All sidings have 76-ft. leads, spring split switches and No. 9 spring frogs. The switches are protected by ground stands with standard target and signal lamps. In general the road is almost a tangent. It has only two curves of 2 deg. and the most severe grade is but 2 per cent. It was decided to use cinder ballast, and to that end efforts were made to secure the cinders near by, but owing to an exceptional amount of steam railroad work in the vicinity it was necessary to ship it at first from Philadelphia and Reading, Pa., but later supplies were obtained from Bayonne and Jersey City. The company used 1341 cars of cinders, equivalent to about 26,000 tons, or about 50,000 cu. yd. The ballast is crowned in the center of the track and then is sloped off to a point 2 ft. beyond the end of the ties, so that there is a 2-in. clearance directly under the rail. A shoulder 1 ft. wide was made and then sloped off 1½ to 1 to terminate in a ditch 3 ft. wide.

POWER GENERATION

The direct current for the section between Bayway and Bonhamtown is furnished from Elizabeth, Metuchen and the new 1000-kw substation at Avenel. The current for the section between Milltown and Trenton is furnished from Milltown power house and Plainsboro substation. The distribution line is carried on chestnut poles 35 ft. long, set at intervals of 100 ft. and 21 ft. on either side of the center line of the right-of-way except between Bayway, Elizabeth, and Woodbridge Junction, Woodbridge Township, where chestnut poles, 50 ft. high, for a high-tension line were erected opposite the poles for the distribution line. At the Rahway River, a navigable stream, two steel towers 150 ft. high were erected to carry the high-tension line over the river. Where high-tension poles were erected no distribution line poles were set on that side. The trolley wire is No. 0000, suspended by span wires from the distribution and high-tension poles.

SIGNALS AND CROSSING SIGNS

The new road is equipped with the Union Switch & Signal Company's continuous track-circuit signals. At each end of the single-track sections home signals are located and about 1000 ft. in advance of these the intermediate



Newark-Trenton Line—Automatic Flagman Type of Crossing Signal

signals are placed. The home signals are of the semaphore type, giving day indications by the position of the blade and their night indication by colored lights. The blade operates in the upper left-hand quadrant to afford the motorman a clearer vision of the position of the blade by

making the sky the background. In the intermediate signals the indications are by lights both day and night. The lights shine through powerful lenses and are shaded so that the sun cannot shine directly on the lenses.

The signals are operated by sixty-cycle alternating current which is transmitted along the line from the Avenel

using the highways, the Brach "automatic flagmen" have been installed at those road crossings which are more frequently used. This signal, in addition to a large locomotive bell, gives a visual warning by a series of eight red lights, electrically operated, set in the form of a crescent at the top of a 12-ft. iron pole. When the train arrives at a point



Newark-Trenton Line—Semaphore Track Circuit Signals at a Siding



Newark-Trenton Line—Type of Intermediate Signal on the New Right-of-Way Division

substation at 2200 volts. At the middle of each signal block is placed a transformer which reduces the voltage to about 8 volts and feeds to the rails. When there is no train in the block the current flows along the rail in both directions and through relays at the two home signals. As long as both these relays are energized the blade is held in its upper or clear position and the green lights are lit.

The home or semaphore signals are controlled by the relays at both ends of the block. As long as there is a train anywhere within the block, the track current passes through the wheels and axles of the train instead of through one or the other of the relays, so causing the blades on the home signals at both ends of the block to remain at "stop." Each intermediate signal is controlled by the relay at the far end of the block only. The signal mechanism and lights are operated by current at 110 volts supplied through transformers from the 2200-volt line.

A standard highway crossing sign has been erected on

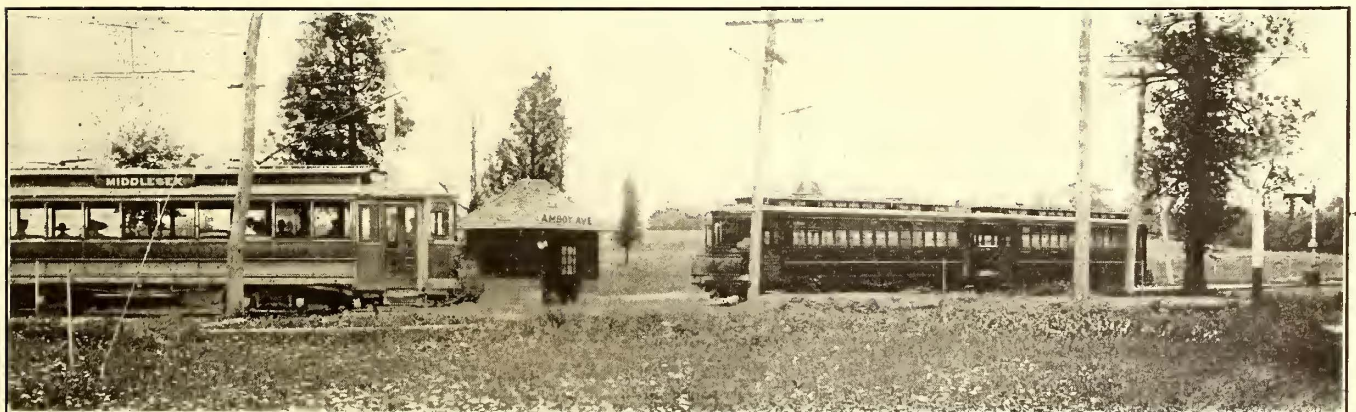
about 1000 ft. from the road crossing, it passes over a contact instrument that starts the bell ringing, causing the lights to operate intermittently and successively to give the appearance of a person swinging a red lantern to and fro. This continues until the train passes over the road crossing.

Safety signals are located at both ends of the Rahway River drawbridge to give warning that the draw is open. As soon as the draw starts to open a large red semaphore drops automatically over the track at such a height as to come directly in front of the motorman, thereby making it impossible to pass without either breaking the board or the front of the train.

On the section between Milltown and Trenton the old hand-throw signals were removed and the United States trolley contact signals were installed. These are dependent upon the lights to give warning both day and night.

FENCES AND CATTLE GUARDS

Concrete fence posts were not adopted owing to the great initial cost of making the posts, consequently, it was



Newark-Trenton Line—Junction of Middlesex Line, Showing Character of Waiting Room

each side of every road crossing. This is a chestnut pole 7 ft. high with a cross in the form of an "X" with the legend "Railroad Crossing—Look Out for the Locomotive." These have been erected at all road crossings, but to supplement these and to give more protection to those

decided to use a galvanized iron post 6½ ft. to 9½ ft. long, with notches cut in to receive the wire. These posts were driven with mauls into the ground, and at intervals strain posts were set to take the strain of the wire. The corner posts were also set in concrete. All the farm crossings,

namely, crossings other than highway, were equipped with a 12-ft. swinging gate made to conform with the fence. The fence wire was the American Steel & Wire Company's perfect fencing 49 in. high, made of No. 7 galvanized wire.

The cattle guards are constructed of steel angle irons, 7 ft. long, set with one side upright, riveted to steel channels. These are placed between the rails and at the sides of all the crossings. The guard includes a wooden guard fence with the faces set at an angle of 45 deg. to the perpendicular and with the sides sloped from 7 ft., the width of the guard, to a point; back of this there is a five-barred board fence which returns and meets with the wire right-of-way fence.

ROLLING STOCK

Ten cars were built for this line and ten more are now under construction. These cars are 44 ft. long and are equipped with the Westinghouse H. L. multiple unit control with field switch for weakening the field to increase speed. Each car carries four No. 310 C-2 60-hp motors, geared 21:66 for a maximum speed of 45 m.p.h. The motors are carried on two M. C. B. trucks with 33-in. steel wheels, 3-in. tread and a CP-27 compressor with General Electric straight-air brake apparatus with train and

for the automatic signals. The distribution pole line and all the distribution system were installed under the supervision of the Public Service Railway distribution department. The high-tension system was installed under the direction of the Public Service Electric Company.

The construction work was completed in ten and one-half months. The greatest amount of track laid in any one day was 925 ft. and the largest force of laborers employed was 220 men. During the progress of the work a daily record was kept of the amount of work done each day and the number of men engaged; also a complete card index of the material received and used.

OPERATION OF THE LINE

Operation of this route is conducted strictly in line with the latest interurban code of the American Electric Railway Association, according to which both the motorman and conductor are required to take orders from the dispatcher. The latter is located at New Brunswick, the center of the line. The several forms used, including the train sheets, are all of standard type. The trainmen were drawn directly from the ranks, but before receiving any instructions they were subjected to a second physical examination, particularly with regard to color discrimination.



Newark-Trenton Line—Station at George's Road

emergency features. The Tomlinson coupler with air-brake connections is standard. For warning purposes the cars have the Public Service standard interurban whistles in addition to the regular foot gong. They have nineteen rattan-covered cross seats with a seating capacity of fifty. The weight of each car complete is 53,000 lb. A toilet has been installed for the convenience of passengers, as well as a tank for drinking water with sanitary cups in a separate rack. Each car is lighted with thirty 64-watt tungsten lamps and carries a General Electric lens luminous arc light. A standard buzzer system is provided for the use of passengers to signal the motorman. The heaters have thermostatic control.

ORGANIZATION

The construction of the line was in charge of a resident engineer, who reported to the division engineer, who in turn was responsible to the engineer of maintenance of way. The J. F. Shanley Company, Newark, was the contractor for the grading, building of bridges and track construction. The Union Switch & Signal Company was the contractor

This examination was followed by two weeks of instruction in interurban operation, including signals and rules, just previous to the public opening of the line. Of this period ten days were spent in actual operation from terminal to terminal. At the end of the instruction time, all candidates were required to pass a strict written examination before entering the service.

As the route is a mixture of city, highway and right-of-way sections, speed conditions and signal equipment vary accordingly. On the 12 miles of most recent construction, where trains are operated at a schedule speed of 30 m.p.h. with one stop about every 2 miles, the company has installed the track-circuit signals of the absolute type previously described. The "absolute" feature, of course, does not permit more than one train in a block, but it was felt that any possible delays due to this feature would be more than offset by its greater safety. The sidings are located to permit much shorter headways than the present hourly service, but as multiple unit equipment is used it will be feasible to handle increased business with longer trains in

preference to reducing the headway below standard inter-urban practice.

The new route was opened to the public on July 1. It has cut down the running time between Newark and Camden from approximately eight hours to four hours and eight minutes and the number of car changes from three to one. This single transfer is being made temporarily on the south-east side of Trenton at a place called Public Service Junction, but a gauntlet rail is now being added to the 5-ft. gage at the Camden division so that it will be possible to operate the cars of 4-ft. 8½-in. gage on the high-speed line to a new transfer point in the heart of Trenton. The fare for the 90 miles between Newark and Camden is \$1.45. A city cash fare is collected first, but for the rest of the trip a duplex ticket is issued.

HEARING CONCERNING PROTECTION OF EMPLOYEES ON NEW HAVEN

Commissioner James E. Sague, of the Public Service Commission for the Second District of New York, and Commissioner John E. Eustis, of the Commission for the First District, presided on Sept. 15 at a joint hearing in an inquiry relative to the failure of the New York, New Haven & Hartford Railroad to comply with the terms of an order adopted by the Commission for the First District last April, requiring all electrical companies and railroads using electricity to formulate and enforce rules to insure the safety of employees wherever electricity is used. The New York, New Haven & Hartford Railroad was the only company which failed to submit a code of regulations satisfactory to the experts for the commission. The three members of the Public Utilities Commission for Connecticut, Messrs. Higgins, Hale and Ford, were present at the hearing by invitation.

John Fitzgibbons, legislative representative of the Brotherhood of Railroad Trainmen, testified that rule No. 100 of the company, which forbade trainmen getting on the top of cars, was contradicted by the time cards of the company, superseding former rules and requiring men to get on top of the cars at certain times. He admitted that under certain circumstances it appeared to be necessary for men to get on the roof of cars, for instance, to give signals to engineers when the train is backing, but he declared that conditions were unsafe since the road had abandoned the "tell-tales" and bridge-guards within the electric zone. He urged the commissions jointly to establish a rule that the railroad should neither command nor allow trainmen to go on the top of cars while at rest or in motion.

Clifton W. Wilder, electrical engineer to the Commission for the First District, testified that no adequate substitute had been devised by the New Haven to take the place of the old "tell-tales," which gave men warning of the proximity of a low bridge and which had to be removed because of the overhead construction used by the New Haven. Mr. Wilder thought that some adequate substitute might possibly be devised, but he did not offer any concrete constructive suggestions. C. R. Vanneman, chief of the transportation division of the Commission for the Second District, also testified that in his opinion some method of giving warning might be devised. He suggested the extension of the use of a red board at the side of the track to give warning of low clearance, such as is already used in the Westchester yard, and he thought that an articulated stick danger signal might further prevent some accidents.

William S. Murray, who had charge of the work of electrification on the road, testified that in his opinion overhead construction, such as is used by the New Haven, is safer than the third-rail system used by the New York Central. Special circumstances, however, rendered the use of the third-rail system desirable by the latter road. He

said that the number of accidents under electrical operation is not so great as under steam operation, and he also said that it is almost impracticable to devise a system of "tell-tales" that will be effective in a gridiron system of tracks.

C. L. Bardo, general manager of the road, testified that rule No. 100 had been issued before his connection with the company, and he said it was absolutely impracticable to operate without having men get on the roofs of cars, and that, in fact, they are safer there than on the ground in a crowded yard. He also maintained that a man would not be any more likely to see a warning sign alongside the track than he would to see the bridge itself, and he did not apparently believe that it was practicable to devise a proper warning system. In reply to the criticism that the employees on steam locomotives are in danger from the overhead wires while at the water stations, Mr. Bardo said that within less than a year the company hoped to do away with all steam freight operation on the electrified zones, but that to obviate the alleged danger at present either the water stations would be moved to points of sufficient clearance or else cut-out switches would be installed to eliminate the current from that section while water was being taken.

Before bringing the hearing to a close, Commissioner Sague said that the commissions are inclined to think that some kind of a warning sign should be used, especially for the benefit of green men, and he suggested that the company's officials consider the matter and consult with the experts for the two commissions. Counsel for the railroad stated that a tentative order would be drawn up and submitted for the approval of the commissions.

BY TROLLEY AND BOAT FROM NEW ENGLAND TO ATLANTIC CITY CONVENTION

A meeting of the prominent electric railway men of New England was held at the Engineers' Club, Boston, on Sept. 17, to consider plans for attending the annual convention of the American Electric Railway Association at Atlantic City, Oct. 13-17. It was deemed advisable to go a considerable portion of the distance by trolley. It is possible to go all the way from Waterville, Me., to the convention city by trolley, but the question of time consumed enters into the proposition. Cars with the passengers who are going to the convention will come from all over New England and concentrate at New London. They will leave so as to arrive at New London on Sunday night, Oct. 12. After spending the night at New London a boat will be taken to Sag Harbor, Long Island, and the trip continued by train. The members of the party are due to arrive in Atlantic City on the night of Oct. 13. It is expected that some of the delegates will travel by trolley from Waterville, Me., to New London, a distance of approximately 355 miles. This is the first time that anything of the kind has been attempted in the East. It is expected that from seven to fifteen special cars will make the trip leaving from various points and meeting in New London. The names of the chairmen of the various committees in charge follow: General executive committee, Charles S. Clark; equipment, E. W. Holst; publicity, H. A. Faulkner; baggage, Henry C. Page; refreshments, M. C. Brush; ladies, Franklin Woodman; to get business, R. E. Hamilton; transportation, W. W. Sargent; hotel accommodations at New London, Conn., C. S. Hawley.

Friday morning, Sept. 19, a specially equipped car from the Bay State Street Railway was to take a party over the line from Boston to New London and back by way of Worcester to inspect the various lines.

Arthur Twining Hadley, president of Yale, and James H. Hustis have been elected directors of the New York, New Haven & Hartford Railroad.

Hypothetical Electric Interurban Railways

A Theoretical Application of the Principles Governing the Operating Revenue, Operating Expense and Cost of Construction of Proposed Electric Interurban Railways

BY LOUIS E. FISCHER, CONSULTING ENGINEER, ST. LOUIS, MO.

In articles published in the *ELECTRIC RAILWAY JOURNAL* of Aug. 23, 1913, and of Sept. 6, 1913, the subjects of the determination of the probable operating revenue, operating expense and cost of construction for a proposed electric interurban railway were discussed in all their details, and from the experience of typical existing lines statistics were carefully compiled in regard to these points that should prove of material assistance to the promoter and the investor. It is the purpose of the present and concluding article by means of a general review to give a bird's-eye view of these factors all combined.

At the present time the prevailing rates of interest demanded by the investing public on the securities of electric interurban railways range from 6 per cent to 7 per cent. These high rates have been largely brought about by the construction of many unprofitable roads through ignorance of the fundamentally essential elements entering into the undertaking, such as we have outlined in the two preceding articles. It may be said that to borrow from the investing public the necessary funds with which to construct an interurban railway the project must show an ability to earn a net revenue, after paying operating expenses and taxes, of from one and a half to two times the amount of the interest on the cost of construction, to be computed on a basis of from 6 per cent to 7 per cent. This being the case, it will be well to trace out the interrelations of operating revenue, operating expense and cost of construction in order to show the conditions under which such a net revenue can be obtained. The best way to obtain this result is by means of hypothetical cases, giving average variations of population and territorial conditions.

POPULATION AND TERRITORY SERVED

It will be recalled that the first article of this series contained an analysis of the population served by an electric interurban railway into its characteristic components. It was stated that, with the tributary farming population eliminated, the population served by such a line may be "divided into three general classes, as follows: primary terminal population, secondary terminal population, and intermediate town and village population. The primary terminal population consists of the population of the principal city into which the railway operates—in other words, the population of that city which is of the greatest commercial importance in the sense that it is a metropolis for the greater portion of the system served. The secondary terminal population is the population of the other important terminal or terminals, exclusive of the principal terminal, which are also of such commercial importance as to attract business from a considerable portion of the territory served but not to the same extent as the principal terminal. The intermediate town and village population is made up of the population of cities, towns and villages served by the line, beyond and between (when there are both primary and secondary terminals), but not including the primary and secondary terminals."

It was further stated in the first article that "the traffic created by the population of an electric interurban railway is consequent to the following general movements:—

"Source I:

"(a) The intercommunication of the population of the primary terminal and the intermediate population served.

"(b) The intercommunication of the population of the intermediate centers only.

"Source II:

"(c) The intercommunication of the population of the secondary terminals and the intermediate population served.

"(d) The intercommunication of the population of the primary terminal and the population of the secondary terminals.

"(e) The intercommunication of the population of the secondary terminals alone (if more than one)."

In the hypothetical cases which follow, variations of Source I, the traffic for which is consequent to the existence of a primary terminal and an intermediate population, and of Source II, which presupposes also the existence of a secondary terminal, will be made, so as to bring within the range of cases different normal electric interurban lines that might be built.

CASE I

Under Case I it is proposed to construct a normal road from a primary terminal city of 50,000 population through a normal territory to a town of 5,000 population 10 miles distant, thence to another town of the same population also 10 miles distant, and thence to a third similar town 10 miles distant. This line will be 30 miles long and will have an intermediate town and village population of 15,000, with no secondary terminal. Under such conditions, as determined in the first article, the earnings from Source I are approximately \$10 per capita of intermediate town and village population, or a total of \$150,000 per annum.

On the basis of the conclusions reached in the second article, because this hypothetical road is short, we estimate the operating expense at the minimum determined for normal roads, or \$3,100 per mile of track per year, which aggregates \$93,000 per year. The taxes will be approximately the minimum of \$250 per mile of track, or \$7,500 per year. The cost of construction will also be approximately the minimum of the limits heretofore determined, or \$26,550 per mile, which is a total of \$801,600.

The surplus earnings, after deducting the operating expenses and taxes, will be \$49,500. The interest on the cost of construction, at 6½ per cent per annum, will amount to \$52,104. This road will therefore fail to earn its interest by \$2,604 and will fall short of making its securities negotiable by approximately \$50,000. The project, therefore, fails as an economic success.

SUMMARY FOR CASE I

The following summary may be of value in showing in statement form how the deficit in Case I is arrived at:

TABLE I—SHOWING APPLICATION OF PRINCIPLES HERETOFORE DEDUCED TO HYPOTHETICAL CASE I

Operating revenue—15,000 intermediate town and village population, at \$10 per capita.....	\$150,000
Operating expense—30 miles, at \$3,100 per mile per year.....	93,000
Net revenue.....	\$57,000
Taxes—30 miles, at \$250 per mile.....	7,500
Surplus applicable to fixed charges.....	\$49,500
Interest on \$801,600, at 6½ per cent.....	52,104
Deficit	\$2,604

MODIFICATION OF CASE I

If we estimate that the total intermediate town and village population is 18,000 instead of 15,000, the results for Case I will be modified as indicated in Table II on the following page.

It will be observed that the surplus earnings, after

deductions for operating expense and taxes, will approximately equal one and one-half times the interest charges computed on the basis of 6½ per cent of the cost of construction. The intermediate town and village population of this hypothetical road is 600 per mile of track. It may therefore be concluded, in a general way, that such a projected road, serving a primary terminal and intermediate town and village population only, should have not less than an average of 600 of intermediate town and village population per mile of track.

Inasmuch, however, as the above operating expense and

TABLE II—SHOWING APPLICATION OF PRINCIPLES HERETOFORE DEDUCED TO HYPOTHETICAL CASE 1 AS MODIFIED

Operating revenue—18,000 intermediate town and village population, at \$10 per capita.....	\$180,000
Operating expense—30 miles, at \$3,100 per mile per annum.....	93,000
Net revenue.....	\$87,000
Taxes—30 miles, at \$250 per mile.....	7,500
Surplus applicable to fixed charges.....	\$79,500
Interest on \$801,600, at 6½ per cent.....	52,104
Surplus applicable to dividends.....	\$27,396

cost of construction were computed at the minimum of the deductions heretofore made, it is apparent that should the elements of construction or operation indicate costs higher than the minimum, a proportionately greater intermediate town and village population per mile of track must prevail to make such a road a financial success.

CASE 2

In Case 1 we had a normal road 30 miles long serving only a primary terminal of 50,000 population and an intermediate town and village population of from 15,000 to 18,000. In this case, however, the road will be extended 10 miles farther to a city with a population of 20,000, qualifying as a secondary terminal (Source II). The intermediate town and village population (Source I) will be 15,000. The total miles of track will be 40 and the distance between terminals 40 miles.

As in the preceding case, the revenue from Source I will be \$10 per capita of intermediate town and village population, or \$150,000 per annum. In obtaining the revenue from Source II, the character of the terminals may be taken into consideration, for the conditions conducive to intercommunication between the primary and secondary terminals will have a bearing on the revenue. It is here estimated that the primary terminal is the capital of a state and the secondary terminal is the county seat of the adjacent county. In this instance there is the average cause for intercommunication, and the average earnings under these conditions can be properly estimated, viz., \$8 per capita of secondary terminal population, which gives a total from Source II of \$160,000.

SUMMARY OF CASE 2

The complete compilation of operating results for Case 2 is as follows:

TABLE III—SHOWING APPLICATION OF PRINCIPLES HERETOFORE DEDUCED TO HYPOTHETICAL CASE 2

Revenue from Source I— 15,000 intermediate town and village population, at \$10 per capita.....	\$150,000
Revenue from Source II— 20,000 secondary terminal population, at \$8 per capita.....	160,000
Total gross revenue.....	\$310,000
Operating expenses— 40 miles, at \$4,350 per mile.....	174,000
Net earnings.....	\$136,000
Taxes—40 miles, at \$250 per mile.....	10,000
Net earnings applicable to fixed charges.....	\$126,000
Interest on construction cost, \$1,440,000, at 6½ per cent.....	86,400
Surplus earnings applicable to dividends.....	\$39,600

The conditions of service in the above instance entailed a greater number of car movements than in Case 1, and the operating expenses were approximately the maximum of those deduced in the preceding article in the issue of Sept. 6, viz., \$4,350 per mile of track, or a total of

\$174,000 per annum. The construction cost in this case would also be higher than in Case 1 and was estimated at \$35,000 per mile, or \$1,440,000 for 40 miles.

This road would fall a little short of producing such economical results as would qualify it as a commercially feasible project, but if the population of the secondary terminal were 22,000 it would just about so qualify.

MODIFICATIONS OF CASE 2

If the primary terminal were merely the county seat of one county and the secondary terminal the county seat of the adjacent county, it is not believed that the revenue from Source II could be safely estimated as high as \$8 per capita. If, on the other hand, the primary terminal were a city of 1,000,000 population and therefore exercised a predominating commercial influence over the secondary terminal, the estimate of earnings due to Source II might be increased to \$15, and in the extreme cases to \$20, per capita of secondary terminal population. Again, if the secondary terminal population were removed a greater distance from the primary terminal, the intercommunication would be reduced, and a reduction of the revenues from Source II should be made to the extent of approximately \$1 per capita for every 10 miles of increased distance between the terminals.

CASE 3

In the preceding case there was a 40-mile normal electric interurban railway with a primary terminal of 50,000 population, an intermediate town and village population of 15,000, and a secondary terminal population of 20,000. In

TABLE IV—SHOWING APPLICATION OF PRINCIPLES HERETOFORE DEDUCED TO HYPOTHETICAL CASE 3

Revenue from Source I— 20,000 population, at \$10 per capita.....	\$200,000
Revenue from Source II— First, the population of the first secondary terminal, viz., 20,000, at \$8 per capita.....	160,000
Second, the population of the second secondary terminal, viz., 20,000, at \$7 per capita.....	140,000
Total gross revenue.....	\$500,000
Operating expenses— 60 miles, at \$4,350 per mile.....	261,000
Net earnings applicable to taxes and fixed charges.....	\$239,000
Taxes—60 miles, at \$250 per mile.....	15,000
Net earnings applicable to fixed charges.....	\$224,000
Interest on construction, \$35,000 per mile, or \$2,100,000, at 6½ per cent.....	136,500
Surplus earnings applicable to dividends.....	\$87,500

Case 3 these conditions will still obtain, with the exception that there will be a further 10-mile extension of the line to a town of 5000 population and another 10-mile extension to a city of 20,000 population of sufficient importance to be classed as an additional secondary terminal, and the intermediate town and village population will be increased to 20,000. The primary terminal is 40 miles distant from the first secondary terminal and 60 miles from the second primary terminal, and the secondary terminals are 20 miles distant from each other.

The revenue from Source I, on the \$10 per capita of intermediate town and village population basis heretofore used, will be \$200,000 per annum.

As to the revenue from Source II, we have the following items: First, the return from the population of the first secondary terminal, viz., 20,000, at \$8 per capita, or a total of \$160,000; second, the return from the population of the second secondary terminal. This latter terminal, being 60 miles from the primary terminal, will be entitled to an estimate of approximately \$6 per capita from the viewpoint of its relations with the primary terminal; and being 20 miles from the first secondary terminal, it will be entitled to an estimate of \$8 per capita, an average of \$7 per capita for the 20,000 population, or a total of \$140,000.

The operating expenses are on the basis of \$4,350 for each of the 60 miles of track. The cost of construction is \$35,000 per mile, as in the previous instance, or a total of \$2,100,000.

The résumé for Case 3 as given in Table IV on the preceding page shows surplus earnings applicable to dividends of \$87,500, which indicates that this hypothetical road is a financially feasible project.

MODIFICATION OF CASE 3

The judgment of the expert must be carefully exercised in determining the intercommunication between the primary and secondary terminals and between the two secondary terminals. The same general reasoning should be followed as in the modification of Case 2. If the second secondary terminal is a city of 40,000 inhabitants, then it will be far less dependent on the primary terminal, and the intercommunication between these terminals will be greatly reduced, while, on the other hand, the intercommunication between the two secondary terminals will be increased. In such a case, the value of the first secondary terminal for revenue from Source II should be increased to perhaps \$10 per capita of its population, and the value of the second secondary terminal should be decreased to perhaps \$4 per capita in estimating the revenues from Source II.

Where the above conditions exist, in addition to the revenue changes the cost of construction will also undergo modification. Because of the importance of the second secondary terminal and its influence on the cost of construction of the road by entering a larger city, the estimate for this case will be \$40,000 per mile of track, or \$2,400,000 for the 60 miles. The complete summary under Case 3 as modified is as follows:

TABLE V—SHOWING APPLICATION OF PRINCIPLES HERETOFORE DEDUCED TO HYPOTHETICAL CASE 3 AS MODIFIED

Revenue from Source I—	
20,000 population, at \$10 per capita.....	\$200,000
Revenue from Source II—	
First, 20,000 population of first secondary terminal, at \$10 per capita	200,000
Second, 40,000 population of second secondary terminal, at \$4 per capita	160,000
Total gross revenue	\$560,000
Operating expense.....	261,000
Net earnings applicable to taxes and fixed charges.....	\$299,000
Taxes	15,000
Net earnings applicable to fixed charges.....	\$284,000
Interest on construction, \$40,000 per mile, or \$2,400,000, at 6½ per cent.....	156,000
Surplus applicable to dividends	\$128,000

This third hypothetical case represents ideal conditions for an electric interurban project. It indicates in a general way the territory necessary to the production of satisfactory economic results.

CONCLUSION

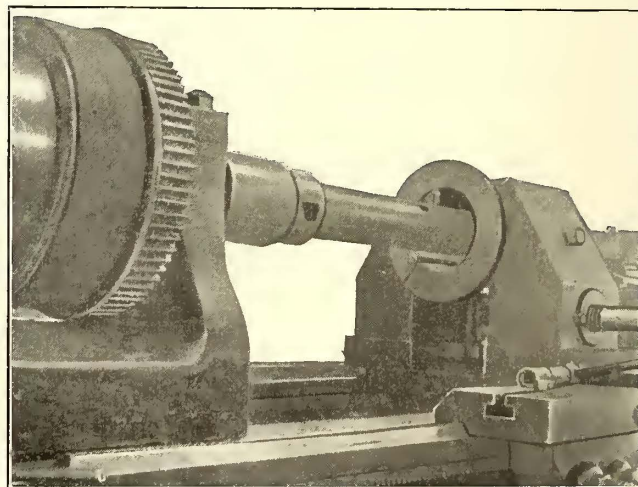
The foregoing discussion and tables should enable the promoter and investor to see more clearly the economic relations between the operating and construction statistics that we have compiled in the previous articles, and they should have a better conception of the factors that are necessary for the success of projected electric interurban railways.

This article completes the discussion of electric interurban lines. We have outlined and discussed the general principles governing operating revenue, operating expense and cost of construction as deduced from existing lines and as applicable to proposed lines. While the fundamental elements necessary to an economically feasible road have been determined within approximate limits for simply normal roads operating in normal territory, it is believed that the hazard of indiscriminately applying these limits to all cases will be fully realized, and that the necessity of employing expert talent, with mature discriminating judgment, to estimate the probable performances of a projected road is fully appreciated. It is also believed that projected electric interurban railways that to the intelligent layman do not qualify as economically feasible propositions, under the limits we have set forth, would better be left unconstructed.

From the statements made in this and the preceding articles the conclusion may be drawn that a great number of the electric interurban railways now in operation are not the commercial successes they are generally considered to be, and in this conclusion the writer fully concurs. This does not mean that there are not many profitable electric interurban railways, for there are many such; but this only serves to emphasize the fact that it is suicidal to rush into electric interurban construction unless a proper study is made of existing conditions and the factors underlying success. At the present time there are territories susceptible of developing profitable electric interurban railways. As the town and village population continues to increase, there will be many more such, and the promoter and investor who use the principles obtained from experience in a scientific study of a projected line will most surely and most quickly be rewarded by financial success.

LATHE-BEARING BORING ATTACHMENT

To reduce to a minimum the time required to center rebabbitted bearings in the lathe, C. W. Day, master mechanic Oklahoma Railway Company, of Oklahoma City, has designed and built a self-centering bearing boring attachment of which an illustration is shown. This is made up of two jaw castings mounted on the lathe carriage and permanently connected by a right and left screw. They are



Lathe Attachment for Boring Motor Bearings

kept in line with the lathe centers by a fork screwed into the exact center of the carriage, the two prongs of this fork engaging with a groove cut at the center of the right and left screw shaft. An extension of the right and left screw through the jaw casting on the operator's side of the lathe permits the jaws to be opened or clamped firmly on the bearing to be bored by turning a hand wheel.

In combination with the self-centering bearing boring attachment a special boring bar has been provided which is set in position between the headstock and tailstock. The end of the boring bar mounted on the headstock has been tapped out so as to take the place of the lathe chuck and the cutting tool is wedged in a slot in the bar. The length of the bar permits the use of two cutting tools, one for the roughing out and the other for the finishing out, making the boring of a bearing complete with one operation. The complete attachment cost approximately \$40 and has more than paid for itself by improved workmanship in the bearings bored.

An application has been filed in Russia for permission to form a company with the object of constructing and operating an electric railway 35 miles long, from Moscow to Voznyesyensk. The cost is estimated at \$3,417,143.

MEETING OF KEYSTONE RAILWAY CLUB

The regular quarterly meeting of the Keystone Railway Club was held in the pavilion on Mount Penn, Reading, Pa., on Sept. 16. The business program consisted of two papers, discussion of the question box and proposed consolidation with the Pennsylvania Street Railway Association and other public utilities bodies of the State. The entertainment comprised a chicken and waffle dinner, with music and outdoor baseball played with indoor equipment by the "Young Eagles" versus the "Red Ravens." As the weather was perfect, the trip up and down the mountain, with its panorama of the city of Reading, was also a most enjoyable feature.

PROPOSED CONSOLIDATION

The first order of business was general welfare. W. B. Rockwell, general manager Eastern Pennsylvania Railway, addressed the meeting on the desirability of combining the Keystone Railway Club and the Pennsylvania Street Railway Association. Furthermore, he said, it was a great burden on the individual members of the club to attend meetings every three months at their own expense. He recommended a consolidation of the two bodies, and suggested a two-day or three-day annual meeting with specialized and joint sessions, thereby following the convention practices of the American Electric Railway Association and its affiliated organizations. It might also be desirable to have a midyear meeting for committee work. The co-operation of the executive, operating and engineering departments of the electric railway interests of the State would be of the greatest value in presenting matters before the new Public Service Commission. Upon motion, President Gould appointed W. B. Rockwell, chairman; C. M. Paxton, Thomas Cooper, W. A. Heindle and F. M. Davis as a committee to confer with the Pennsylvania Street Railway Association on the question of consolidation. This committee was also authorized to report on the advisability of consolidating with other Pennsylvania public utilities, such as lighting and power companies.

AIR-BRAKE MAINTENANCE

W. G. Kaylor, Westinghouse Traction Brake Company, then read a paper on "Air-Brake Maintenance." Mr. Kaylor confined himself, however, to a discussion of how depreciation of straight-air-brake equipments could be decreased through the use of special appliances and improvements in construction. Great progress had been made in suction protectors. In the latest form oil was used to absorb the dirt taken in with the air. The air on its way to the pump did not pass through the oil, but was broken up by perforations or baffle plates which directed the incoming air toward the oil. The dirt was then entrained by the adhesiveness of the oil and settled to the bottom of the strainer, while the clean air passed on to the pump. Compared with the curled hair strainer, its efficiency was as 98 per cent to 50 per cent, and for this reason it could be attached directly to the head of the compressor, so obviating the necessity of piping the suction to the roof. The crank-case vent, through which dirt was also liable to enter, was now either fitted with a separate strainer or was connected to the suction by a pipe or cored passage. The proper protection of the intake and crank case vent would make it possible to operate a compressor in normal service for ten years or more before bushing the cylinders or renewing the bearings.

Deterioration due to corrosion, oxidation, etc., could be postponed indefinitely by enameling the reservoir both inside and out. To guard against explosions from excessive pressure, all reservoirs should be protected by a safety valve set at 10 lb. above the maximum working pressure. The safety valve, in turn, should be inspected regularly to prevent it from freezing shut on account of corrosion. When ordering motorman's brake valves the purchaser

should specify types which were provided with renewable bushings. As to brake cylinders, the best grade leather should be used for packing, the expander ring should have a flat surface which distributed its pressure over a greater area than the ordinary round expander ring, and the lubricant should be a compound which would fill the pores of the leather to make it absolutely air-tight. The speaker also recommended the wider use of brake slack adjusters and of case-hardened pins and bushings for the brake rigging.

ACCIDENT PREVENTION

Mr. Rockwell then read his paper entitled "How to Prevent Accidents." He said the term "prevention" was a misnomer if understood literally, because of the frailty of human nature; the problem really was: How could accidents be reduced to a minimum? Good car and road equipment should be a matter of course, but it was of paramount importance that no car should ever leave the carhouse until the maintenance force knew that it was in perfect condition. He was strongly opposed to the open car with running boards and would change it to a center-aisle car at once.

The next important point was the character of the men on the cars. A motorman was not made in a month, but rather in two or three years, for he would learn many things long after the days of formal instruction. Thus, one thing that could not be taught, but was learned by experience, was how to handle a car on a slippery rail. No conductor should be kept on a route where he was physically unable to handle the business in schedule time with due attention to fare collection, prompt signals and the like. But the most important means of reducing accidents was to treat the men so fairly that they would feel that they were handling their own property. The motorman who was indifferent to his employer's interest would cause much loss without any tangible evidence of carelessness on his part. For example, a side wipe which ruined the varnish on one side of a car might readily have been avoided by a conscientious operator. The manager should, therefore, get next to the hearts of his men as well as to their pocket-books.

OTHER BUSINESS

After resolutions of thanks had been tendered to Messrs. Kaylor and Rockwell for their papers, the question box was thrown open. The discussion on the merits of lined versus solid bearings for city service was particularly active. W. O. Stieff, Galena Signal Oil Company, quoted from his own experience and from data published by the American Electric Railway Engineering Association as to the necessity for larger journals and the conditions for which each style of bearing appeared to be best adapted. As the result of this discussion, W. B. Rockwell, W. O. Stieff and N. M. Lentz were appointed a committee to carry out a series of tests with a large variety of bearings on a car to be furnished by Mr. Rockwell's company. Additional members for this committee will be appointed later.

The meeting was then adjourned for luncheon and the baseball game.

Two English engineers have arrived at Bagdad to survey three different lines for an electric railway from Moazzem, 5 miles north of Bagdad, to Garara, 6 miles south of Bagdad. It was reported in May, 1912, that a concession to build this line had been granted to Mahmoud Shabander, Bagdad, and that Mr. Shabander had left for Europe to contract for engineers and materials. It is now reported that Mr. Shabander has sold his concession in whole or in part to an English firm, and that construction will begin in the near future. The engineers are surveying two lines through the city of Bagdad and a third line just along the east border of the city. A fourth line will be surveyed along the west bank of the Tigris through west Bagdad.

NEW METHODS OF DISTRIBUTING TIME IN THE SHOPS OF THE INDIANAPOLIS TRACTION & TERMINAL COMPANY

Accurate distribution of employees' time against various jobs in a general repair shop is essential if value is to be attached to maintenance cost records. To depend on the

		REGULAR TIME	
Elapsed Time _____ Commenced _____		S. O. No.	3676
Name: <i>John Doe</i> Clock No. 80 Rate 74		Hours	3.1
Description of Work: <i>Painting/Grake/Severs</i>		Amt.	7.44
		Job No.	
		Hours	
		Amt.	
		Job No.	
		Hours	
		Amt.	
		Checked O. K. Against Clock Card	Entered On Distribution Sheet
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

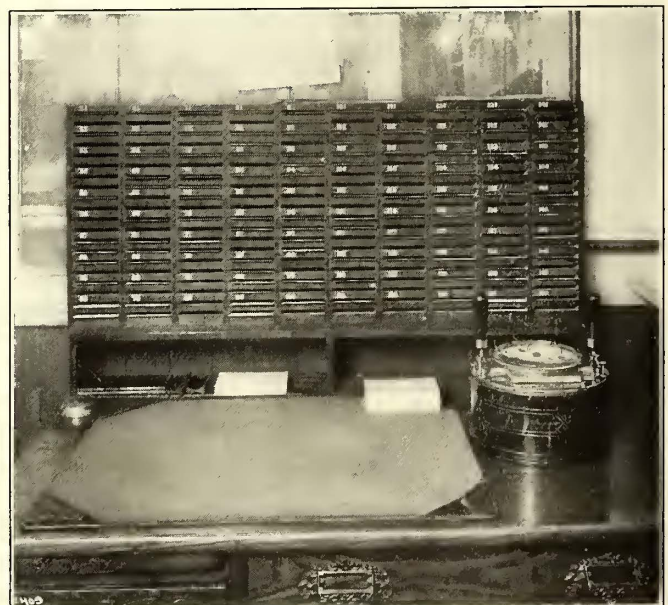
Calculagraph Record Card for Regular Time

men to distribute their own time means, in most cases, inaccuracy, as it is not done until the close of the day's work, and with a large force the total time consumed in this way represents a considerable proportion of the total shop cost. At the shops of the Indianapolis Traction & Terminal Company, however, it is estimated that each employee consumes only between ten and fifteen minutes in making his distribution each day.

After giving this subject of lost time careful consideration, L. M. Clark, master mechanic, decided to purchase some type of time-recording device that would not only reduce the amount of time wasted by employees in computing distribution but would be accurate. The device selected took the form of a time clock and stamp which would automatically record the time of commencing a particular job on a card and when the work was completed would stamp a record of the time elapsed on the same card. In other words, this clock and card system displaces the old distribution cards which were filled out by each workman at the close of his day's work. The recording clock is known as a "calculagraph" and is manufactured by the Calculagraph Company, New York.

third in the carpenter shop. The accuracy of the clock movement is checked with a master clock twice each day, at 7 a. m. and 1230 p. m. Two of the clocks and cabinets have been placed so that the paint and carpenter department storekeepers may operate them and do their regular work, thus making it unnecessary to employ a clerk especially for this purpose. In the general repair shop, however, it is necessary to employ an extra clerk to operate the job card system and clock. All his time is not required for this particular work, and he is kept busy with other duties, such as writing storeroom requisitions and doing light office work.

At the close of each day's work the calculagraph cards for jobs completed and under way are turned over to the general timekeeper, who takes off the labor distribution. Employees continue to ring in and out on a time clock, and these cards furnish a check on the total time recorded against any workman on the calculagraph cards. All cards in this new system of recording time distribution are filled in by the two storekeepers and one clerk. Each of these operators is furnished with a complete list of current order numbers so that he may know to what each job is chargeable. The workman simply reports the completion or commencement of the different jobs to the operator, giving a



View of Calculagraph and Cabinet

		EXTRA TIME	
Elapsed Time _____ Commenced _____		S. O. No.	
Name: <i>J. E. Field</i> Clock No. 17 Rate 30		Hours	
Description of Work: <i>Repairs to rear seats, car # 470</i>		Amt.	
		Job No.	60
		Hours	1.7
		Amt.	51
		Job No.	
		Hours	
		Amt.	
		Checked O. K. Against Clock Card	Entered On Distribution Sheet
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Calculagraph Record Card for Extra Time

In combination with the calculagraph a pigeonhole cabinet to receive the working cards has been installed. As shown in the illustration, this cabinet is arranged with two pigeonholes for each workman's number, one for jobs to be done and the other for jobs completed. At the present time three calculagraphs have been installed, one in the general repair department, one in the paint shop and the

brief description of the work done, and with the aid of the list of order numbers the proper one is written on the card. These calculagraph cards have not displaced the shop order blanks but form an accurate record of time chargeable against each order.

Essentially, the calculagraph is a clock with three time-recording elements in the form of dies which revolve with the hands of the clock. The dial which prints the time of the day remains fixed, and the hand revolves. The other two dials, one for recording elapsed time in hours and the other in tenths of hours, revolve continuously. The marker of each elapsed-time dial is secured rotatively to its respective dial but has a vertical printing movement independent of it. In beginning a calculagraph record, a card is placed face down at the right end of the slot provided for this purpose beside the clock face. The right lever is pushed away from the operator and this movement prints the time of day on the card. Without releasing the lever or moving the card the man pulls the lever back as far as it will go, which prints the two elapsed-time dials in the proper relative position to the dial showing the time of day. To close the record when a job is complete the record card

again is inserted in the slot, and the left operating lever is pulled toward the operator as far as it will go. This prints the two hands which indicate the hours and tenths elapsed time in the proper dials.

Since both parts of the elapsed-time printing dies have been revolving during the interval between the two printings and since the printed record on the card has not been revolved, the complete record on the card will show that the arrows have rotated forward and will not point toward the zero mark where they stand in the die. The figures toward which the arrows point represent in hours and tenths the arc of their rotation during the interval of the working period. As the above mechanism permits the location on each record of a new zero, or a starting point for a new record, it is possible for one calculagraph to make elapsed-time records for any number of workmen without having its printing dies reset.

Reproductions of two of these card records in the illustrations on page 464 show the changed position of the elapsed-time dials as well as the other information deduced from this automatic distribution record. To distinguish between the regular and extra time worked, as there is a difference in the rate paid, cards of two colors are employed for the calculagraph record.

COST OF BURNING WEEDS IN OKLAHOMA

The Oklahoma Railway Company, Oklahoma, Okla., has designed and built a weed burner with which it is obtaining satisfactory results. In general, the weed burner comprises a discarded single truck equipped with two Westinghouse 12-A motors, on which has been constructed an 18-ft. platform. Two Westinghouse "D" air compressors, mounted on the car floor, maintain a pressure of 100 lb. in four 16-in. x 42-in. reservoirs removed from an old car

burner moved over the track at approximately 50 ft. per minute. The cantilever arms supporting the burners and apron are adjustable, permitting the burners to be lowered to the working position or elevated for transporting over the road.

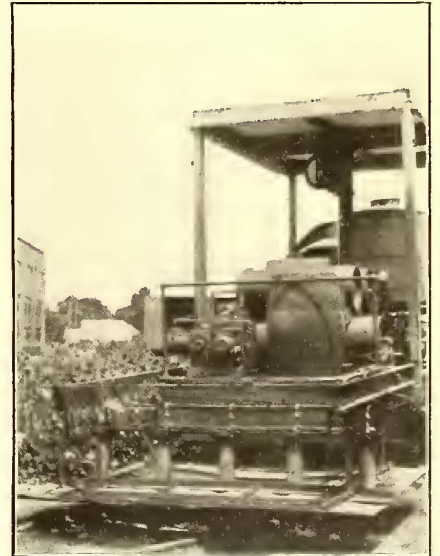
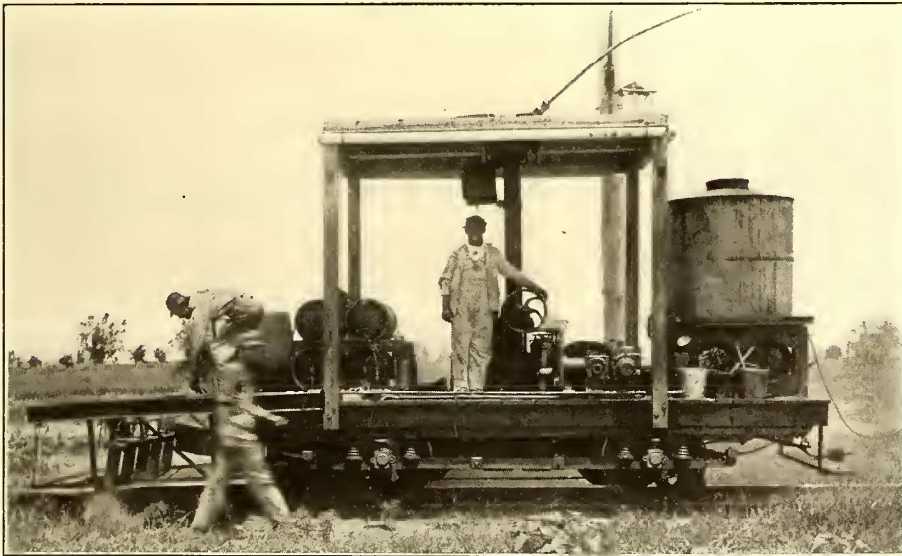
The motor controller is mounted at the center of the car floor so that the motorman may observe the quantity of weeds to be burned and adjust his speed accordingly. When the weed burner is in operation the controller usually is set at the second point, and the speed is varied by a hand-brake lever installed beside the controller.

One of the difficulties experienced by other companies in the operation of a weed burner is that a great many ties are set afire, thus requiring a small gang to follow the burner

COST OF BURNING WEEDS ON OKLAHOMA RAILWAY, BURNER OPERATED AUG. 15 TO SEPT. 7, 1912

Miles actually burned.....	56.92
Dead mileage going to and from work and switching out of way of regular cars.....	472.38
Total miles traveled.....	529.30
1292 gal. of crude oil used at 2½ cents per gal.....	\$32.30
Total labor cost.....	126.80
Cost of energy used to run car 529.3 miles at 3 kw-hr. per car mile, 1¼ cents per kw-hr.....	19.84
Total cost of burning weeds on system.....	\$178.94
Cost per miles of track.....	\$3.14
Cost per mile to remove weeds by hand.....	18.00
Cost to remove weeds by hand on 56.92 miles of track.....	1024.56
Which shows a net saving by using the weed burner of 82.5 per cent.	

at all times to extinguish them. In operating its burner the Oklahoma Railway Company has eliminated much of this trouble by attempting not to destroy the weeds totally as it moves over a section of track, but to burn them so that they will dry and blow away in a few days. Experience has developed the fact that intense heat applied for a short time cooks weeds, and although they do not differ much in



Oklahoma Railway Company's Weed Burner, Side and End Views

Supported at one end of the car on cantilever arms are five burners and a sheet-metal apron which deflects the heat to the ground. On the opposite end of the car a 300-gal. oil tank is installed. Two small tanks are set under the large oil storage tank to serve as reservoirs for the oil under 35-lb. pressure.

The quantity of air and oil supplied to all five burners is controlled through two valves in the main air and oil lines leading from their respective reservoirs. By forcing the oil and compressed air into a mixing chamber just above each burner and directing the flame with the sheet-metal hood, intense heat is obtained at the ground level. Best results were obtained where the weeds were thick when the

appearance from that before burning, twenty-four hours later they will dry up and blow away. In some instances where the weeds are very thick badly decayed ties do catch fire, and one man accompanies the burner to extinguish these. He accomplishes his work with a bucket of water and a wet mop.

After more than a year's experience with this particular weed burner it has been found by the company that three men can operate it successfully, namely, a motorman, a burner operator and a helper who keeps the fire from spreading. The company has compiled the accompanying record, which includes the entire expense of burning weeds over the system.

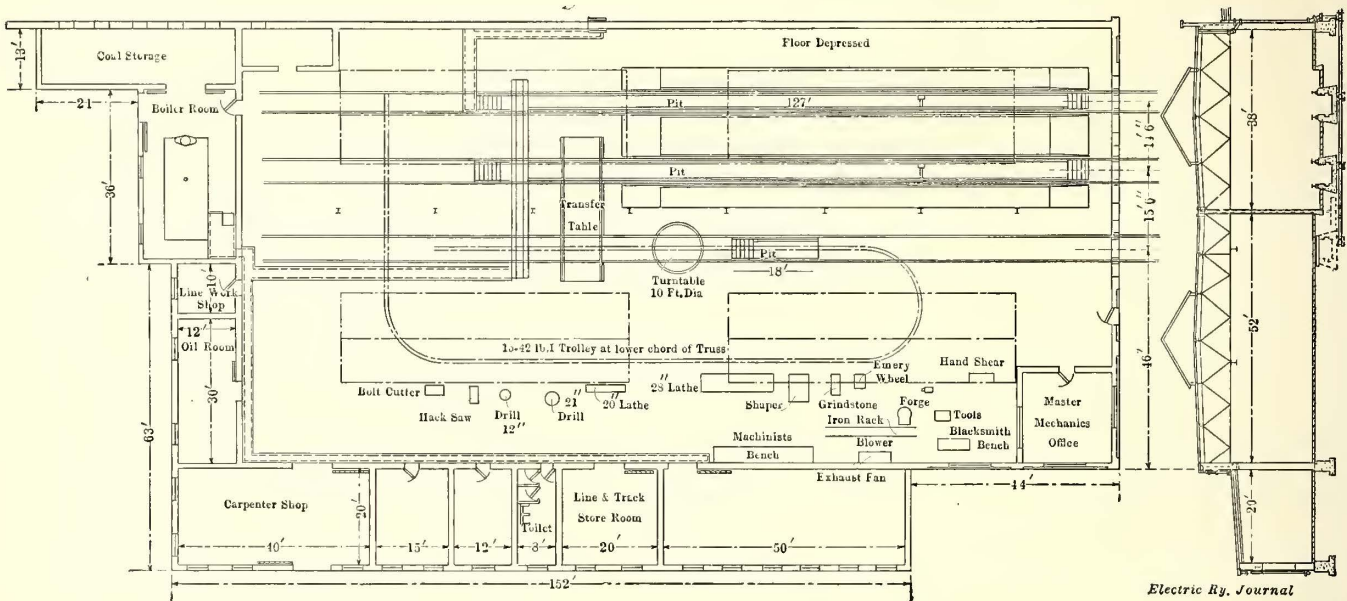
NEW SHOPS FOR THE ROCHESTER, SYRACUSE & EASTERN RAILROAD

The new shops at Newark, N. Y., which have recently been erected by the Rochester, Syracuse & Eastern Railroad, occupy the site of some shops which were burned down on April 1, 1912. The lay-out of the new building is shown in the accompanying drawings and, as these show the shops in considerable detail, attention need be called to but a few important features. The plan is based on the experience of the company with its Lakeland shops, located in a suburb of Syracuse. These have been used for several years, or long enough to demonstrate their strong and weak points.

The new building consists of two main divisions, the carhouse, 240 ft. by 82 2/3 ft., and the shops, of irregular outline, approximately 204 ft. by 105 ft. The carhouse is divided into three two-track sections by brick partitions.

The machine tools, forge, etc., are ranged along the side of the main shop and are driven from an overhead line shaft operated by a 35-hp interpole motor. A trolley hoist serves these machines, the equipment consisting of two 5-ton Yale & Towne hand-operated hoists running on a 12-in. I-beam attached to the lower chords of the roof trusses. The trolley crane is so designed that a load can be picked up from any one of the three tracks and practically from any part of the turntable track. The wood shop, armature room, store and other auxiliary rooms are in a projection from the main building.

Great stress has been laid upon the matter of ample lighting, both natural and artificial. The natural lighting is helped by the exceptionally large skylight area. The artificial lighting is furnished mainly by five-light clusters of 40-watt tungsten lamps, a total of about 200 lamps being required. The clusters are hung just below the bottoms of the trusses in accordance with an illumination plan



General Plan and Cross-Section of Repair Shop and Carhouse

In the shops are three work tracks, two with long pits and one with a short pit, these pits having floors crowned in the center with a small drainage trench on each side. On the side of every pit is a depressed floor, 18 in. below the main floor level. This depression permits a workman to carry on an inspection without stooping and greatly facilitates work on brakes and journal boxes. The floor of the building is granolithic, except in the shop, where it is of 1-in. wood laid on 4 in. of concrete, nailing strips being molded into the latter. The roof trusses over the shop are supported on the walls and upon a row of steel columns. The latter are surrounded with concrete to prevent the steel from softening in case of a car fire. All through the building a 1½-in. T-iron, supported under an inverted wood trough, is used for the contact conductor.

The three work tracks are cross-connected by a wheel pit in which the track for the jacks has been placed 10 in. off the center of the pit so that a man can squeeze by the wheels. The wheel pit is located at such a distance from the back wall of the building that there is space sufficient for a car undergoing wood-work repairs to stand on the track next the carpenter shop without interfering with the operation of the wheel pit. A transfer table for shifting trucks connects two of the tracks, one of which has a turntable for reversing the trucks. This arrangement of transfer table and tracks has been found best for removal of trucks. By means of two jacks by which one end of a car body can be raised a few inches a truck can be removed in ten minutes or less.

laid out by the Westinghouse Lamp Company. The wiring for the lighting fixtures is in conduit.

In the matter of fire protection the installation of a sprinkler system is at present under consideration. The building itself is entirely fireproof, and, as mentioned above, the columns are fireproofed to prevent softening. The only danger of fire is from cars in storage or undergoing repairs. The company has made a careful study of the causes of car fires and has taken every precaution to remove them. It is likely, however, that a sprinkler system will be installed in this as well as the other shops and carhouses of the system.

The Newark shops are conveniently located for handling the work of the central division of the Beebe lines. Newark is about midway between Rochester and Port Byron, where the Rochester, Syracuse & Eastern Railroad connects with the Auburn & Northern. At Newark the Newark & Marion Railway joins the main line. Thus the shops are within easy reach from at least a third of the trackage of the system.

An agreement as to the financing of the proposed Vienna (Austria) Electric Underground Railways and the electrification of the Vienna Metropolitan Railway has been arrived at between the Austrian group, the Austrian Siemens-Schuckert Werke, and the French group under the auspices of the Société Centrale des Banques de Province and the Compagnie Omnium Lyonnais. The capital of the construction company has been fixed at \$10,000,000.

TWIN CITY WELFARE NOTES

The relations of the management of the Twin City Rapid Transit Company with its men have always been satisfactory and the company does not hesitate to make any reasonable expenditure to promote their welfare. Fortunately for both, Minneapolis has a Young Men's Christian Asso-

by the company entirely. The company is considering the purchase of a moving-picture equipment next winter to enable the men to vary the nature of their entertainments.

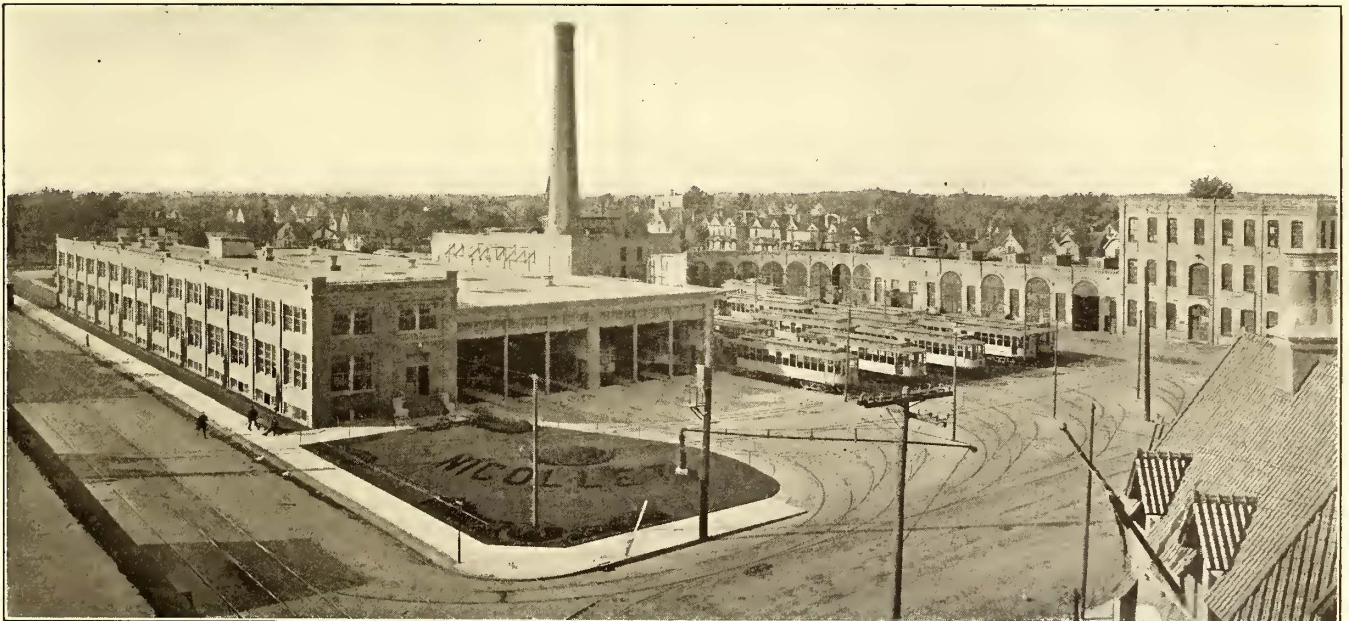
All carhouses are provided with club quarters comprising reading and rest rooms. The men may also spend the night in the carhouses, as cots, blankets and towels are furnished for that purpose without charge. Pianos, shower



Twin City Welfare Work—Lake Street Carhouse

ciation which is alive to its opportunities for usefulness. Particular attention has been given to the electric railway men by one of the secretaries, F. M. Anderson, who has the rare gift of developing the initiative of the men so that they are able to plan for themselves. The secretary gives talks in the carhouses at 10 o'clock in the morning with such good results that the motormen and conductors much prefer listening to his addresses to loafing between runs. Evening entertainments are also handled by the secretary with excellent support. On account of the past successful work of Mr. Anderson the company arranged on Aug. 1 for him to devote all of his time to its men.

baths, punching bags and other sources of recreation and comfort form parts of all equipment. Pool tables have recently been added and pool tournaments in and between stations were conducted last winter with great success. Individual medals and a large loving cup were presented by the company, the latter as a station trophy. The athletic apparatus has been so popular that the installation of small gymnasiums is being considered for next winter. Barber shops are provided at all stations. The company supplies the equipment but does not pay the barbers, who work independently but under an agreement as to prices to be charged the men. The convenient location and reasonable



Twin City Welfare Work—Nicolet Avenue Carhouse

The actual work of planning entertainments is done by committees appointed by the division superintendent. Parties are held at more or less regular intervals, three or four to a station during the winter. The usual entertainment is a card party followed by a dance and refreshments. The cost of music, refreshments, prizes and incidentals is borne

prices of these shops are effective in encouraging the men to maintain a neat appearance.

The company has not found it satisfactory to conduct elaborate restaurant service, but its light lunch counters, where cigars, soft drinks and fruits are sold at cost, are very popular.

COMMUNICATION

NEW YORK BRAKE TESTS

PUBLIC SERVICE COMMISSION, FIRST DISTRICT
NEW YORK, Sept. 15, 1913.

To the Editors:

I wish to thank you for the way in which my article on the "New York City Brake Order" has been presented in your issue of Sept. 13. The care and accuracy with which such technical articles are published form one of the strong points of the *ELECTRIC RAILWAY JOURNAL*. I note that George L. Fowler, the consulting engineer retained by the Brooklyn Rapid Transit Company to conduct its brake test, alluded to in the article, has made certain criticism of my conclusions. I beg to say just a word in reply.

His letter apparently suggests that there is a dispute as to the facts. All the facts in the case, including the tests omitted from the article, were presented before the Supreme Court. The Brooklyn Rapid Transit Company was represented by able counsel. The decision of the court was based on the facts and was unanimous. Therefore, it seems fitting to refer to the decision of the court for a correct interpretation of the facts.

Mr. Fowler claims that the wet-rail tests and the motor-reverse tests which have been omitted from the article afforded material evidence. It is necessary to point out that such a claim appears inconsistent. The value ascribed by Mr. Fowler during the progress of the tests to those made on a wet rail is indicated by the following extracts from the minutes:

GEORGE L. FOWLER: "We tried to get our dry-rail conditions identically the same." Q. "Then you tried to get your wet-rail conditions the same." A. "But we could not because it is impossible." (Folio 704.)

E. G. CONNETTE: "For these reasons we agree with the Brooklyn Rapid Transit Company in confining the discussion to the dry-rail tests." (Folio 792.)

As regards the motor-reverse stops, apart from the fact that these are tests not of the brakes but of the motors and of the circuit-breaker adjustment, it is also a fact that all the latest tests made by Mr. Fowler on both air brakes and hand brakes omitted the reverse stop.

The results of air-brake "service" tests were not given in the article. These tests also were abandoned by Mr. Fowler long before the series was completed. These results—namely, the wet-rail stops, the motor-reverse and the air-brake "service" stops—are the only ones made by Mr. Fowler which have been omitted in the article.

All the tests were fully considered by the commission and fully presented to the court. The decision of both commission and court was based on such tests as they thought truly indicated the value of the brake.

J. N. DODD.

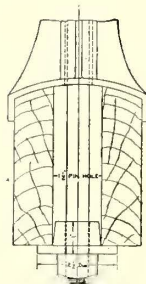
PURE IRON VERSUS COPPER-BEARING STEEL

Dr. A. S. Cushman, director of the Institute of Industrial Research, Washington, D. C., has just issued a bulletin discussing the merits of pure iron versus copper-bearing steel from the standpoint of resistance to rust. Dr. Cushman mentions his earlier work, issued by the Department of Agriculture, in which he urged manufacturers to eliminate the use of manganese in farm fence wire, etc., in order to produce a metal of a slow and even rusting quality. Owing to the demand for such a metal great progress was made during the years 1909 and 1910 in the manufacture of commercially pure iron in the basic open-hearth furnace. During the following year, however, other metallurgists brought forth the theory that the addition of a small quantity of copper to steel would make it rust-resistant. Dr. Cushman, in opposing this theory, points out that the favorable results reported with such alloys were made

under special conditions and that it is very unlikely that the mere addition of a small quantity of copper to ordinary commercial steel would have any beneficial effect. In contrast to this he presents the history of some well-preserved ancient utensils which were found to consist of exceptionally pure wrought iron with an unimportant admixture. Further, he contends that the consumer would have difficulty in determining whether the specifications were carried out beyond that of the presence of copper. On the other hand, if an engineer or other consumer demanded a commercial iron of a given limit of purity the chemical analysis would be much more likely to insure delivery up to specification. Again, if the use of coppered steel became general in the future, the scrap which is so necessary for the proper conduct of the open-hearth furnace would become infected with copper. As this copper is not eliminated by the refining reactions of the open-hearth process a general deterioration of the best quality of iron and steel products would be sure to take place.

ADAPTER CROSS-ARM WASHER

The washer or bushing shown in the accompanying cut has been placed on the market by the Electric Service Supplies Company for use with its Keystone truss pins.



Cross-Arm
Washer

When used with these pins, it readily adapts the cross-arm hole for $1\frac{1}{2}$ in. so that an iron truss pin with a curved base like that shown may be used. This adapter makes it possible to replace wooden truss pins with iron pins without placing new cross-arms. It is particularly valuable when difficulties arise such as running a heavy feeder over an old line or when the need for pins of greater strength at curves arises. In neither case has it been found necessary to change the cross-arms or to bore new holes. This method is available for complete renewals of line truss pins.

A NEW 6-TON CHAIN HOIST ASSEMBLY

In handling weights of more than 1 ton or 2 tons with a portable chain hoist the users have met much trouble and inconvenience in suspending the hoist.



Six-Ton Hoist Arranged for Lower
Capacities

The ordinary 6-ton hoist, for example, weighs 400 lb., so that either another hoist or special scaffolding is required to put it up. To overcome this drawback, the Wright Manufacturing Company, Lisbon, Ohio, has designed a 6-ton hoist any part of which can be carried up a ladder and suspended from the track. This hoist is shown in the accompanying illustrations.

To install the device the chain is run off the power part of the hoist, thereby leaving less than 150 lb. to lift. Next the idler blocks are put up and then the load chain is run back on the hoist. This design may be used as a 2-ton hoist if employed without either idler, or as a 4-ton hoist if the top idler and hook are retained.

News of Electric Railways

Unsuccessful Attempt to Precipitate Strike in Indianapolis

Following the failure of the strike on the Indiana inter-urban lines, an attempt was made to organize the men on the city lines of the Indianapolis Traction & Terminal Company, Indianapolis, with a view to calling a strike during State Fair week, Sept. 8 to 13. John D. Lingenfelter was arrested on Aug. 30, following an investigation of the cutting of feed wires on the Brazil and Danville divisions of the Terre Haute, Indianapolis & Eastern Traction Company during the attempted strike on the inter-urban lines, and the organizers who were at work among the men on the Indianapolis city lines left the city. The leaders of organized labor in Indianapolis stated early in September that W. D. Mahon, of the Amalgamated association, had placed the work of organizing the men of the local city lines in the hands of the leaders of the Central Labor Union, Mr. Mahon informing them that they would be backed by the Amalgamated association in whatever course they thought best to pursue. Public sentiment was aroused against the attempt to induce the car men to strike during fair week. The day the fair closed, Sept. 12, organizers made another attempt to induce the men to strike.

On Sept. 8 the International Brotherhood of Electrical Workers called a strike of the linemen of the various inter-urban and city lines in Indiana. About nine men from three of the six divisions of the Terre Haute, Indianapolis & Eastern Traction Company, eight from the city lines of the Indianapolis Traction & Terminal Company, ten from the several divisions of the Union Traction Company of Indiana, five or six from the Indianapolis & Cincinnati Traction Company and a few men from other smaller lines in the State walked out. The places of these men were filled at once and the work of the different line departments was not interrupted.

Franchise Progress in Kansas City

As a result of conferences between the receivers of the Metropolitan Street Railway and representatives of Kansas City, Kan., and Kansas City, Mo., in regard to the franchise submitted by Mayor Jost on Aug. 13, Section 1 was agreed upon recently as follows:

"The authority is granted to operate a street railway system in streets of the cities.

"No general right to construct subways or elevated structure is granted, the intent being to prevent excessive additions to the capital of the company and to leave the cities free to grant franchises for such projects to other companies.

"The franchise must be accepted within fifteen days after its passage.

"The federal court and the receivers will cause to be deposited a sum sufficient to pay the expenses of the election.

"The company is required to take over in a prescribed manner all of the property, franchises and privileges of the old companies free from all encumbrances. Any claim then unknown, afterwards appearing, shall be met by the new company without addition to the capital value or any effect upon the interest of the cities in the property.

"The obligations to the cities are to be the first and paramount obligations of the company, prior to any other lien or right against the property or earnings.

"The company is not to be required to acquire funds held for special purposes, such as stocks, bonds, notes, accounts or claims of any kind, that the several companies may hold against each other or the Kansas City Railway & Light Company. Such accounts and claims, however, shall be surrendered and canceled when necessary to free the property acquired from all encumbrances.

"Moneys, notes and liquid assets in possession of the receivers may be used to pay liabilities of the receivership in order to free the property.

"Any surplus money or liquid assets thereafter remaining shall be charged to the capital account for operating

expenses, according to the purpose for which they may be used, as determined by the board of control.

"The city gives its consent for the transfer of the properties from the old companies to the new. When that is done the city shall relieve the old companies of all obligations of the old contract.

"The receivers, with the consent of the court, are to operate the property under the terms of the new franchise, pending the transfer of the property to the new company.

"The Kansas City Railway & Light Company shall deposit bonds for \$100,000 that the property, privileges and assets of the old company will be acquired by and transferred to the new company within six months."

At a conference held later the reorganization of the existing companies and the election and qualification of the directors to represent the city was provided for in the following words:

"The stock of the new company shall, pending the acquisition of the title as aforesaid, be deposited with William C. Hook, judge of the United States Circuit Court of the Eighth Circuit, to be by him or his successor in office held for the benefit of the parties entitled thereto under and pursuant to a plan of reorganization to be hereafter prepared, or in case reorganization cannot be effected, then for the benefit of those who paid for the stock.

"Such plan of reorganization must be in harmony with the provisions of this ordinance and must be so drafted that it will carry out its purposes and spirit, and must be approved by said Judge William C. Hook or his successor in office before it can be adopted and put into operation.

"It shall be organized with eleven directors. Kansas City, Mo., shall select in the manner hereinafter provided three of such directors, and Kansas City, Kan., shall have the right to select two. The number of directors shall not at any time be changed without the consent by ordinance of the city first being obtained.

"No person so designated by either city shall be eligible to serve if he, either as principal or agent, has any direct or indirect financial interest or motive in the business of the company. If at any time he has any interest his right to the office shall forthwith cease.

"The board of directors shall not have the authority to delegate its power to any executive or managing committee of the company without the unanimous consent of the city's directors as to the organization and formation of such committee.

"The city hereby designates — and — as the persons to be elected by the company for and in behalf of the city as directors to be elected and re-elected by the company as such directors for a period of two, four and six years respectively. Said persons shall serve as such directors until their successors have been designated, elected and qualified as hereinafter provided.

"The successors are to be chosen by the Kansas City Court of Appeals from a list of five names for each place submitted by the mayor."

Subsequent conferences were concerned principally with matters of detail. It was agreed that the franchise should be for a period of thirty years and become operative immediately after the ratification of the franchise by the people. As to street paving, grading and other physical matters the receivers practically agreed to pave between the tracks and 18 in. outside. Failure to pave or keep the pavement in repair justifies the city in having the work done and charging the cost up to the company.

For three years the company is required to spend \$1,000,000 a year from the capital account in rehabilitation of the system, general improvements and the building of extensions. It must also build 2 miles of double track, or 4 miles of single track extensions and additions every year for three years, when the board of control certifies to the Council the necessity for them and certifies that the extensions or additions will net 6 per cent of the cost of operation.

Some difficulty has arisen in the conferences on account

of differences between the two Kansas Cities. The Kansas City, Kan., officials desire immediate improvement of service and extensions of lines, instead of provisions for amortization and future financing, and have withdrawn from the conferences. This will necessitate separate negotiations with this city in due time.

The next question of importance to be decided in Kansas City, Mo., is that dealing with a board of control to have charge of the physical operations of the new company. Mayor Jost asks that he be permitted to appoint one member, the company one, the third to be appointed by the Kansas City Court of Appeals. The receivers prefer that the third member of the board be named by the Missouri Utilities Commission, and there may be a compromise by empowering the chairman of the commission to confer with the Court of Appeals in the selection.

Increase in Railway Tax Valuations in Ohio

The valuation placed on the street, suburban and inter-urban railways by the State Tax Commission of Ohio for this year is \$143,075,690, compared with \$136,137,135 for 1912. Nearly half of the increase is on the property of the Cleveland Railway. The increase on the property of the Cincinnati Traction Company was only \$19,000. There was only a small increase in the valuation of the property of the Ohio Electric Railway. The valuations placed on the property of some of the principal companies compare as follows with the valuations for the previous year:

Name of Company	1912	1913
Cincinnati Traction Co.	\$18,516,420	\$18,535,630
Cincinnati & Columbus Traction Co.	511,580	499,760
City Railway (Dayton)	2,685,740	2,886,600
Cleveland, Painesville & Eastern R. R.	1,601,450	1,684,930
Cleveland & Eastern Traction Co.	664,130	670,400
Cleveland, Painesville & Ashtabula R. R.	471,850	475,770
Cleveland, Southwestern & Columbus Ry.	4,234,070	4,257,220
Cleveland Ry.	19,854,850	22,124,180
Columbus, Delaware & Marion R. R.	1,273,130	1,514,350
Columbus Railway & Light Co.	11,871,130	11,911,140
Dayton, Covington & Piqua Traction Co.	485,360	539,760
East Liverpool Traction & Light Co.	1,675,000	1,699,150
Interurban Railway & Terminal Co.	828,210	828,210
Lake Shore Electric Ry.	4,514,920	4,590,850
Lorain Street R. R.	790,850	824,240
Mahoning Valley Railway Co.	2,790,750	2,850,950
Mansfield Railway, Light & Power Co.	864,110	872,240
Northern Ohio Traction & Light Co.	10,959,830	12,742,760
Oakwood Street Ry.	403,320	403,320
Ohio Electric Ry.	13,316,550	13,567,440
People's Ry.	1,593,040	1,597,090
Portsmouth Street Railway & Light Co.	852,130	896,250
Scioto Valley Traction Co.	1,663,300	1,764,060
Springfield Ry.	936,220	939,020
Stark Electric R.R.	1,198,790	1,211,010
Steuben & East Liverpool Traction & Light Co.	1,243,470	1,277,710
Steuben & Wheeling Traction Co.	405,930	412,380
Toledo, Fostoria & Findlay R. R.	805,590	816,250
Toledo & Indiana R. R.	896,650	931,780
Toledo Rys. & Light Co.	8,117,950	8,617,450
Toledo & Western R. R. Co.	918,790	944,520
Toledo, Bowling Green & Southern Traction...	1,515,140	1,525,430
Western Ohio R. R.	2,460,300	2,558,160
Wheeling Traction Co.	1,028,380	1,102,450
Totals	\$136,137,135	\$143,075,690
1913 valuation		\$143,075,690
1912 valuation		136,137,135
Increase over 1912		\$6,938,555

Illinois Commission Revises Overhead Power Line Crossing Rules

The Illinois Railroad & Warehouse Commission as a result of hearings on fourteen petitions, five coming from the Aurora, Elgin & Chicago Railroad and nine from the Chicago, Milwaukee & St. Paul Railway, a steam railroad, to cross other steam roads with overhead high-tension transmission lines, has decided to revise its rules governing the installation of telegraph, telephone and power lines over the right-of-way of railroad companies. The revised rules will conform to the specifications adopted by the joint committees for overhead crossings of light power lines. The Aurora, Elgin & Chicago Railroad, in filing its petitions, claimed that it had conformed to the specifications adopted by the joint committee for overhead crossings of light and power lines and had provided an overhead clearance of 30 ft. The rules of the Illinois Railroad & Warehouse Commission for overhead line crossings provide for an overhead clearance of 35 ft. On Sept. 4, the members of the commission heard the appeal of the companies and agreed to issue

an order for each of the fourteen crossings if both the Aurora, Elgin & Chicago Railroad and the Chicago, Milwaukee & St. Paul Railway conformed to the joint specifications. The engineers for the Railroad & Warehouse Commission will begin at once to revise these rules, using as a basis the specifications adopted the joint committee.

The Boston Arbitration Hearings

The duties and working conditions of power station employees and substation attendants occupied a large share of the attention of the arbitration board sitting in the Boston Elevated Railway labor investigation during the week ended Sept. 20. Additional data were presented by the company upon the ruling of the board in relation to the salaries of subordinate officials. J. Henry Neal, general auditor, stated that the accounts of the company are kept according to the Interstate Commerce Commission's classification; that all salaried officials are required to sign receipts for their compensation, and that all vouchers and payrolls are kept for six years. Fred S. Freeman, superintendent of power, reviewed the working conditions in generating plants and substations. At the main 45,000-kva alternating current generating station in South Boston there are three chief operators and three switchboard operators. The latter work eight hours daily, but are allowed one day off per month without loss of pay. These men receive a vacation in the summer. Each substation on the system is in charge of a foreman who is responsible for its operation and maintenance. The usual hours of such employees are daily from 9 a. m. to 12 noon and from 1 to 6 p. m. In steam generating stations of the direct-current type the switchboard operator is in charge of the regulation of voltage and load on the different machines, putting machines on the line, withdrawing them, handling circuit-breakers, reading meters and looking after switchboard connections. The evidence presented did not indicate hardship in the working conditions of employees in electric plants, although an effort was made by the counsel for the men to show that these working conditions are unusually hazardous. In a representative substation the foreman receives \$21 per week, and under him are three operators paid \$18 in one case and \$16 in the others. Rubber gloves are furnished men engaged in switchboard work. Mr. Freeman said that in his opinion the work at the South Boston main plant switchboard was no more difficult than at a substation, except that the responsibility was greater in the former case. Oilers are paid from \$14 to \$16 per week. The work of these employees was stated by Mr. Freeman to be substantially uniform at all stations. Inspections of the lubrication conditions are made in representative plants every twenty minutes upon the sound of a gong. Mr. Freeman stated that a green man should become a good fireman in six months, if at all, and that in two months a man should become a competent oiler. About 350 men are employed under the superintendent of power.

The irregular conditions accompanying the unloading of coal from vessels were described, and it was stated that when a barge arrives at a plant the unloading of fuel is continuous until the work has been completed. This usually requires eighteen to twenty hours, but sometimes thirty-six hours. Conveyor men are allowed "time-and-a-half" pay for overtime work. Bonus systems are in use for stevedores, hatchmen and tower engineers. Trimmers are paid 25 cents an hour without bonus opportunities. The rate of pay for coal-hoisting engineers is \$20 a week for seven days' work, but by their own volition they usually work only six days out of seven, earning \$17.10. Boiler-room repair men are paid as a rule from \$12 to \$14 a week. Feed-pump operators are now standardized at \$14 a week. Watchmen are paid \$14 a week and work eighty-four hours, while janitors and cleaners work sixty hours a week at from \$10 to \$13.30. The point was brought out that when the company's coal-handling force was reduced it was the result of improvements in coal-handling machinery which doubled the efficiency of the individual employee. Thus far the company has never had a serious accident in any of its power stations. In illustrating the bonus system which applies to the discharge of fuel it was stated that if a vessel of 1700 tons' capacity discharged in twenty-four hours instead of the standard allowance of thirty-six hours there would be

a bonus of \$45, of which the foreman in charge receives 20 per cent and the hatchmen and hoisting engineers divide the balance according to the number of hours each man has worked. The company retains half the bonus on any saving in cost. It was shown by Mr. Freeman that although long hours are frequently required in coal unloading, a hoisting engineer sometimes earns no less than \$65 in a week through the arrival of two boats, overtime, bonuses and regular pay. The machinery operated by the hoisting engineer is mainly of the automatic type. A hoisting engineer's pay for several weeks was as follows: Worked seventy-five and a half hours, paid \$47.20; worked eighty-four hours, paid \$65.85; worked sixty-three hours, paid \$66.04; worked seventy-two and a quarter hours, with no bonus, paid \$23.89; worked fifty-four and a half hours, with bonus of \$21.56, paid total of \$39.26. The engineer stated on the stand that he preferred a fixed rate of pay to the bonus system.

Report of the New York Railways Association

The following statement of receipts and disbursements of the New York Railways Association for the year ended June 30, 1913, was published in the annual report of the New York Railways:

RECEIPTS	
Dues	\$25,939
Initiation fees	2,809
Pool rooms	2,627
Entertainments	5,812
Interest on investments and deposits	2,273
Miscellaneous	397
Total receipts.....	\$39,857
DISBURSEMENTS	
Sick benefits	\$17,758
Death claims	13,186
Medical fees	4,649
Pool rooms	1,466
Stationery and printing	1,211
Entertainments	1,053
Miscellaneous	55
Total disbursements	\$39,375
Cash on hand:	
June 30, 1913.....	\$6,262
July 1, 1912	5,780
Excess—Cash surplus.....	\$482
Total	\$39,857

According to a statement of the lunchroom fund for the year ended June 30, 1913, the donation of rentals for the lunchroom, the equipment replacements, deposits and the interest on deposits make up total receipts of \$7,057, from which disbursements were made to the extent of \$500 advanced to the loan fund account on July 11, 1912, and \$71 for equipment replacements, leaving a balance on hand July 1, 1913, of \$6,486, the balance on hand July 1, 1912, of \$3,688 being included.

The loan fund account for the year ended June 30, 1913, shows the following: The amount advanced from the lunchroom fund, \$1,500; amount of unpaid loans, \$927, and 226 loans made during the year to employees who, on account of disability or sickness in their families, were in temporary financial distress, \$3,640. Payments on account of the above loans have been made to the extent of \$3,940, leaving a balance on hand in the loan fund account of \$874. Under the pension system of the company the total pensions paid during the year ended June 30, 1913, amounted to \$7,473. The number of pensions granted during the year was ten and the number of pensions terminated by death during the year was two. A report of the New York Railways Association for the year ended Sept. 19, 1912, was published in the ELECTRIC RAILWAY JOURNAL of Jan. 25, 1913.

Chicago City Council Again Considers Subway

A sub-committee of the local transportation committee of the Chicago City Council again took up the question of subway systems for the city of Chicago at a meeting held on Sept. 10. At this conference members of this sub-committee and representatives from the corporation counsel's office and the elevated railways discussed the new plan presented in a communication of Mayor Harrison to the Council, in which he recommended that the question of the construction of subways be submitted to a referendum vote. The communication contained two ordinances, one for downtown subways to be leased to the elevated rail-

ways, and another for a comprehensive independent system of rapid transit subways. The purpose of the meeting of the sub-committee was to review the two ordinances and obtain a statement of terms and conditions upon which the subway could be leased by the city to the elevated railways. The representatives of the elevated railways agreed to submit terms under which a lease could be accepted from the city. The sub-committee cannot complete its work and submit the ordinances to the local transportation committee until the companies' reply has been received.

Through Routes and Interchange of Transfers in Chicago

Acceptance by the Chicago & Oak Park Elevated Railroad of the Council ordinance of July 28 was authorized in an order filed in the United States District Court at Chicago on Sept. 6 by Federal Judge Christian C. Kohlsaat. This ordinance relates to the through routing of north and south side elevated trains, and the interchange of transfers by the four elevated systems.

In his order Judge Kohlsaat directed Samuel Insull, receiver for the Chicago & Oak Park Elevated Railroad, to file with the city clerk his acceptance of the ordinance. The receiver was further authorized to do all the work that the ordinance provided should be done by the elevated road and to carry out all the provisions of the ordinance.

To meet the expense that will be incurred in the change provided by the ordinance Mr. Insull was authorized by Judge Kohlsaat to issue receiver's certificates and from the sale of these provide funds for the improvements in the road's structure.

As affecting peculiarly the Chicago & Oak Park Elevated Railroad the ordinance says a third track shall be constructed on the structure between North Crawford Avenue and North Feramie Avenue, and a third track between North Rockwell Street and North Ashland Avenue. Improvements that will affect all the elevated systems will be made as provided in the ordinance in the "loop" district, where various stations will be increased over their present length by from 6 ft. to 350 ft.

New Officers of the Massachusetts Street Railway Association

At the annual meeting of the Massachusetts Street Railway Association held at Young's Hotel, Boston, Mass., on Sept. 10, 1913, officers were elected as follows for the ensuing year: President, H. H. Crapo; first vice-president, W. W. Sargent; second vice-president, D. A. Belden; secretary, Charles S. Clark; treasurer, Frederick H. Smith; executive committee, H. H. Crapo, president of the Union Street Railway and the New Bedford & Onset Street Railway, New Bedford; W. W. Sargent, president and general manager of the Fitchburg & Leominster Street Railway, Fitchburg; D. A. Belden, president of the New Hampshire Electric Railways, Haverhill; Francis H. Dewey, president of the Worcester (Mass.) Consolidated Street Railway; Robert S. Goff, vice-president and general manager of the Bay State Street Railway, Boston; P. F. Sullivan, president of the Bay State Street Railway, Boston; J. T. Harmer, president of the New England Investment & Security Company, Springfield; J. L. Richards, president of the Middlesex & Boston Street Railway, Newtonville.

Bill to Compel Installation of Block Signals.—Representative Esch has reintroduced in the House of Representatives his bill intended to require the use of the block system by common carriers engaged in interstate commerce. A similar bill was introduced by Mr. Esch last April.

Collision Near Massillon, Ohio.—More than a score of persons were injured on the evening of Sept. 10, when two cars of the Northern Ohio Traction & Light Company, running between Massillon and Canton, Ohio, collided head-on on a curve 4 miles east of Massillon.

Decision in Paving Suit in Kentucky.—The circuit court at Winchester, Ky., has decided that the Kentucky Traction & Terminal Company, Lexington, which operates in Winchester, must pay the cost of paving the street within its tracks and 18 in. outside. The company will appeal the decision.

Complaint in Regard to Violation of Labor Law Dismissed.—The complaint made by one of the inspectors of the Department of Labor of the State of New York against the officials of the Brooklyn Rapid Transit Company, to the effect that the company was violating the labor law, was dismissed by Magistrate Nash in the Adams Street court on Sept. 15.

Effort to Revive Plan to Build Municipal Line in Tacoma.—The construction of a municipal electric railway from the heart of the business district of Tacoma, Wash., to the manufacturing sites on the tide flats is being agitated again. Late last fall the proposition carried at the election, but the proposed bond issue to build the line was voted down. According to City Engineer Raleigh the question of issuing bonds to provide funds to construct the line will be submitted to the voters at the November election.

San Francisco Supervisors Pass Railway Bond Issue.—The Supervisors of San Francisco, Cal., have passed to print the ordinance providing for the issuance of \$3,500,000 of 5 per cent bonds to provide for the extension of the municipal railway system on Van Ness and Potrero Avenues, Stockton, Eleventh, Church, California and other streets. Two accompanying resolutions were adopted, one formally declaring the result of the late bond election, the other requesting the city attorney to solicit offers from the Presidio & Ferries Railway for the sale of such of its property to the city as might be useful in the carrying out of the proposed extension plans.

Lehigh & New England Railroad Investigating Advisability of Electrification.—The report published in the daily papers to the effect that the Lehigh & New England Railroad, South Bethlehem, Pa., contemplates electrifying its lines in the anthracite region has no foundation in fact. The company has considered the subject of electrification in a general way and is investigating the advisability of electrifying some of its railroad tracks around the mines in the Panther Creek Valley, with the idea of using power to be generated at the plant of the Navigation Electric Company now in course of erection at Hauto, Pa., but nothing has definitely been decided.

Report on Earnings of Canadian Line Under Electrification.—Thomas Marshall, traffic expert of the Toronto (Ont.) Board of Trade, who was engaged by the City Council of London, Ont., to report on the probable earnings of the London & Port Stanley Railway, owned by the city, if the line were electrified, estimates that the second year after the motive power of the road has been changed from steam to electricity the gross earnings will be \$202,000, as follows: passenger revenue, \$80,000; freight revenue, \$95,000; trackage and terminal rights, \$20,000; express, mails, etc., \$7,000. Last year the passenger earnings were only \$32,000. The people are to vote on the question of electrification early in October.

Tunnel Plans Being Considered in Providence.—In connection with the proposed underground system for Providence, R. I., tentative plans for the construction of two new tunnels have been presented to the subway committee of the City Council by William W. Lewis, its consulting engineer. Among the exhibits was a drawing which showed a subway running east and west, with terminals at the Red Bridge and Olneyville, and a north and south tube connecting the North Burial Ground section with Trinity Square. The two bores are to cross each other in the business district. The committee has passed a resolution asking for an additional appropriation of \$5,000 to carry on the preliminary studies and make surveys before a full report on the proposed tunnels is presented.

Jurisdiction of Ohio Commission Questioned.—The Northern Ohio Traction & Light Company, Akron, Ohio, in answering a petition filed with the Public Service Commission has denied that the commission has jurisdiction over its lines. Two weeks ago a petition was filed with the commission in which complaint was made against the company to the effect that passenger service which had been operated through property of the complainant near Akron had been diverted to another line and that it was impossible for the complainant to secure adequate service. It was charged that when the franchise was granted to the company it was to operate on a certain schedule

through the property of the plaintiff. In its answer the company says that it has changed its route to avoid dangerous curves and to shorten the line between Akron and Cleveland.

Petition to Intervene Denied.—The Public Service Commission of the Second District of New York has denied the application of the International Railway, of Buffalo, to intervene in the matter of the complaint of Louis P. Fuhrmann, as Mayor of Buffalo, against the Cataract Power & Conduit Company, upon which complaint the commission entered an order on April 2 whereby certain rates and charges for electricity were fixed for the power company. The International Railway, in its petition, asked that it be allowed to intervene in the proceedings and make necessary proof of the facts concerning a contract existing between it and the power company and that the company be enjoined from charging or receiving from the International Railway any greater compensation for services than it charges and receives from any other consumer receiving like service.

Increase in Wages in Manchester.—The Manchester Traction, Light & Power Company, Manchester, N. H., has increased the wages of the motormen and conductors in its employ. The new scale went into effect on Sept. 15. The notice to the employees informing them of the increase is concluded with the following reference to the wages as advanced: "Regular men will receive a minimum of 26 cents and a maximum of 29½ cents an hour on the following scale: Eight-hour men, 29½ cents an hour; eight and one-fourth hour men, 28 3-11 cents an hour; eight and one-half hour men, 27 8-17 cents an hour; eight and three-fourths hour men, 26 5-7 cents an hour; nine-hour men, 26 cents an hour. Extra men will receive a minimum of 23 cents and a maximum of 26 cents an hour on the following scale: First year, 23 cents an hour; second year, 24 cents an hour; third year, 25 cents an hour; fourth year, 26 cents an hour.

Salaries of Officials No Criterion.—In its issue of Sept. 13, 1913, *Truth*, published in Boston, said in part in referring to the subject of salaries paid to the officers of the Boston (Mass.) Elevated Railway: "The question of salaries paid to the officers of the Boston Elevated Railway never should have been permitted to enter into the present wage controversy. The Boston Elevated Railway does not pay its president \$36,000 a year and other officials from \$4,000 to \$15,000 because it wants to, but because it has to. If it wants men of ability and experience, who will keep the road up to the standard of efficiency, it must pay the price. Ability, especially executive ability, comes high. Should the officials of the Boston Elevated Railway leave their present positions, they would probably be snapped up by other railway companies at higher salaries than they are now getting. Of how many conductors or motormen would the same be true?"

More Rapid Transit Construction Bids in New York.—Bids for the construction of Section No. 2 of the Seventh Avenue subway in Manhattan will be received by the Public Service Commission for the First District at 12.15 p. m. on Oct. 1. This is the first construction contract on the Seventh Avenue extension of the existing subway to be submitted to bidders. This extension leaves the present subway at Times Square and runs down Seventh Avenue and Varick Street, West Broadway, Park Place, Beekman Street, William Street and Old Slip, to and under the East River to a connection with the present subway in Brooklyn. There will also be a two-track extension from Park Place south to the Battery. North of Park Place the road will be a four-track line. When completed the extension will be operated under the dual system contracts by the Interborough Rapid Transit Company. Section 2 is under Greenwich Street, West Broadway and Park Place.

Ruling in Regard to Free Transportation in Indiana.—On Sept. 13 the Public Utility Commission of Indiana entered an order providing that the blind may not ride free of charge on street cars in cities in Indiana hereafter. The order of the commission was entered on a petition from residents of Terre Haute calling the attention of the commission to the practice of the company in Terre Haute of allowing blind persons to ride free on the street cars. The railway tracks and crossings at grade in that city are so numerous that it is exceedingly dangerous for blind per-

sons to travel from one part of the city to another except on the street cars. The petitioners asked that the commission interpret the public utilities act passed at the 1913 session of the Indiana Legislature. The order of the commission states that the term "blind," as used in the petition, evidently referred to a class of citizens and not to a body of inmates of any "eleemosynary or charitable institution," free transportation being allowed to the latter under the utilities act. "The blind cannot be included in the class of destitute or homeless persons," the order said in denying the petition. "The purpose of the Legislature is to prevent public utilities for any purpose from extending gratuities in the way of service or commodity at the expense of the patrons who pay for their service."

Newark Franchises Considered.—The last of the applications made by the Public Service Railway, Newark, N. J., for franchises in connection with the proposed terminal were considered by the Board of Works of Newark on Sept. 11. Seven more franchises were granted by passing the third and final reading, while six others were passed on first and second reading. The agreement between the city and the company was also put through in ordinance form on first and second reading. The franchises finally granted, which must be accepted by the company within twenty days, are for the elevated structure over Pine Street, the High and Warren Street connection, Fourth Avenue extension, Bowery Street, Chapel Street and Ferry Street connections, single track in Green Street, single track in Lafayette Street and the Wolcott Terrace "Y." It is not considered likely that final action will be taken on the other six franchises and the ordinance of agreement for two weeks. These are for the subway running from Halsey Street to Park Place, the Washington Street connection to the entrance to the subway on private property, the Mulberry Street connection with the elevated structure on private property, double curves at Market and Mulberry Streets, second track in High Street from Springfield Avenue north to Market Street, and the Market Street gas works extension consisting of a single track from Market Street east and west into Madison Place and Jersey Street.

PROGRAMS OF ASSOCIATION MEETINGS

Railway Signal Association

The annual meeting of the Railway Signal Association will be held at the Hotel Hermitage, Nashville, Tenn., Oct. 14-17. Reports will be presented on the following subjects: "Signaling Practice," "Mechanical Interlocking," "Power Interlocking," "Automatic Block," "Manual Block," "Standard Designs," "Subjects and Definitions," "Electric Railways and A.-C. Signaling," "Wires and Cables," "Storage Battery and Charging Equipment," "Method of Recording Signal Performance," "Special Committee of the Board of Direction," and "State of Signaling in the Northwest."

Kansas Gas, Water, Electric Light & Street Railway Association

The Kansas Gas, Water, Electric Light & Street Railway Association will hold its sixteenth annual convention at Hutchinson on Oct. 9, 10 and 11. The morning of Oct. 9 will be taken up with the registration of members. Following the address of the president, L. O. Ripley, Wichita, the following papers will be presented:

Paper, "The Cost of Distribution Versus Cost of Production," by J. R. Murphy, manager of the Hoisington Electric & Ice Company.

Paper, "The Relation of the Load-Factor to the Net Revenue of the Average Kansas Central Station," by F. F. Rossman, of the Westinghouse Electric & Manufacturing Company, Kansas City, Mo.

Paper, "Pumping Water for Municipalities," by M. Duns-worth, manager of the Emporia Railway & Light Company.

Paper, "Treatment of Poles," by F. B. Uhrig, district manager of the Western Electric Company, Kansas City, Mo.

In the evening P. Lloyd Lewis, of the Wagner Electric Manufacturing Company, Kansas City, Mo., will explain the work of the Jovian Order.

Financial and Corporate

Stock and Money Markets

Sept. 17, 1913.

In the trading on the New York Stock Exchange to-day advances were reported in a number of issues, but the general tendency was to lower levels. The tone throughout was heavy. Reading was the feature. Price movements were extremely variable, and the net result was to establish the majority of issues on fractionally lower levels. Rates in the money market to-day were: Call, 2½ @ 3¼ per cent; sixty days, 4½ @ 4¾ per cent; ninety days, 4¾ @ 5 per cent; four months, 4¾ @ 5¼ per cent; five and six months, 5 per cent.

In the Philadelphia market to-day Reading and Cambria Steel were the strong features at the opening. In general the list ruled quiet.

In the Chicago stock market to-day lower levels were established. Bonds were fairly active and steady.

After firmness in the early dealings in Boston to-day a heavy tone developed and recessions followed.

The trading in stocks on the Baltimore exchange was broader to-day, but the volume of transactions was small. The demand for bonds was good.

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

	Sept. 10	Sept. 17
American Brake Shoe & Foundry (common).....	91 7/8	92
American Brake Shoe & Foundry (preferred).....	132 1/8	133 7/8
American Cities Company (common).....	36	37
American Cities Company (preferred).....	63	65
American Light & Traction Company (common)....	345	354
American Light & Traction Company (preferred)....	105	105
American Railways Company.....	38 3/8	39 3/8
Aurora, Elgin & Chicago Railroad (common).....	41 1/2	41 1/4
Aurora, Elgin & Chicago Railroad (preferred).....	82	83
Boston Elevated Railway.....	87	88
Boston Suburban Electric Companies (common)....	7	7
Boston Suburban Electric Companies (preferred)....	56 1/2	56 1/2
Boston & Worcester Electric Companies (common)....	a10	a10
Boston & Worcester Electric Companies (preferred)....	42	43
Brooklyn Rapid Transit Company.....	88 3/4	89 1/4
Capital Traction Company, Washington.....	116 1/2	a116 1/4
Chicago City Railway.....	160	160
Chicago Elevated Railways (common).....	25	25
Chicago Elevated Railways (preferred).....	75	75
Chicago Railways, pteptg., ctf. 1.....	90 1/2	91 1/2
Chicago Railways, pteptg., ctf. 2.....	31	29
Chicago Railways, pteptg., ctf. 3.....	8 1/2	8
Chicago Railways, pteptg., ctf. 4.....	2 3/4	3
Cincinnati Street Railway.....	a110	103
Cleveland Railway.....	103 3/4	101
Cleveland, Southwestern & Columbus Ry. (common)...	5 1/2	5 1/2
Cleveland, Southwestern & Columbus Ry. (preferred)...	28 1/4	28 1/4
Columbus Railway & Light Company.....	18	18
Columbus Railway (common).....	a69 1/2	a69 1/2
Columbus Railway (preferred).....	88	88
Denver & Northwestern Railway.....	104	104
Detroit United Railway.....	70	69
General Electric Company.....	144	147
Georgia Railway & Electric Company (common)....	116 1/2	117
Georgia Railway & Electric Company (preferred)....	83 1/2	86
Interborough Metropolitan Company (common)....	15 7/8	15 5/8
Interborough Metropolitan Company (preferred)....	62 1/2	61
International Traction Company (common).....	30	30
International Traction Company (preferred).....	a95	95
Kansas City Railway & Light Company (common)....	20	20
Kansas City Railway & Light Company (preferred)....	30	30
Lake Shore Electric Railway (common).....	5	5
Lake Shore Electric Railway (1st preferred).....	89	89
Lake Shore Electric Railway (2d preferred).....	24	24
Manhattan Railway.....	130	129
Massachusetts Electric Companies (common).....	14	14
Massachusetts Electric Companies (preferred).....	69	68
Milwaukee Electric Railway & Light Co. (preferred)...	95	95
Norfolk Railway & Light Company.....	27 1/2	27 1/2
North American Company.....	72 3/4	75
Northern Ohio Light & Traction Company (common)...	63	65
Northern Ohio Light & Traction Company (preferred)...	100	100
Philadelphia Company, Pittsburgh (common).....	44	44
Philadelphia Company, Pittsburgh (preferred).....	40	40
Philadelphia Rapid Transit Company.....	23	23
Portland Railway, Light & Power Company.....	55	55
Public Service Corporation.....	109	114
Third Avenue Railway, New York.....	38 5/8	40 5/8
Toledo Traction Light & Power Company (common)...	a30	a30
Toledo Traction, Light & Power Company (preferred)...	a80	a80
Twin City Rapid Transit Co., Minneapolis (common)...	107	107 1/2
Union Traction Company of Indiana (common).....	5	*5
Union Traction Company of Indiana (1st preferred)...	80	*80
Union Traction Company of Indiana (2d preferred)...	20	*20
United Rys. & Electric Company (Baltimore).....	26 7/8	27
United Rys. Inv. Company (common).....	22	19
United Rys. Inv. Company (preferred).....	40	39
Virginia Railway & Power Company (common).....	52	52
Virginia Railway & Power Company (preferred).....	92	93
Washington Ry & Electric Company (common).....	89 1/2	89
Washington Ry. & Electric Company (preferred).....	87 3/4	89
West End Street Railway, Boston (common).....	72	72
West End Street Railway, Boston (preferred).....	88	88
Westinghouse Elec. & Mfg. Company.....	72 1/2	72
Westinghouse Elec. & Mfg. Company (1st preferred)...	114	114

* Last sale. a Asked.

ANNUAL REPORTS

New York Railways

The statement of income, profit and loss of the New York (N. Y.) Railways for the fiscal year ended June 30, 1913, follows:

Operating Income:			
Revenue from transportation:			
Passenger revenue.....		\$13,605,852	
Other street railway operating revenue:			
Advertising	\$300,000		
Rent of equipment	8,952		
Rent of tracks and terminals.....	12,156		
Sale of power.....	133,734		
Miscellaneous revenue—rent of buildings and other property.....	4,464	459,306	
Total revenue from street railway operations..... \$14,065,158			
Street railway operating expenses:			
Maintenance of way and structures.....	\$1,216,759		
Maintenance of equipment.....	966,564		
Horse-power—revenue car service.....	183,274		
Operation of power plant.....	748,421		
Operation of cars.....	3,456,387		
Injuries to persons and property—deferred....	424,633		
Injuries to persons and property—expended..	663,835		
General and miscellaneous expenses.....	486,379		
Total			
Taxes assignable to street railway operations..	1,169,896	9,316,148	
Income from street railway operations..... \$4,749,010			
Non-operating Income:			
Dividends on securities owned.....	\$212,000		
Interest revenue.....	76,832		
Miscellaneous rent revenue (net)—real estate department.....	127,769	\$416,601	
Non-operating revenue reductions:			
Net loss from direct operation employees' stores	6,571	410,030	
Gross Income..... \$5,159,040			
Deductions from Gross Income:			
Interest on funded debt:			
On underlying mortgage bonds.....	\$492,500		
Interest on unfunded debt:			
Real estate mortgage.....	\$42,750		
Bills payable.....	35,584		
Miscellaneous	227	78,561	
Rent for leased roads.....	1,885,152		
Rent under operating agreement.....	50,000		
Track and terminal privileges.....	53,984		
Rent of land and buildings.....	134,517		
Amortization of debt, discount and expense....	841	2,695,555	
Net income available for interest or other additional charges..... \$2,463,485			
Deduct:			
Interest on first real estate and refunding mortgage 4 per cent gold bonds.....	\$651,838		
Interest on adjustment mortgage 5 per cent income gold bonds.....	1,190,164	1,842,002	
*Net Income Surplus..... \$621,483			

*The above surplus includes the reserve imposed upon the company by the order of the Public Service Commission now in litigation.

Comparing the income statement with the corresponding period of last year (six months of which were under receivers' operation) the revenue from transportation shows an increase of \$407,831; other operating revenue a decrease of \$46,389, resulting in a net increase in gross earnings of \$361,442. The operating expenses show a decrease of \$97,345, and taxes, \$21,205, resulting in an increase in income from operation of \$479,992, which, with an increase in non-operating income of \$116,723 and with due allowance for the variation of \$106,000 of dividends not included during the receivership period (for the six months ended Dec. 31, 1911), makes a total improvement in gross income of \$490,715.

There has been expended for maintenance of track and roadway, electric line, buildings and structures, etc., \$1,216,759, and for the maintenance of equipment, power plant, cars, etc., \$966,564. The extraordinary charges for improvements and replacements, included in the operating expenses, amount to \$582,158. An amount equivalent to 8 per cent of the gross passenger revenue has been set aside for injury and damage claims and expenses of litigation.

T. P. Shonts, president of the company, says in part: "The full amount assignable for the year's taxes has been accrued or paid. A favorable decision is anticipated on amounts in litigation, which, if received, will contribute a considerable refund to the credit of the income account.

"Considerable progress has been made during the past year in the final adjustment of receivership matters, and many intricate questions have been settled. Recently a number of further questions have been presented to the court, and when decisions are rendered the litigation should

be speedily concluded. It is impossible at this time to make any accurate estimate as to what amount the company will ultimately receive from the funds in the hands of the receivers.

"A petition and order for a writ of certiorari were taken out on the question of setting up for maintenance and depreciation a reserve of 20 per cent of the gross operating revenue, and the writ was allowed on April 17, 1913. The Public Service Commission has not as yet made a return to the writ. In all probability the writ will be presented to the court and a decision received before the first of the year. In case the company is sustained, so much of the 20 per cent as the board of directors may deem to be unreasonable will be credited to net income available for interest on the company's bonds.

"The \$600,000 face value of the Metropolitan Crosstown Railway first mortgage 5 per cent bonds (being the entire issue) have all been acquired and are at present carried in a loan. This debt, being part of the original cost of the property, can be extinguished either by the issue of 4 per cent bonds, the use of cash now in the hands of the trustee or from the proceeds of real estate sales.

"In order to establish a uniform rate of pay properly graduated over a period of five years, a general increase in wages was granted to all motormen, conductors, inspectors, starters, flagmen, switchmen, carhouse helpers, etc. This became effective as of Feb. 2, 1913, and increased the company's payrolls approximately \$106,000 per annum.

"The company has a special cash fund of approximately \$554,000 received from the joint committee on reorganization which was contributed as a part of the working capital of the company.

"The company has cash in bank amounting to approximately \$1,800,000, not including cash in the hands of the trustee and bills receivable representing loans to the city of New York amounting to \$1,000,000."

According to the report the amount paid on the \$30,626,977 of thirty-year adjustment mortgage 5 per cent income bonds for the first six months of the calendar year 1912 was 0.771 per cent. For the second six months the amount paid was 2.25 per cent, making a total of 3.02 per cent for the year. For the fiscal year ended June 30, 1913, 3.88 per cent was paid. The payment for the first six months of the calendar year 1913 will be 1.636 per cent, an increase of 0.112 per cent over the corresponding period of 1912. The last months of this year will be compared with the last six months of last year, for which period 2.25 per cent was paid.

The following decreases were made in the capitalization of the company owing to adjustments with the reorganization committee: \$4,940 of capital stock, \$3,220 of thirty-year first real estate and refunding mortgage 4 per cent gold bonds, and \$2,200 of the 5 per cent income bonds mentioned above. The report contains a detailed list of all the real estate, buildings and railroad leases that secure the bond issues of the company.

The \$1,543,375 principal and interest which was derived from the foreclosure of \$1,200,000 of first mortgage bonds of the Central Park, North & East River Railroad, not formerly included as collateral to the New York Railways mortgages, has been deposited as additional collateral with the Guaranty Trust Company, trustee of the first and refunding mortgage of the company. Under the provisions of the mortgage, however, this sum may be invested in improvements upon the property.

One of the principal features of this year's report is the large expenditure for improvements made and authorized during the year, approximating \$2,500,000. According to the report, some of these, outside of track and grading improvements, are as follows:

"In various carhouses an automatic system has been installed for the purpose of cutting off the electrical current from tracks on which cars are stored, with the double object of reducing the fire hazard and of preventing waste of electrical current.

"Additional instruments have been installed and other improvements made in the private telephone system of the company in order to facilitate communication between different departments and to improve the effectiveness of the organization.

"The purchase of 815 fare boxes has been authorized for

installation on the cars, as experience has demonstrated that these are effective devices for conserving the company's revenue.

"Vestibules and side doors have been placed on sixty-nine snow-sweeping cars for the better protection of the men engaged in the operation of this equipment.

"Vestibules have also been placed on twenty-four of the conduit scraper cars for the greater comfort of the men operating the equipment.

"A chain device has been installed on fenders which sometimes become broken through contact with obstructions on the street. The use of the chain will make it possible to hold up the fender thus disabled and prevent serious interference with operation which would otherwise result.

"Authority has been granted for the installation of seats for motormen on 556 pay-as-you-enter cars. This is in line with the general policy of the company to improve the service by taking such action as will promote the comfort and convenience of its employees.

"The test of an electric emergency wagon has demonstrated the superiority of such a vehicle over the horse-drawn wagons, and accordingly additional electric wagons of this character have been ordered and will be placed in service in the near future.

"A thorough study of the general system of trucking has been made, and it is apparent that the needs of the company in this connection can be much more satisfactorily cared for at less expense than heretofore by the use of automobile trucks in place of horse trucks. Orders for the necessary equipment have been placed and the new vehicles are nearly completed.

"Twenty-five stepless cars were authorized by the board of directors to be purchased, in addition to the 150 cars authorized prior to July 1, 1912, making a total of 175 cars now in process of construction.

"Forty-five storage battery cars are now being built and the necessary equipment for a storage battery charging plant has been ordered. It is expected that these cars will be placed in operation some time this fall.

"Additional feeders have been installed on a number of lines for the better regulation of the service, and a readjustment of the entire feeder system is now under way in order that the power may be supplied in a more economical, reliable and satisfactory manner than has heretofore been possible."

The New York Railways has unproductive real estate valued at approximately \$7,000,000. It is the intention to sell and lease these properties as rapidly as it can be done to advantage, and it is anticipated that an annual income of about \$300,000 will be derived from this source.

The report continues:

"Compared with the twelve months ended June 30, 1912 (six months ended Dec. 31, 1911, being operations under the receivership), the number of serious personal injuries was reduced over 4 per cent and the total number of accidents was reduced 3½ per cent. The combined cost of claims for the current year and those arising out of the operations during the receivership and liquidated during this year (which were assumed by the company as a part of the purchase price of the property) amounted to approximately 6.6 per cent of the gross passenger revenue. A few years ago the accidents took over 10 per cent of the gross revenue of the predecessor of this company, so it would seem that there has been considerable improvement.

"The controversy over universal transfers among all the lines of street surface railroads on Manhattan Island has been settled and the litigation in this matter ended. The new form of coupon transfer adopted for use upon the lines of this company on June 1, 1912, has, during the last year, given entire satisfaction in practical operation, and in a large measure solved the difficulties arising out of the extensive use of free transfers. The privileges of the passenger have not been curtailed, but the possibilities of the abuse of the privileges have been greatly limited.

"Arrangement has been made for the exchange of transfers between the longitudinal lines of the New York Railways and the line operated through Canal Street across the Manhattan Bridge over the recently granted franchise of the Brooklyn & North River Railroad.

"Negotiations are pending with the city for the establishment of a through route and joint rate between the Municip-

pal Ferry and the cars terminating at South Ferry. The company has offered to carry passengers to and from the ferry boats on the connecting lines for a 3-cent transfer ticket, thus giving the borough of Richmond a 5-cent fare into Manhattan.

"It has been the aim of the management of this property to furnish adequate and convenient service to its patrons, and to this end a careful study has been made of transportation conditions. The schedules have been revised so as to provide for the operation of cars in a manner most beneficial to the public as a whole. On some lines too many cars were found to be in operation, with the result that the transportation facilities were actually impaired because of the slow car movement involved. The elimination of car mileage, which was both unnecessary and obstructive, has resulted in greater operating efficiency."

Interborough-Metropolitan Company

The annual financial statement of the Interborough-Metropolitan Company, New York, N. Y., for the year ended June 30, 1913, compares as follows:

Receipts:	1913	1912
Dividends on Interborough Rapid Transit stock..	\$4,069,536	\$5,426,048
Interest, etc.	359,702	327,782
Total income	\$4,429,238	\$5,753,830
Disbursements:		
Interest on Interborough-Metropolitan bonds....	\$3,052,125	\$3,052,125
Interest on 6 per cent notes.....	471,391	432,516
Interest on bills payable.....	.....	19,014
Expense account.....	84,321	94,995
Taxes	32,887	29,873
Total disbursements	\$3,640,724	\$3,628,524
Surplus	\$788,514	\$2,125,307
Previous surplus	2,806,807	681,500
Total surplus	\$3,595,321	\$2,806,807

T. P. Shonts, president of the company, says in part:

"During the fiscal year just closed the operations of the principal subsidiary properties of the Interborough-Metropolitan Company, i. e., the Interborough Rapid Transit Company and the New York Railways, have shown satisfactory progress. The surplus earnings of the Interborough Rapid Transit Company for the year ended June 30, 1913, aggregated 18.68 per cent upon the capital stock of that company (of which your company owns 339,128 shares out of 350,000 shares outstanding) as against 16.07 per cent for the fiscal year ended June 30, 1912.

"The net income of the New York Railways for the fiscal year ended June 30, 1913, after providing for the interest on the first real estate and refunding 4 per cent bonds, was \$1,811,647. After deducting from this sum the amount held in reserve (including that for depreciation in conformity with the requirements of the order of the Public Service Commission, now in litigation) the remainder was equal to 3.886 per cent upon the \$30,626,977 of adjustment bonds of that company outstanding."

At the annual meeting on Sept. 16 a resolution calling for the reduction in the number of directors from twenty-one to fifteen was unanimously adopted. J. A. Ritchie was elected a director to fill a vacancy.

New Security Issues of the Northern Ohio Traction & Light Company

The Canton-Akron Consolidated Railway has been authorized by the Ohio Public Utilities Commission to issue to the Northern Ohio Traction & Light Company, Akron, Ohio, its 5 per cent mortgage bonds of the total principal sum of \$91,000, and the Northern Ohio Traction & Light Company has been authorized to issue its preferred capital stock of the par value of \$360,000 and its 4 per cent consolidated mortgage bonds of the total principal sum of \$400,000. The Northern Ohio Traction & Light Company is also authorized to borrow \$1,500,000 and execute therefor its 6 per cent serial notes, maturing in the sum of \$100,000 per year, beginning Nov. 1, 1914, to and including Nov. 1, 1916, and in the sum of \$200,000 per year, payable in semi-annual instalments of \$100,000 each, beginning May 1, 1917. The Northern Ohio Traction & Light Company is required to pledge and deposit collateral for the above securities to the amount of \$2,300,000, par value. The company is ordered to obtain not less than the following prices for the

authorized issues: the par value of the preferred capital stock; 68 per cent of the par value of the 4 per cent consolidated mortgage bonds; 97 per cent of the par value of the 6 per cent notes, and 80 per cent of the par value of the 5 per cent bonds. It is further ordered that the company must pay out of its income into its capital cash account any difference which may exist between the par value of its 6 per cent serial notes and the sum for which the same are issued and sold.

The proceeds from the sale of the securities are to be used for the following purposes, to wit: the proceeds of said notes to be applied to the payment and discharge of the balance of the collateral trust loan of May 1, 1909—any sum in excess of the principal amount of said loan, the payment of which is necessitated by reason of the discharge of the loan before the date of maturity, to be provided and paid by the Northern Ohio Traction & Light Company out of its income, \$600,000; also to the payment and discharge of liabilities for improvements and betterments to the properties of the Northern Ohio Traction & Light Company other than the property composing its Canton-Akron Consolidated Division, \$700,000; and the proceeds of the preferred capital stock and bonds to be applied to the payment and discharge of the balance of any liabilities on account of the improvements and betterments made to the property of the Northern Ohio Traction & Light Company other than the Canton-Akron Consolidated Division.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—A modified plan for the reorganization of the Buffalo & Lake Erie Traction Company, its absorption of the Buffalo, Lockport & Rochester Railway and the establishment of through freight and passenger service between Erie, Pa., Buffalo, Niagara Falls, Toronto, Ont., and Rochester was hinted at in the hearing on Sept. 12 in Buffalo before the Public Service Commission of the Second District of New York. The new plan, it is said, would allow the holders of the preferred stock of the Buffalo & Lake Erie Traction Company to participate in the reorganization plan on better terms than were originally proposed. Charles S. Beekman, attorney for the committee representing the holders of 80 per cent of the bonds, and for Bertron, Griscom & Company, the banking firm interested, was not prepared to give details of the modified plan. Attorney Henry W. Killen, representing the minority bondholders, who are protesting against the plan of reorganization, demurred against going on with his side of the case until it was definitely known what the bankers or the bondholders' committee had to offer to the holders of the preferred stock. Chairman Decker of the commission agreed with him as to the importance of this information to all concerned, including the commission. Attorney Beekman said he probably would be in possession of a definite proposition within a week, and the case was therefore adjourned until Sept. 19. Practically all the testimony taken at the hearing related to the contract between the Electrical Development Company of Ontario and the Canadian-American Power Corporation for the delivery of 46,000 hp.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—No definite action concerning the line in Batavia, N. Y., was taken by the stockholders of the Buffalo & Williamsville Electric Railway at the recent meeting in Williamsville. Two-thirds of the stockholders were represented by proxies, which were held by Loran L. Lewis, Jr., the president, and Godfrey Morgan, the secretary, both of Buffalo, N. Y. According to the call, the purpose of the meeting was to have the stockholders ratify the intention of the directors to abandon the line in Batavia. The stockholders took no action. Before the meeting adjourned Mayor Louis Wiard of Batavia told the officers that if they wanted to sell he would organize a company of Batavia capitalists to buy the property.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—The annual meeting of the Chatham, Wallaceburg & Lake Erie Railway was held on Sept. 3, and the members of the new board chosen include D. B. Hanna, A. J. Mitchell, R. G. O. Thomson, Judge F. Phippen and Mr. Morton, Toronto; D. A. Gordon, Wallaceburg, and J. G. Kerr, Chatham. It is stated that the main office of the company will be moved from Chatham to Toronto.

Chicago (Ill.) Railways.—John A. Brown, of Chicago, as attorney for the holders of the consolidated mortgage bonds of 1907, has protested to the trustees of the various mortgages and the directors of the Chicago Railways against a further payment of dividends on the participation certificates of the company. The mortgage debt, it is said, amounts to \$90,084,611, against a valuation of \$77,488,461, for which the city may take over the property at any time for municipal operation within the franchise term. The latter figure, it is claimed, includes about \$30,000,000, the original valuation of the properties taken over by the company and the brokerage fee of \$5,995,000, leaving the present value of the property \$41,493,461, an amount insufficient to discharge the liabilities. A letter signed by Wallace Heckman, Seymour Morris and Henry A. Blair has been sent to the holders of the participation certificates, Series 1, 2 and 3, urging that in their judgment the best interests of the company require that the present management should retain control for the following year. It is stated that if the protective committee should obtain control the commercial value of the participation certificates would be destroyed. The criticisms of the present management have, it is said, emanated from sources in which there is a lack of understanding of the problems confronting it and are based "either upon deliberate misrepresentations and misstatements or upon rumors spread by discharged employees and by others whose interests are inimical to those of the company." Nominations for seven directors of the Chicago Railways, in opposition to the present board headed by Henry A. Blair, have been filed with the Central Trust Company, trustee for the capital stock, by B. R. Barnes for the protective association. The opposition ticket is headed by Joseph Beifield. The annual election is to be held in New York on Oct. 23.

Dedham & Franklin Street Railway, Westwood, Mass.—Pursuant to a foreclosure decree of the Supreme Court of Massachusetts, noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 23, 1913, the property of the Dedham & Franklin Street Railway was sold at auction on Sept. 15 by Receiver Eugene H. Mather to H. M. Verrill and R. H. Johnson, acting on behalf of the bondholders, for \$10,000.

Clear Lake Railroad, Lakeport, Cal.—The Clear Lake Railroad has filed an amended application with the Railroad Commission of California asking for authority to issue \$500,000 of bonds and \$200,000 of stock to provide funds to construct and equip a railroad from Hopland to Lakeport.

Goldsboro (N. C.) Traction Company.—The property of the Goldsboro Traction Company, consisting of the road and equipment and a sixty-acre plot, will be offered at foreclosure sale at Goldsboro on Sept. 20, under a decree of sale by Judge Conner in the United States District Court, noted in the *ELECTRIC RAILWAY JOURNAL* of Aug. 30, 1913.

Joliet & Southern Traction Company, Joliet, Ill.—It is expected that the Kane County Circuit Court will order the property of the Joliet & Southern Traction Company to be sold in November under a decree of foreclosure. The company was placed in the hands of receivers on Feb. 4, 1911.

Metropolitan Street Railway, New York, N. Y.—Special Master William L. Turner on Oct. 7 will offer at auction through Joseph P. Day as auctioneer at the County Courthouse in Manhattan all of the right, title and interest of the Metropolitan Securities Company and of William W. Ladd as receiver of the New York City Railway in and to certain real estate in the borough of Manhattan east of First Avenue, running from Ninety-fourth to Ninety-fifth Street. This action is the result of an order of the United States District Court in the matter of a petition of the receivers of the company for an order directing the receiver of the New York City Railway to deliver to them the proceeds of the sale of the property previously mentioned.

Middle West Utilities Company, Chicago, Ill.—The Middle West Utilities Company has sold a new issue of \$1,500,000 of three-year 6 per cent collateral trust notes to N. W. Halsey & Company, New York. The notes are part of an authorized issue of \$3,500,000, of which \$2,000,000 were sold last June, as noted in the *ELECTRIC RAILWAY JOURNAL* of June 21, 1913. Arrangement has been made to deposit part of these notes with the Illinois Trust Company, and under this deposit certificates of \$100 and \$500 will be issued, convertible into the notes in amounts of \$1,000 or multiples.

Pacific Gas & Electric Company, San Francisco, Cal.—A special meeting of the stockholders of the Pacific Gas & Electric Company has approved the issue of \$7,000,000 of one-year 6 per cent collateral trust notes. This issue was approved by the California Railroad Commission on Aug. 11, and \$4,500,000 have been sold to a syndicate of New York bankers. The remaining \$2,500,000 will be held in reserve and not sold unless additional money is required. The new notes are secured by \$5,000,000 par value general and refunding 5 per cent bonds and \$5,000,000 par value general lien 6 per cent bonds. The funds from the sale of notes are being used in completion of the Lake Spaulding hydroelectric development. The company on July 31 was serving 331,192 customers, a gain of 28,985 customers since Aug. 1, 1912. The unauthorized reports that certain construction work of the company had been stopped have been denied by A. F. Hockenbeamer, vice-president and treasurer, as follows: "These alleged statements are erroneous and misleading and could not possibly have been obtained from authoritative sources. Work on the South Yuba power development and transmission lines has proceeded without interruption and is being pushed with all possible speed. The work is progressing so satisfactorily that we feel assured of being able to deliver at our consuming centers from the new development approximately 35,000-hp before the close of this year."

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—At the recent annual meeting of the Quebec Railway, Light, Heat & Power Company resolutions were adopted giving the directors wider powers than they have possessed in regard to control of the company and its subsidiaries. The number of directors was reduced from nine to six and Sir Rodolphe Forget, Lorne C. Webster, J. N. Greenshields, Robert Mackay, Paul Gilbert and D. O. L'Esperance were elected directors.

Railway & Light Securities Company, Boston, Mass.—The Railway & Light Securities Company, an investing company formed by the Stone & Webster interests, has made a report for the fiscal year ended July 31, 1913. The total earnings for the year, including dividends received and interest received and accrued, were \$274,868; interest paid and accrued amounted to \$85,680; taxes were \$3,992 and expenses were \$8,758, leaving a profit from income of \$176,438. Dividends of 6 per cent were paid on the preferred and common stock. The surplus was \$70,467. The total surplus at the close of the fiscal year was \$471,004.

Third Avenue Railway, New York, N. Y.—The Third Avenue Railway will pay the semi-annual instalment of interest amounting to 2½ per cent, due Oct. 1, 1913, for the period of six months ended July 1, 1913, upon its adjustment mortgage fifty-year 5 per cent income gold bonds at the office of the United States Mortgage & Trust Company.

Dividends Declared.

Arkansas Valley Railway, Light & Power Company, Pueblo, Col., quarterly, 1¾ per cent, preferred.
 Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.
 Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., quarterly, 1½ per cent, preferred.
 Brockton & Plymouth Street Railway, Plymouth, Mass., 3 per cent, preferred.
 Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.
 Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.
 Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.
 Dallas (Tex.) Electric Corporation, first preferred, 3 per cent; second preferred, 2½ per cent.
 Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.
 El Paso (Tex.) Electric Company, quarterly, 2 per cent, common.
 Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.
 Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.
 New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.
 Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.
 Philadelphia (Pa.) Traction Company, \$2.
 Toronto (Ont.) Railway, quarterly, 2 per cent.
 Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.
 United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, three-fourths of 1 per cent, second preferred; quarterly, 1 per cent, common.
 Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.
 Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, CHICAGO, ILL.							
Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	June,	'13	\$184,786	*\$103,309	\$81,477	\$32,957	\$48,520
1 "	"	'12	181,426	*97,252	84,174	32,789	51,385
12 "	"	'13	1,955,723	*1,164,856	790,867	388,245	402,622
12 "	"	'12	1,845,488	*1,083,199	762,288	380,825	381,465
ATLANTIC SHORE RAILWAY, SANFORD, MAINE							
1m.,	July,	'13	\$49,743	\$28,943	\$20,800	\$672	\$20,128
1 "	"	'12	47,559	27,396	20,163	478	19,685
CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO							
1m.,	July,	'13	\$46,002	*\$23,741	\$22,261	\$10,396	\$11,865
1 "	"	'12	44,449	*22,131	22,318	9,952	12,366
7 "	"	'13	234,541	*130,336	104,205	72,941	31,264
7 "	"	'12	220,434	*130,834	89,599	69,381	20,218
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO							
1m.,	July,	'13	\$120,558	\$67,277	\$53,280	\$31,974	\$21,306
1 "	"	'12	110,447	60,261	50,186	30,913	19,273
7 "	"	'13	695,716	424,612	271,104	219,521	51,583
7 "	"	'12	651,323	390,819	260,504	213,511	46,993
DETROIT (MICH.) UNITED RAILWAY							
1m.,	July,	'13	\$1,228,759	\$805,430	\$423,279	\$181,443	\$241,837
1 "	"	'12	1,125,055	733,613	391,442	176,302	215,140
7 "	"	'13	7,623,430	5,019,509	2,603,921	1,257,551	1,346,370
7 "	"	'12	6,615,997	4,228,611	2,387,386	1,242,328	1,145,059
EL PASO (TEX.) ELECTRIC COMPANY.							
1m.,	June,	'13	\$69,836	*\$38,776	\$31,060	\$40,180	\$26,880
1 "	"	'12	60,175	*32,859	27,316	6,464	20,852
12 "	"	'13	865,624	*466,086	399,538	51,547	347,991
12 "	"	'12	730,169	*408,389	321,780	82,125	239,655
FEDERAL LIGHT & TRACTION COMPANY, NEW YORK, N. Y.							
1m.,	July,	'13	\$184,084	\$111,273	\$72,811	.....	.....
1 "	"	'12	169,889	104,837	65,052	.....	.....
7 "	"	'13	1,365,617	786,409	579,208	.....	.....
7 "	"	'12	1,208,229	706,227	502,002	.....	.....
GRAND RAPIDS (MICH.) RAILWAY							
1m.,	July,	'13	\$117,688	*\$73,005	\$44,683	\$15,075	\$29,608
1 "	"	'12	111,191	*62,170	49,021	14,562	34,459
12 "	"	'13	1,270,319	*743,494	526,825	177,953	348,872
12 "	"	'12	1,212,028	*675,783	536,245	176,289	359,956
LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO							
1m.,	July,	'13	\$152,721	*\$77,779	\$74,942	\$35,395	\$39,547
1 "	"	'12	137,639	*68,903	68,735	35,188	33,547
12 "	"	'13	779,223	*482,546	296,677	245,681	50,996
12 "	"	'12	724,890	*427,435	297,454	244,061	53,393
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE							
1m.,	July,	'13	\$75,102	*\$40,048	\$35,054	\$15,551	\$19,503
1 "	"	'12	67,637	*\$34,833	32,804	14,448	18,356
12 "	"	'13	657,469	*406,447	251,022	175,236	75,786
12 "	"	'12	609,838	*383,469	226,369	143,437	52,932
NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO							
1m.,	July,	'13	\$319,132	\$185,186	\$133,945	\$60,348	\$73,597
1 "	"	'12	297,235	157,996	139,239	50,292	88,947
7 "	"	'13	1,816,370	1,113,645	702,725	403,454	299,271
7 "	"	'12	1,674,571	950,826	723,744	313,217	410,527
TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.							
1m.,	July,	'13	\$773,499	\$389,533	\$383,966	\$150,090	\$233,876
1 "	"	'12	715,129	355,232	359,896	143,079	216,817
7 "	"	'13	5,004,030	2,555,758	2,448,272	1,028,719	1,419,553
12 "	"	'12	4,641,249	2,403,838	2,237,411	998,554	1,238,857
VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.							
1m.,	June,	'13	\$426,514	\$197,876	\$228,636	\$128,209	\$100,427
1 "	"	'12	392,970	207,840	185,128	120,595	64,533
12 "	"	'13	4,950,811	2,416,988	2,533,822	1,500,501	1,033,321
12 "	"	'12	4,627,353	2,422,993	2,204,448	1,423,201	781,247

*Includes taxes.

Traffic and Transportation

Decision in Los Angeles Fare Complaint

In the complaint of the city of Inglewood against the passenger rates of the Los Angeles Railway and the Los Angeles Railway Corporation the Railroad Commission of California, in a decision which it handed down recently, held that discrimination exists in the rates of the companies in favor of Eagle Rock as against Inglewood. The commission ordered that one-way fares between Inglewood and Los Angeles be reduced from 15 cents to 10 cents with transfer privileges and that the price of thirty-ride family commutation tickets be reduced from \$3 to \$1.50.

In the complaint the city of Inglewood, a municipal corporation, attacked the rates of the defendant corporations, the Los Angeles Railway and Los Angeles Railway Corporation, as being unjust, unreasonable and discriminatory in favor of other communities similarly situated, so far as distance is concerned, from the center of population of Los Angeles. The companies operate the principal street railway systems in Los Angeles and in some cases lines have been extended to points outside the corporate limits of the city. The municipal limits of Los Angeles are not at all regular, so that in many instances the service extends beyond the city limits. On account of the irregular boundary lines of the city some of the lines which run beyond the boundaries of the city are much shorter between the terminus and the center of population than are other lines operating in other directions wholly within the city. The one-way fare of the companies between Los Angeles and Eagle Rock is 10 cents, made up of a fare of 5 cents to Glassell Road and 5 cents from Glassell Road to Township Avenue. The companies maintain two family commutation rates between Los Angeles and Townsend Avenue, Eagle Rock—one thirty-ride family commutation ticket for \$1.50, or 5 cents a trip, and one fifty-ride family commutation ticket for \$3, or 6 cents a trip. Between Los Angeles and Inglewood the defendants maintain a one-way passenger fare of 15 cents, made up of 5 cents to Fifty-fourth Street and 10 cents from Fifty-fourth Street to Inglewood. Adult commutation rates maintained by the companies between Los Angeles and Inglewood are as follows: Ten-ride party ticket, \$1; thirty-ride family ticket, \$3; fifty-two-ride individual monthly commutation, \$4.

The companies drew a circle of 6.2 miles from Sixth and Main Streets, Los Angeles, which latter point is claimed to be the center of population, and within this circle a fare of 5 cents is charged as a general proposition. The one exception to the rule that no fare of 5 cents extends beyond the circle drawn 6.2 miles from Sixth and Main Streets, Los Angeles, is that line operating to a point beyond the city limits of Los Angeles known as Annandale, and between this point and Los Angeles a fare of 5 cents is charged without transfer privilege, which is practically equivalent to the commutation rates between Los Angeles and Eagle Rock. According to the official transportation and city map of Los Angeles, Twelfth and Main Streets has been selected as the center of population and a circle radiating around this assumed center a distance of 8 miles therefrom goes through the city of Inglewood and across the line of the defendant at Arbor Vitæ Avenue. This same line passes through Eagle Rock a short distance beyond the terminus of the Eagle Rock line of the defendants at Townsend Avenue and Eagle Rock Road, and also a short distance beyond Buena Vista Terrace and Eagle Rock Road, Annandale.

In the opinion on which the order of the commission was based Commissioner E. O. Edgerton said in part:

"It is almost impossible to take a street car system and segregate the earnings of all of its different routes or lines so as to determine whether the rates on any particular route or line are yielding an excessive return on the capital invested. The defendants operate twenty-seven lines over various streets and along certain routes in Los Angeles, one of which operates from Eagle Rock to Hawthorne through Inglewood. They also operate a line, known as the 'Main Street Line,' to Eagle Rock Park through Annandale. From the records of earnings furnished by the defendants it would appear that the line operating from Eagle Rock to Hawthorne through Inglewood is a very much better paying

line than the one operating to Eagle Rock Park through Annandale.

"On one end of the Eagle Rock-Hawthorne line, for approximately the same distance, a set of rates is charged lower than on the other end of the line for approximately the same distance, while the line through Annandale, which appears to be less either per car mile or per car hour than the through line between Eagle Rock and Hawthorne, is favored with a still lower rate. This lower rate, however, as before stated, is practically equivalent to the commutation rates in effect between Los Angeles and Eagle Rock. I believe the evidence clearly discloses the fact that discrimination exists in favor of Eagle Rock as against Inglewood. Whatever may have been the reasons moving the defendants to establish a fare of 10 cents between Los Angeles and Eagle Rock they are of little consequence. The fact remains that passengers may travel to Eagle Rock for 10 cents, including transfer privileges within Los Angeles, and for approximately the same distance to Inglewood a fare of 15 cents is exacted. It is also a fact that a person may travel from Buena Vista Avenue, Annandale, to all points in Los Angeles for 10 cents, and I am at a loss to understand how the defendants expect to maintain the present rate adjustment as against Inglewood.

"When a carrier voluntarily establishes a scale of rates between two points the presumption must be entertained that such rates are *prima facie* reasonable, and entertaining such a presumption it is clearly apparent that the rates between Los Angeles and Inglewood are excessive.

"Street railway lines such as are operated by the defendants are in a position to handicap the development of a particular section by placing lower rates in effect to one locality than to another for approximately the same distance. Under such circumstances carriers allege that the greater density of population justifies a lower rate to one section than to the other, notwithstanding the distance may be about the same; and while, to a certain extent, the density of traffic is a factor in making rates, the fact that one community is denied rates for a service almost identical with that accorded another community is frequently the reason why the population of the first community does not increase. Population usually follows the lowest transportation rates, and when one locality is denied rates equal to another for approximately the same service the result is generally the same: the community with the low rate prospers and that with the higher rate lies dormant. I find that the rates of the defendants between Los Angeles and Inglewood are excessive, unreasonable and discriminatory. I find that just and reasonable passenger fares between Los Angeles and the city of Inglewood would be as follows: one-way fare including the usual transfer privileges to points in the city of Los Angeles, 10 cents; thirty-ride family commutation ticket without transfer privileges, \$1.50."

Modification of Order by Wisconsin Commission

Application was made to the Railroad Commission of Wisconsin some time ago by the Southern Wisconsin Railway, Madison, Wis., for certain modifications of the order in the case of Elver vs. Southern Wisconsin Railway. Additional testimony was offered with reference to the type of brake used, the size of cars, and the method of routing cars. Certain objections were also made to changes in routing before additional double tracking could be completed. The commission held as follows:

"The type of hand brake with which the cars of the company are at present equipped is adequate but careful maintenance is necessary.

"Conditions in Madison at the present time require frequent headway with small cars rather than larger cars operated on an infrequent headway.

"The fact that the double tracking necessary for efficient operation has not been completed is not a sufficient reason for the postponement of the five-minute schedule as previously ordered (9 W. R. C. R. 1). The use of signal devices will assist in operation. A simple hand-throw block signal device will suffice to move cars between the sidings with a minimum delay.

"The objections of the company to greater frequency of cars are not valid. The earnings are ample to provide for running the cars as ordered in the previous decision

(9 W. R. C. R. 1). Certain modifications are made in the routing in order to facilitate a five-minute headway within the zone of heaviest riding. It is ordered that cars on the Fair Oaks-Wingra Park line be operated on a ten-minute headway similar to the schedule in force. The East Johnson-South Madison line is to be operated on a ten-minute schedule from the present east terminus of the East Johnson Street line to Mound Street on the South Madison line via State Street and Mills Street, alternate cars proceeding beyond Mound Street on a twenty-minute headway to the present terminus of the South Madison line. The cars on this line are to be operated in conjunction with the cars on the Fair Oaks-Wingra Park line on such a schedule as to give a five-minute headway between Capitol Park and University Avenue at Mills Street. Cars on the West Main-Baldwin Street line are to be operated on a ten-minute headway from the present terminus of the West Main Street line at the West Madison station of the Chicago, Milwaukee & St. Paul Railway via Jenifer Street to Baldwin Street or Dickinson Street on the present Fair Oaks-Wingra Park line, and the schedule should be so arranged that cars on the West Main-Baldwin Street line operating in conjunction with those on the Fair Oaks-Wingra Park line give a five-minute headway from Capitol Park to Baldwin Street or Dickinson Street."

Plans for Organizing Proposed Chicago Committee

Reference was made in the *ELECTRIC RAILWAY JOURNAL* of Sept. 13, 1913, page 441, to the suggestion of Coroner Hoffman, of Chicago, that a law be passed to prohibit persons from crossing streets at intersections and that a public safety committee be established to lessen automobile, street car and vehicle accidents in that city. The coroner has selected the twenty-five persons whom he will ask to serve on a public safety committee to lessen the number of deaths and injuries from avoidable accidents. He has sent to each of those selected a letter that reads in part as follows:

"This letter is addressed to you to invite you to become a member of a permanent organization or general public safety committee to work in conjunction with the coroner's office of Cook County for a safer Chicago and to minimize the dangers that now beset her citizens and destroy lives to an appalling degree. Your name has been suggested to me as one whose time and labor would be of great value in this worthy enterprise if you could be induced to devote a little time occasionally in becoming familiar with conditions and in helping all of us to apply remedies. Kindly let me know if you would consent to become a part of this movement and we shall be pleased to call you to a general meeting later."

A thorough investigation of the situation will first be made by the committee, for which purpose all the records in the office of the coroner will be thrown open to obtain accurate figures on the various kinds of accidents that resulted fatally. Among those to whom the coroner has addressed letters are H. B. Fleming, vice-president and chief engineer of the Chicago City Railway, and H. L. Bronnell, of the safety committee of the Chicago Railways.

Crusade Against Vehicle Drivers.—Following the killing on Sept. 7 of a five-year-old boy, who was run over by an automobile while he was alighting with his parents from a car of the Springfield (Ill.) Consolidated Railway, the police of Springfield have begun a crusade against drivers who violate the traffic ordinances.

Accidents in Greater New York in July.—Accident reports to the Public Service Commission for the First District of New York showed that during July, 1913, there were 6884 accidents on the railroads and street railroads of New York City, as against 6550 in July of last year. The number of serious accidents from which death or grave injury resulted was 226, as against 209 in July of last year. The number killed was twenty-nine, which is the same as in July last year.

Service to the Illinois State Fair.—The Chicago & Alton Railway has informed the Springfield Commercial Association that it will not furnish shuttle train service from Springfield to the Illinois State Fair Oct. 3 to 11. This leaves the

traffic entirely to the Springfield Consolidated Railway and to the unorganized vehicle service. A. D. Furlong, general manager of the company, has announced that 136 cars will be placed in service over the loop, running out on Ninth Street and back on Seventh Street.

Second Wreck on San Francisco, Napa & Calistoga Railway.—Seven people were injured on the morning of Sept. 12 on the Main Street wharf at Vallejo, when a south-bound electric train of the San Francisco, Napa & Calistoga Railway, Napa, Cal., entered an open switch and collided with an empty coach which was standing on the siding. The south-bound car was loaded with passengers bound for San Francisco from Napa. In June thirteen persons were killed and more than fifty persons injured in a collision on the road.

New Safety Stations Suggested in San Francisco.—M. M. O'Shaughnessy, city engineer of San Francisco, has recommended to the Board of Supervisors that new safety stations, 100 ft. in length, to accommodate two street cars tandem, be constructed at various points along Market Street where the traffic is heaviest. The points designated are at the junctions of Drumm and California Streets, and on the south side of Market Street, west of Fourth; south side of Market, east of Fifth, and south side of Market, opposite Mason.

Revision of Transfer System Proposed in Newark.—At a recent conference with the members of the Board of Public Works of Newark, N. J., the officers of the Public Service Railway agreed to submit to the board within two months a plan for the revision of its transfer system. John L. O'Toole, representing the company, said that there was no objection on the part of the company to modifying its transfer rules and regulations provided the revision could be so devised that the company would not be embarrassed by passengers looping and otherwise abusing the privileges extended to them.

Re-routing in Philadelphia Practically Completed.—The re-routing of lines by the Philadelphia (Pa.) Rapid Transit Company is being continued. The first move under step No. 6 was put into effect on Sept. 14 and other changes under this step will be made on Sept. 20 and Sept. 27. This will complete most of the changes begun last spring under the general re-routing plan. The remaining changes and adjustment of routes to be undertaken under step No. 7 have almost altogether to do with the building of new track and must await the opening of streets, revision of grades and abolition of grade crossings.

Hearings in Tacoma Rate Case Postponed.—The taking of testimony by the Public Service Commission of Washington in connection with the investigation which it is conducting into the complaints about rates made against the American Lake line of the Pacific Traction Company and the Spanaway line of the Tacoma Railway & Power Company ended temporarily on Sept. 6, and the commission adjourned to some date between Nov. 5 and Nov. 10. Engineers of the commission are appraising the realty of both companies, and the figures obtained in the appraisal will probably be submitted in evidence when the hearings in the case are resumed.

Electricity on North Shore Division of the Long Island Railroad.—Electric service on the North Shore division of the Long Island Railroad will be begun on Oct. 21, when a new schedule will be put into effect. The road was double-tracked to Great Neck while the installation of the third-rail was being made. The running time from the Pennsylvania Railroad station at Thirty-third Street and Seventh Avenue, New York, with express trains was thirty-eight minutes, and, while the electric expresses will consume about as much time, a saving of about five minutes will be effected, owing to the elimination of the necessity of transferring, and, by the same process, local trains will save at least ten minutes.

Terminal Plans Postponed in Columbus.—The new inter-urban terminal station which interests associated with the Scioto Valley Traction Company have planned for Columbus, Ohio, at a cost of close to \$1,000,000, will not be started this year. Frank A. Davis, president of the Scioto Valley Traction Company, has announced that financing plans for the terminal have been completed, but delays in closing

negotiations for property in connection with the site and in securing franchise rights from the city have made it necessary to postpone construction until 1914. Contracts will be let early the coming year, and the new station and terminals are then to be completed as rapidly as possible.

Strip School Tickets in Albany.—The United Traction Company, Albany, N. Y., has placed strip school commutation tickets on sale with the approval of the Public Service Commission of the Second District of New York. A strip ticket of ten coupons, each coupon of face value 5 cents, is sold to any person under seventeen years of age attending public school at any point within the territory served by the United Traction Company and Cohoes Railway for 25 cents per strip. Such strip ticket will entitle the pupil to ten rides within the limits of any 5-cent zone going to and from school on school days between the hours of 8 a. m. and 9.30 a. m., 11.30 a. m. and 2.15 p. m. and 3.30 p. m. and 4.30 p. m., within thirty days from date of sale.

Accident Prevention Plans Considered in Toronto.—The adoption of a plan to prevent accidents in Toronto, Ont., was before the safety campaign committee, which met in the public accounts committee room at the Ontario Parliament Buildings at Toronto on Sept. 15. Notices of the meeting were sent out through the Ontario Railway & Municipal Board to the Board of Trade, the Board of Education, the Toronto Railway, the Toronto & York Radial Railway, the civic car lines, the Ontario Motor League, the Toronto Suburban Railway, the International Brotherhood of Teamsters, the Toronto Railway Employees' Union, the Canadian Manufacturers' Association, the chief factory inspector for Ontario and the secretary of the Bureau of Labor for Ontario.

Liquor Barred on Cars.—A bulletin has been issued by the Detroit (Mich.) United Railway to motormen and conductors of the interurban lines calling attention to Act 68 of the Public Acts of 1913. The bulletin reads as follows: "1. A person in an offensive state of intoxication need not be carried as a passenger. 2. Any person drinking or giving others a drink of liquor should be warned to desist. If he refuses, the bottle should be taken away and turned over to the agent at the nearest station, the passenger receiving a receipt for the liquor taken. If the person becomes offensive or boisterous, call the nearest station and ask for an officer to eject the passenger. The station agent receiving the liquor must keep the same ten days and deliver the same to the passenger upon the presentation of the conductor's receipt."

Complaint Against Pennsylvania Railroad Dismissed.—The Board of Public Utility Commissioners of New Jersey has dismissed the complaint of the Board of Works of Newark against the Pennsylvania Railroad and has refused to disturb the present rate of fare between Park Place, Newark, and Summit Avenue, Jersey City, or to order the abolition of the present practice under which refund coupons are sold. The commission holds that the rates exacted are neither unjustly discriminatory nor unreasonable, and it does not find any ground for criticism of the refund system, in view of the circumstances of the traffic. On the contrary, the board takes the view that the railroad has acted with commendable consideration of the Newark traffic and has not unnecessarily imposed any hardship upon the citizens of that community. In disposing of the controversy the board found it unnecessary to pass upon the question whether the 3-cent per mile maximum fare permissible under the general railroad act is modified or displaced by the public utility act empowering the board to fix just and reasonable fares and charges. The board also devoted a part of its opinion to consideration of the memorandum presented by the chairman of the committee on internal trade of the Newark Board of Trade, submitting that the rates between Newark and Jersey City divert a trade of large value from the merchants of Newark. The board remarked that if the Newark-Summit Avenue one-way rate were reduced from 15 cents to 12 cents it would similarly make the rate from Newark to New York 3 cents less. This, the board pointed out, might result in an increased incentive to trade in New York. Joint service is operated by the Pennsylvania Railroad and the Hudson & Manhattan Railroad between New York City and Newark.

Personal Mention

Mr. G. L. Langdon, New York, has been appointed auditor of the Kentucky Traction & Terminal Company, Lexington, Ky., to succeed C. M. Cory, who recently resigned on account of ill health.

Mr. Phillip Dawson, consulting electrical engineer of the London, Brighton & South Coast Railway, London, Eng., expects to arrive in New York on Oct. 8 for an extended trip of inspection of electric railway properties.

Mr. Frederick I. Day, superintendent of the power plant of the Louisville (Ky.) Railway, was elected vice-president of the National Association of Stationary Engineers at the recent convention of the association in Springfield, Mass.

Mr. H. H. Crapo, president of the Union Street Railway and the New Bedford & Onset Street Railway, New Bedford, Mass., has been elected president of the Massachusetts Street Railway Association to succeed Mr. Robert S. Goff.

Mr. James E. Weaver has been appointed superintendent and purchasing agent of the Huntsville Railway, Light & Power Company, Huntsville, Ala., to succeed Mr. J. V. Blackwell, who has become connected with the Alabama Power Company.

Mr. W. H. Given, whose appointment as assistant general manager of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., was noted in the *ELECTRIC RAILWAY JOURNAL* of Sept. 13, entered the service of the Des Moines-Fort Dodge Railway in Iowa as a messenger in 1874. The property of the company was afterward absorbed by the Chicago, Rock Island & Pacific Railway, in whose employ Mr. Given continued without interruption until Sept. 1, 1913. He filled every position connected with the train service and afterward served in turn as traveling freight agent, trainmaster and assistant superintendent. For the last thirteen years he has been superintendent of the Missouri, Des Moines Valley and Minnesota divisions of the company.

Mr. B. C. Edgar, who was appointed assistant general superintendent of the Columbus Railway & Light Company, Columbus, Ohio, some time ago, was employed on electrical construction work by the Manhattan Railway, New York, N. Y., for four years beginning in 1900. Subsequently he was connected with W. E. Baker & Company, New York, N. Y., for four years on general investigation and construction work. He was with Latey & Slater, New York, N. Y., for two years on electrical construction work in connection with the building of the lines of the Hudson & Manhattan Railroad under the Hudson River between New York and New Jersey. For four years before accepting the position with the Columbus Railway & Light Company which he now holds Mr. Edgar was assistant electrical engineer with the Southern Pacific Company at San Francisco, Cal., and was connected with all of the electric railway properties of the company.

Mr. Everett E. Stone, Springfield, Mass., has been appointed a member of the Massachusetts Public Service Commission, succeeding Mr. George P. Lawrence, resigned. Mr. Stone is well known in engineering and political circles in the Bay State. He is a native of Leicester, Mass., and was educated at Worcester Academy and later studied architecture in the office of Stephen C. Earle and civil engineering with Wood & Rugg, Worcester. In 1887, at the age of twenty-two, he joined the engineering staff of the Boston & Albany Railroad at Springfield, later serving as assistant roadmaster and roadmaster of the division between Worcester and Springfield. In 1894 he became assistant chief engineer of the road and later was appointed chief engineer. The new Boston & Albany pier at East Boston was built under his direction. He was Mayor of Springfield for two terms in 1903-4 and is a Republican in politics. During the past few years Mr. Stone has been at the head of the New England Construction Company, Springfield. His appointment to the commission was confirmed by the Executive Council immediately after its announcement.

Mr. George A. Valentine, chief inspector, and Mr. Adam J. Oot, inspector, have been appointed division superintendents of the Syracuse lines of the New York State Railways. Mr. Valentine will have full charge of the south division,

composed of all lines running out of the south carhouse in South Salina Street and Mr. Oot of all lines running out of the north carhouse in Wolf Street. Mr. Valentine will also have charge of the instruction of all conductors and motormen employed on the system. The appointment of the superintendents divides the responsibilities heretofore borne entirely by Mr. W. E. Holstock, superintendent of transportation, to whom the new officials will report. The lines out of the south carhouse over which Mr. Valentine will have control are the Court-Salina-Valley, Midland-Butternut, Midland-Park, one section of Rockwell Springs-Liverpool, Grape-West Genesee, and Solvay-Common Center. Running out of the north carhouse, in charge of Mr. Oot, will be the Wolf-Salina Valley, one section of Rockwell Springs-Liverpool, Dudley-East Genesee, University-Summit, Elmwood-Eastwood, Eastwood-Oak Valley and East Syracuse-Green.

Mr. C. E. Hart has been appointed superintendent of transportation of the Trenton & Mercer County Traction Corporation, Trenton, N. J. Mr. Hart is a native of Pennsylvania. He became a conductor in Trenton, N. J., in 1892, but resigned to accept a position as motorman with the Seashore Electric Railway, Asbury Park, N. J. The following year he became gripman with the Metropolitan Street Railway, New York, and remained in the employ of that company until 1912. He was promoted from time to time with the Metropolitan Street Railway, finally reaching the office of chief instructor. He resigned as chief instructor of the Metropolitan Street Railway in 1912 to accept a similar position with the Trenton Street Railway, which had been merged with several other companies as the Trenton & Mercer County Traction Corporation.



C. E. Hart

OBITUARY

Charles M. Copeland, manager of the State House Press News Service at Boston, Mass., for the last ten years and widely known in political circles in Massachusetts, died on Sept. 14 at the Boothby Hospital, Boston, following a brief illness. Mr. Copeland was about forty years of age. He was a native of Cambridge, Mass., and for some years was a correspondent of the STREET RAILWAY JOURNAL in connection with Massachusetts legislative news. He is survived by his daughter and a widow.

George Spencer Hart died at his home in Glen Ridge, N. J., on Sept. 11, 1913. Mr. Hart was born in Cornwall, Conn., on Feb. 11, 1837. In 1862 he entered the produce business in New York. In 1874 he obtained an interest in the Central Crosstown Railroad, New York, and he was president of the company from 1885 to 1897. He was also president and a director of the Second Avenue Railroad, New York, from 1887 to 1896. He secured control of the Christopher & Tenth Streets Railroad, New York, and was an officer of that company for a number of years. All three roads in which he was interested were finally merged with the Metropolitan Street Railway. Besides being president of the corporation of George S. Hart & Company, he was a director and trustee of several banks and was a member of the New York Produce Exchange, the New York Cotton Exchange and the Consolidated Stock Exchange.

The city of Springfield, Ohio (population, about 50,000), has adopted a new charter. Five commissioners elected by the people are to elect a city manager, who will be the administrative head of the city and who need not be a resident at the time of his appointment. Franchises cannot be granted for a longer period than twenty years. The city reserves the right to purchase or lease all utilities. Dayton has adopted a similar charter, but Akron has defeated the proposal.

Construction News

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

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

RECENT INCORPORATIONS

***Indianapolis, Linton & Vincennes Railroad, Indianapolis, Ind.**—Application for a charter has been made by this company in Indiana to build an interurban railway from Indianapolis through Mooresville, Tell City, Jasonville, Linton, Bicknell and Vincennes to Patoka and also from Linton to Sullivan. Capital stock, \$10,000. Incorporators: Gilmer Bray, Charles Park, William Thompson, John A. Schaffer and Karl W. Behr.

New Albany & French Lick Valley Traction Company, New Albany, Ind.—Application for a charter has been made by this company in Indiana to build an electric railway from New Albany to French Lick and West Baden Springs, with a branch from Mooresville, 4 miles north of New Albany, via Georgetown and Lanesville to Corydon. Capital stock, \$1,100,000. Officers: John H. Martin, Palmyra, president; Charles W. Schindler, New Albany, vice-president and general counsel; W. P. Huff, Corydon, treasurer; C. S. Hernley, Newcastle, secretary. [E. R. J., Sept. 6, '13.]

FRANCHISES

Mobile, Ala.—The Mobile Electric Company will ask the Council for a franchise along St. Louis Street to the parkway and to the property of the electric company in Mobile.

Little Rock, Ark.—The City Council has approved the action of Mayor Taylor in disapproving the ordinance granting a franchise to the Little Rock, Pine Bluff & Eastern Traction Company to use the free bridge and South Main Street to Markham in Little Rock.

Riverside, Cal.—The Pacific Electric Railway has received permission from the Railroad Commission to construct its lines over highways from its present track at Main Street and Fourteenth Street and Magnolia Avenue in Riverside to a point near the junction of Magnolia Avenue, Palm Avenue and Oregon Avenue.

San Rafael, Cal.—S. J. Norton, representing the San Rafael & San Anselmo Valley Railway, has received a forty-nine-year franchise from the Council in San Rafael. This line will connect San Rafael and San Anselmo, a distance of 6 miles. [E. R. J., Aug. 9, '13.]

Visalia, Cal.—The Big Four Electric Railway has asked the Council for a franchise in Visalia. The line will connect Visalia, Tulare, Lindsay and Porterville. [E. R. J., Sept. 13, '13.]

***Augusta, Ga.**—The Atlanta & Carolina Construction Company has received a thirty-year franchise from the Council in Augusta. This line will extend over certain streets and connect with the line of the Augusta-Aiken Railway & Electric Company on Broad Street in Augusta.

Galesburg, Ill.—The Peoria, Canton & Galesburg Railway has asked the Council for a franchise in Galesburg. Permission is asked to enter Galesburg over the tracks of the Illinois Traction System on East Main Street. This 52-mile line will connect Peoria, Canton and Galesburg. Horace Clark, president. [E. R. J., Sept. 13, '13.]

Boston, Mass.—The Boston Elevated Railway has received permission to relocate its tracks on Tremont Street, Park Street and Washington Street in Boston.

Detroit, Mich.—The Detroit United Railway has received a franchise from the Common Council for its Junction Avenue line and the Kercheval Avenue extension in Detroit.

Newark, N. J.—The last of the applications made by the Public Service Railway, Newark, N. J., for franchises in connection with the proposed terminal were considered by the Board of Works of Newark on Sept. 11. Seven more franchises were granted by passing the third and final reading, while six others were passed on first and second reading.

Buffalo, N. Y.—The International Railway has asked the Council for a franchise over Abbott Road from Cazenovia Street to the city line in Buffalo.

Islip, N. Y.—The Suffolk Traction Company has accepted the franchise granted by the Town Board for an extension from Patchogue to Sayville.

Columbus, Ohio.—The Columbus Crosstown Railway has asked the Council for a franchise in Columbus. This 11-mile line will extend from south Columbus to northeast Columbus. George M. Williams is interested. [E. R. J., Aug. 10, '12.]

Sudbury, Ont.—The electors have voted to grant a franchise to the Sudbury-Copper Cliff Suburban Electric Railway.

***Ephrata, Wash.**—W. M. Clapp, attorney, representing Eastern capitalists, has received a franchise from the Council for a gasoline car line between Soap Lake and Ephrata.

Milwaukee, Wis.—The Mayor has signed the ordinance granting a franchise to the Milwaukee Western Electric Railway. The proposed line is to run between Milwaukee and Beaver Dam.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—This company has received the approval of the Calgary City Council to build an extension through Shagannappi Park. The promoters of the extension agree to pay \$20,000 for construction and guarantee the expenses of operation for four years, at the end of which time the city is to pay back the cost of construction. The signing of the agreement is being held up, pending a decision on the question of whether the agreement has to be ratified by the ratepayers or not.

Edmonton (Alta.) Interurban Electric Railway.—It is understood that the first section of this railway, which will operate between Edmonton and St. Albert, will be completed within a few weeks. Cars of the gasoline electric type will be used.

Medicine Hat (Alta.) Railway.—It is reported that work will soon be begun by this company on its line in Medicine Hat. Max Aitken, Medicine Hat, is interested. [E. R. J., May 24, '13.]

British Columbia Electric Railway, Vancouver, B. C.—This company contemplates the construction of a line between New Westminster and Bellingham via Sumas.

Fresno (Cal.) Traction Company.—Plans are being made by this company to extend its Wishon Avenue line in Fresno to the Normal School grounds.

Clear Lake Railroad, Lakeport, Cal.—Plans are being made by this company to build an extension from Hopland to Lakeport.

Geary Street Municipal Railway, San Francisco, Cal.—Assistant City Engineer Ransom says that all plans for the new city railways for which bonds were voted recently will be completed so that contracts may be let for carhouses, track specials and all material by Jan. 1. The Van Ness Avenue and Potrero lines will be the first constructed, and the rails of the Stockton Street line laid as the tunnel work progresses. Negotiations for the transfer of the Union Street line to the city when the franchise expires in December will be opened at once by the city attorney and supervisors. The latter will take action to provide for the acquisition of the necessary rights-of-way for the carhouses, terminal sites and widening of Division Street in San Francisco.

San José (Cal.) Railway.—This company has been directed by the Railroad Commission to reconstruct as a standard-gage line its present narrow-gage section from San José to Toyon station, on the road to Alum Rock Park, a distance of $4\frac{1}{2}$ miles. The company is further directed to make a connection at Toyon station with the Peninsular Railway.

Watsonville Railway & Navigation Company, Watsonville, Cal.—Plans are being considered by this company for the rehabilitation of its lines in Hollister and an extension to San Juan and Hollister.

New Britain, Kensington & Meriden Tramway Company, New Britain, Conn.—This company states that it is indefinite when construction will be begun on its line to connect New Britain, Kensington and Meriden. Capital stock authorized, \$50,000. E. A. Moore, president. [E. R. J., Sept. 13, '13.]

Atlanta & Carolina Railway, Atlanta, Ga.—A second three-year extension of its charter has been granted this company. This extension was granted after the company had shown that it had acquired its right-of-way, graded a portion of its line and completed other development work. This 170-mile line is to extend in an easterly direction from Atlanta through Fulton, DeKalb, Rockdale, Gwinnett and Jackson Counties, and in a westerly direction from Atlanta through Campbell, Coweta, Meriwether and Troup Counties. The line will touch at all the principal towns in the counties named.

***Kewanee, Ill.**—A fund of \$1,000 is being raised in Kewanee for the preliminary survey for an interurban line between Rock Falls and Kewanee.

Oil Belt Traction Company, Martinsville, Ill.—The directors of this company have called a meeting of the stockholders to be held Sept. 18 at Oblong, Ill., for the purpose of changing the name of the company to the Oil Belt Railway. [E. R. J., Nov. 23, '13.]

Louisville (Ky.) Railway.—Plans are being considered by this company to obtain a free right-of-way for the extension of the Orell line in Louisville to Kosmosdale.

Middlesboro, Ky.—W. Godfrey Hunter, Middlesboro, Ky., is considering plans to construct an electric railway in Middlesboro and the construction of interurban lines to connect Middlesboro with other coal centers of that section.

Winnipeg (Man.) Electric Railway.—The extension of this company's park line along the Pembina highway in Winnipeg has been practically completed as far as the new university buildings, 3 miles, and is to be extended still further to St. Norbert.

Bay State Street Railway, Boston, Mass.—Work has been begun by this company laying heavier rails on its line in Washington Square in Weymouth. The grade is to be raised 4 in. The company is relaying its tracks through Main Street in Melrose and will soon relay the tracks between the Malden line and Franklin Square in Melrose.

Detroit (Mich.) United Railway.—The reconstruction of tracks on South Saginaw Street, Flint, between Second Street and the Grand Trunk tracks, is under way. The groove rail now used will be replaced by new 7-in. girder rail. The city and the company will put in a new pavement at the same time. Construction of two pile bridges and a concrete culvert along the line of the new private right-of-way through Wayne on the Detroit, Jackson & Chicago line is under way.

Grand Rapids (Mich.) Electric Railway.—This company has been asked to consider plans for an extension from Butterworth Street in Grand Rapids to Kent Country Club.

Electric Short Line Railroad, Minneapolis, Minn.—This company announces that work on the construction of the proposed line will be begun soon. The line will extend from Minneapolis through Hutchinson, and a branch will be extended from Hutchinson which will pass through Bird Island. Right-of-way is being surveyed for the line which will extend through Clinton on its route to Big Stone Lake and thence to Browns Valley and into South Dakota. The line will extend west from Litchfield to Clinton.

Luce Electric Company, Minneapolis, Minn.—This company has raised \$7,000 at Ivanhoe toward the construction of its line between Minneapolis, Ivanhoe and Redwood Falls. [E. R. J., Sept. 6, '13.]

Jefferson City Bridge & Transit Company, Jefferson City, Mo.—Plans are being made by this company to build a 1-mile extension along the Moreau Road to Berry's Springs.

Red Lodge, Mont.—About \$20,000 of the \$50,000 needed to construct an electric line from Red Lodge to Washoe, a distance of 5.5 miles, has been subscribed by the citizens of Red Lodge. [E. R. J., Aug. 30, '13.]

Public Service Railway, Newark, N. J.—This company has begun grading for a 9000-ft. piece of single track which will form a short cut between Port Reading, on the Newark-Trenton line, and Sewaren, on the Rahway line. This cut-off will avoid a detour of 3 miles and a transfer in reaching Perth Amboy from Newark and will permit a high-speed through service.

Hornell (N. Y.) Traction Company.—All trouble in regard to the laying of the North Hornell extension of this company's line has been settled and work has again been resumed. The work was stopped by the city of Hornell some time ago pending an inquiry into whether or not the company has a franchise and to decide upon a kind of rail to be used. The line will now be completed.

Brooklyn Rapid Transit Company, New York, N. Y.—Approval of plans for the elevated extensions and third-tracking of some of this company's elevated lines is being held in abeyance by the Public Service Commission until the necessary consents of property owners along these lines are secured by the company, which hopes to file them with the commission before the end of the year. The Public Service Commission has authorized the company to execute a contract for completing a connection between the Fourth Avenue subway (Brooklyn) and the Culver, West End and Fifth Avenue lines by way of Thirty-eighth Street and for laying two additional tracks in the Centre Street subway. The company agrees to do this work at cost.

Chardon, Jefferson & Meadville Interurban Railroad, Cleveland, Ohio.—The surveys and estimates have been completed and the Public Service Commission will be asked for authority to issue the stock and bonds and increase the capitalization of this company, which plans to build a 30-mile line to connect Chardon, Hampton, Fontville, Rock Creek and Jefferson, Ohio, and Linesville, Pa. The company plans to use gasoline cars. Capital stock authorized, \$10,000. Officers: Henry Orth, Rock Creek, vice-president; C. H. Felton, 735 Williamson Building, Cleveland, secretary; A. H. Bacon, Footville, Ohio, treasurer. [E. R. J., June 21, '13.]

Fremont, Ohio.—It is stated that no additional work is being done on the proposed electric line between Fremont and Tiffin. A. S. Close, Toledo, is interested. [E. R. J., Oct. 21, '11.]

Minster & Laramie Railway, Minster, Ohio.—This company, which has completed surveys and laid 16 miles of track between Minster and Fort Laramie, plans to resume construction in the spring of 1914. John B. Raterman, Fort Laramie, president. [E. R. J., June 11, '10.]

Ottawa & St. Lawrence Electric Railway, Toronto, Ont.—This company has awarded the contract for the construction of its line to connect Ottawa, Morrisburg, Brockville and Arnprior to a Toronto construction company of which J. A. Morden is president. It is estimated that it will take five years to build this line. The Ottawa-Arnprior and the Ottawa-Morrisburg branches will be built first. It is also understood that the contractors have taken over the bonds of the railway. The headquarters of the company will be transferred from Ottawa to Toronto. John E. Askwith, Ottawa, president. [E. R. J., July 12, '13.]

Saskatoon (Sask.) Electric Railway.—The ratepayers recently passed a by-law authorizing the expenditure of \$100,000 upon extensions of electric railways in Saskatoon.

Cumberland Valley Interurban Railway, Nashville, Tenn.—Two routes are being considered by this company for its 80-mile line between Nashville and Sparta. One will extend from Nashville by way of Greenvale, Auburn, Liberty and Smithville and the other by way of Greenvale, Alexandria and Smithville. Plans for a survey of these proposed routes are now being completed. J. H. Cartwright, 410 Union Bank Building, Nashville, president. [E. R. J., Aug. 2, '13.]

Dallas (Tex.) Northwestern Traction Company.—Preliminary surveys have been completed by this company on its line between Dallas and Denton, a distance of 40 miles. John T. Witt, chief engineer. [E. R. J., Sept. 13, '13.]

Dallas (Tex.) Southwestern Traction Company.—Preliminary surveys have been completed by this company on its 80-mile line between Dallas and Glen Rose, via Cleburne. E. P. Turner, president. [E. R. J., Aug. 9, '13.]

Gainesville, Whitesboro & Sherman Railway, Dallas, Tex.—Plans are being made to secure financial backing to build this line to connect Gainesville, Whitesboro and Sherman. J. W. Blanton, Gainesville, is interested. [E. R. J., April 19, '13.]

Houston (Tex.) Electric Company.—This company has placed in operation its new 3-mile extension known as the Houston Harbor line in Houston.

SHOPS AND BUILDINGS.

Tri-City Railway Company, Davenport, Ia.—This company has awarded the contract to G. Decker French, of the Central Engineering Company, to build its new carhouse in Rock Island to replace that which was recently destroyed by fire. The structure will be 296 ft. x 150 ft. and of brick and concrete construction. The interior will be divided into four sections, each having three tracks and each section divided by a fire wall. Work on the new building will be begun at once and will be completed by Nov. 8. The cost is estimated to be about \$75,000.

Kentucky Traction & Terminal Company, Lexington, Ky.—It is stated that the offices of this company on West Main Street in Lexington will be removed in order to clear the way for the erection of the new viaduct.

Ware & Brookfield Street Railway, Ware, Mass.—This company has awarded a contract to P. H. Provencal to build an addition to its carhouse in Ware. The structure will be 15 ft. x 45 ft. and will be used for housing cars and will also contain an office for the superintendent and a rest room for the employees.

Houghton (Mich.) County Traction Company.—Plans are being made by this company to build a new carhouse in Houghton. The structure will be one-story and 100 ft. x 150 ft. The cost is estimated to be about \$8,500.

Buffalo, Lockport & Rochester Electric Railway, Rochester, N. Y.—After a conference between Public Service Commissioner Devoe P. Hodson and counsel representing the complaining residents and the railway company, it was agreed that a new passenger station should be built in Middleport, N. Y., by the Buffalo, Lockport & Rochester Electric Railway. The company states that land has been bought and that plans for the station will be submitted to the commission at once.

Scioto Valley Traction, Columbus, Ohio.—The new interurban terminal station which interests associated with the Scioto Valley Traction Company have planned for Columbus at a cost of \$1,000,000 will not be started this year. Frank A. Davis, president of the company, has announced that financing plans for the terminal have been completed, but delays in closing negotiations for property in connection with the site and in securing franchise rights from the city have made it necessary to postpone construction until 1914.

Tacoma Railway, Light & Power Company, Tacoma, Wash.—Plans are being made by this company to move its carhouse, power house and other buildings to a site on the corner of L Street and Eleventh Street in Tacoma.

Panhandle Traction Company, Wheeling, W. Va.—This company has remodeled and painted its passenger station at North Warwood.

POWER HOUSES AND SUBSTATIONS

Albany (Ga.) Transit Company.—This company is installing new machinery in its power house in Albany.

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—This company is building a larger dam across the Fox River at Batavia, Ill., to insure an adequate supply of water for the battery of eighteen boilers at its power house.

Elmira Railway, Water & Light Company, Elmira, N. Y.—This company has placed an order with the General Electric Company for 1,000-kw converters, transformers and switchboard apparatus.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—A contract has been awarded by this company to Newman Brothers, St. Catharines, Ont., for the erection of a transformer station in St. Catharines.

Eastern Pennsylvania Railways, Pottsville, Pa.—This company has placed an order with the General Electric Company for substation apparatus consisting of a 700-kva two-unit three-bearing motor-generator set, three 300-kva transformers and a switchboard.

Utah Light & Railway Company, Salt Lake City, Utah.—This company will shortly place in operation in one of its substations a 1700-kva synchronous motor-generator set and switchboard. The apparatus has been ordered from the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Ogdensburg (N. Y.) Street Railway is in the market for five 20-ft. 8-in. single-truck prepayment car bodies, about 32 ft. over all.

Frankfort, Tacony & Holmesburg Street Railway, Tacony, Pa., noted in the *ELECTRIC RAILWAY JOURNAL* as being in the market for two double-truck cars, has ordered these cars from The J. G. Brill Company.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont., has ordered two 59-ft. motor freight cars from the Preston (Ont.) Car and Coach Company, and two from the Tillsonburg (Ont.) Electric Car Company, to replace those destroyed by fire recently.

City Light & Traction Company, Sedalia, Mo., has purchased six second-hand trailers from Lloyd J. Smith, Chicago, and three single-truck closed cars from the St. Joseph Railway, Light & Power Company, which will be placed in service in the handling of the heavy traffic during the state fair.

Montreal (Que.) Tramways, reported in the *ELECTRIC RAILWAY JOURNAL* of Aug. 6 as having ordered twenty-five closed trail cars from The J. G. Brill Company, has specified the following details for this equipment:

Seating capacity.....	54	Control, type..	Westinghouse
Bolster centers, length..	21 ft.	Couplers	Tomlinson
Length of body..	32 ft. 3 in.	Curtain fixtures,	
Length over vesti-			National L. W. Co.
bule	43 ft. 3 in.	Curtain material...	Pantasote
Width over sills...	8 ft. 3 in.	Destination signs...	Keystone
Width over all...	8 ft. 4 3/4 in.	Fare boxes.....	None
Height, rail to sills,		Gears and pinions,	
2 ft. 3 13/16 in.			Westinghouse
Height, sill to trolley base,		Hand brakes...	Brill ratchet
8 ft. 10 7/8 in.		Paint	Murphy
Body...wood, steel sheathing		Sanders	Dumpit
Interior trim.....cherry		Sash fixtures,	
Headlining	Agasote		National L. W. Co.
Roof, type.....	plain arch	Seats, style.....	Winner
Underframe	steel	Seating material.....	rattan
Bumpers...3 1/2 in. x 6 in. x 3/8 in.		Springs	Brill
Car trimmings...bronze metal		Step treads.....	Mason
Conduits and junction		Trucks, type...	Brill No. 67-F
boxes	Westinghouse	Ventilators	Garland

TRADE NOTES

Perry Ventilator Company, New Bedford, Mass., has received an order to equip with ventilators the hundred new cars of the Boston Elevated Railway which are now being built by the Jewett Car Company.

Keyes Products Company, New York, N. Y., is rapidly reconstructing its finishing department at Montville, Conn., which was destroyed by fire last August, and expects to have it ready for business again within a very few weeks.

Canadian General Electric Company, Ltd., Toronto, Ont., has purchased the plant and assets of the Stratford Mill Building Company, which manufactures flour machinery. The plant will be equipped to manufacture machinery such as produced by the Allis-Chalmers Company.

General Vehicle Company, Long Island City, N. Y., noted in the *ELECTRIC RAILWAY JOURNAL* of April 1, 1913, as having received an order from the New York (N. Y.) Railways for a number of electric commercial vehicles, has delivered all these wagons, with the exception of the dumping trucks.

H. W. Johns-Manville Company, New York, N. Y., has opened a new office and warehouse of large proportions in Galveston, Tex., where stock will be consolidated for distribution to the different offices and throughout the firm's Texas territory. This location will make a convenient point of distribution for shipments by coastwise lines from New York and for trade with South America.

General Electric Company, Schenectady, N. Y., has received orders for four-motor car equipments from the following: Detroit (Mich.) United Railway; York (Pa.) Railway; East St. Louis & Suburban Railway, East St. Louis, Ill.; Mahoning & Shenango Railway & Light Company,

Youngstown, Ohio; Norfolk & Bristol Street Railway, Foxboro, Mass. Air-brake equipments with compressors have been ordered by the Pittsburgh, Harmony, Butler & New Castle Railway.

Canada Floors, Ltd., Montreal, Que., has put its new "mastic" flooring in one of the new cars of the Ottawa (Ont.) Electric Railway. This flooring preparation somewhat resembles asphalt in appearance, and one of the claims made for it is that it is unaffected by temperatures up to 400 degrees Fahrenheit. It is put over the ordinary wood floor in practically the same way as that in which asphalt is put on the streets. The features of this new product are its ease of cleaning, its sanitary nature, its good appearance and its durability.

Beck Electrical Construction Company, Minneapolis, Minn., has been formed with V. S. Beck at the head. Mr. Beck has held various positions with several of the Stone & Webster companies in the Middle West, most recently being associated with the Mississippi River Power Company at Keokuk, Ia. The new company will do a general engineering contracting business, making a specialty of electric power plant and transmission-line work. It will also act as manufacturers' agent and has already secured the agency for several engineering concerns. The offices will be in the Andrus Building.

Joseph Dixon Crucible Company, Jersey City, N. J., has received favorable reports from the Lake Shore Electric Railway, Cleveland, Ohio, which has been successfully using its graphite cup grease No. 2 for trolley lubrication for the past four or five years. This railway manufactures its trolley wheels with an extra large chamber for the lubricant and graphite bushing for a 5/8-in. pin 2 in. long only. The lubricant is thinned slightly with oil, being made thinner in winter than in summer, and is then forced into the chambers of the wheel with a force pump. The wheel is then put into the harp attached to the trolley pole and is ready for service. This is all the lubrication that is required for the life of the wheels, which average approximately 4000 miles per year.

ADVERTISING LITERATURE

Electric Service Supplies Company, Philadelphia, Pa., has issued a series of five booklets entitled "Steel," "Tightness," "Brackets," "Fit" and "Weight," covering the details of the above subjects embodied in the manufacture of its Keystone steel gear cases.

The J. G. Brill Company, Philadelphia, Pa., prints in the September, 1913, issue of the *Brill Magazine* an illustrated bibliography of E. J. Cook, vice-president of the New York State Railways. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service in Milwaukee, Wis.," "Trailer Coaches for Long Distance Interurban Service," "New Type of Stepless Car for Syracuse," "Double-Deck Cars for Southern Chile," "Two Types of Funeral Cars for Bahia, Brazil;" "Open Cars for South Africa," "Special Features on Multiple Dump Cars," "Lightweight Storage Battery Car," and "Old-Time Snow-Fighting Equipment."

NEW PUBLICATION

Public Utilities, Their Cost New and Depreciation. By Hammond V. Hayes, Ph. D. New York: D. Van Nostrand Company. 262 pages. Price, \$2.

This is an excellent treatise on the general principle of valuations of public utility properties. Although the book is written by an engineer, the author quotes copiously from the decisions of the federal and state courts and from those of the state commissions to illustrate and emphasize the points made by him. He also draws clear distinctions between the values of a property for different purposes, the different elements of values, the various methods of calculating depreciation, etc. Special emphasis is laid upon the importance of the determination of the original investment in any examination into the present fair value of a property. The decisions quoted include some during the present year. In view of the comparative newness of the subject treated and its importance in the technical field, Mr. Hayes' book is a welcome addition to the library of public utility companies.