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## The Tendency Toward Centralization

One of the characteristic features of industrial development during the past four years has been the centralization of authority and control of distant properties, and it is not surprising that many street railway companies in the country should come under this influence. Although these consolidations of interests have occurred in the street railway field for some years past, they have notably increased during the past year, and, on account of the many advantages secured, will undoubtedly continue as an economic force. We have referred to some of the advantages of such a change in organization, and we are glad to publish in this issue an article by William Pestell, who sounds a note of warning as to one danger which should be

guarded against. In the economies which flow from a centralized organization, sight should not be lost of the local representative, and if his authority should be so reduced that he loses his ability to take the initiative or forfeits the confidence of the public that he is in a position to rectify troubles, or is out of touch with the general policy of the company, his value is greatly diminished. We referred last week to the importance of looking after the man with the nickel, and we feel it is equally important for a centralized management either to keep in close touch with the local situation, which can only be done by close attention to details, or else to get a good superintendent and then give him a wide latitude in handling the local situation. If this is not done there is great danger of nullifying many of the advantages gained by consolidation.

## Lighting Machine Tools

Although articles and comments have appeared from time to time on shop lighting, very little has been said specifically on the lighting of separate machine tools. Many shops could make much-needed improvements if attention were given to this important detail, as there are very few shops that do not have machines installed in dark corners, and at this season of the year in all shops artificial light must be depended upon entirely for a period of about two hours each day. In some shops about the only provision for lighting machine tools is to suspend a 16-cp lamp over the machine. No shade is provided, and there is nothing to prevent the lamp swinging from side to side. As the suspending cord is usually very long, the lamp is swinging most of the time.

It is demanding too much of a workman to require him to do accurate work under such a light. No matter how hard he tries, he is likely to make errors, the cost of which will many times pay for the installation of lights in the proper manner. Even if no errors are made, it is a costly plan to fail properly to light machines. A man can never work as fast when he is compelled to feel rather than see what he is doing, and the slow rate at which work is turned out with inadequate lighting is in itself a sufficient incentive to better the arrangements. Then, again, the workman, after he has made a few mistakes in setting his tool and has reached the point of exasperation, loses pride in his work, and when this happens, both the management and the workman are the losers.

Lights for machine tools should be placed on brackets or stands in such a manner that they are held rigidly. The support should be provided with adjustable arms, so that the lamp may be set down close to the work. Such stands or brackets may be easily constructed in the machine shop, and the cost of the material will be practically nothing. By all means, the lamps should be provided with shades of some sort. Sometimes large shades are not permissible, as they prevent placing the lamp as near the work as desirable. But there is a sufficient number of shapes and types of shades on the market to permit of a selection of a style most suitable to each machine.



Often, however, one lamp, even if it be a 32-cp one, is not sufficient to properly light a machine. If so, the cost of current for extra lamps should not be reckoned, and especially so in a street railway shop, where the current usually costs about .3 cent per kw-hour. Assuming this rate, a lamp-hour costs about .015 cent. At this cost, it is a rather safe risk to install all the lamps which have the least possibility of being used.

It isn't necessary to employ an illuminating engineer to place lamps properly about a shop. All that is required is to give the workmen to understand that the lamps will be fixed for them as they may desire. If such a hint were given them and their wishes were then followed, in many shops much more satisfactory machine work would be turned out, and it would be executed much more rapidly.

### Inspecting Armatures for Clearance

It seems rather strange that so many armatures should be burned out because of their dropping down on the pole pieces. This occurs even in those shops where motors are supposed to be inspected every day or two. If bearings were of such a nature that they wore down suddenly, there might be some excuse for armatures dropping down. But this is not the case. The bearings, of course, wear gradually. About the only reason that can be attributed to the condition of things is that those responsible for the inspection of clearances do not do their duty properly. To properly inspect an armature for clearance, both hand-hole covers should be removed. These are usually fastened in position with cap screws, and to remove the covers and replace them quite a little time is required. The motor inspector most probably doesn't see the necessity of going to all the trouble of removing the covers simply to look at an armature, which ninety-nine cases out of a hundred will be all right, so without removing the hand-hole covers he puts "clearance O. K." on the inspection card, and trusts to luck that everything is all right.

Since we cannot improve on the inspectors, it might be well to make the inspection of the motors a little less difficult. This could be done by hinging the hand-hole covers and providing them with a suitable latch. The latch, of course, would necessarily be of such a design that the cover could not become unfastened and swing down when the car was in service. However, we see no mechanical reason why the cover could not be hinged and fastened satisfactorily. If this change were made on motors, we do not doubt that the cases of armatures being grounded on the pole piece would be very much less frequent than at the present time.

### Single vs. Double-End Interurban Cars

The discussion on cars for interurban service at the recent Indiana convention, naturally brought up the question of building cars to be operated in one direction only. The idea of building them to operate always in one direction seems to be gaining ground. Of course, there are roads where local conditions render it impossible to put in Y's or loops at the terminals, and in such instances single-end operation is out of the question. There has also been recently considerable discussion as to the proper location of toilet and smoking compartments on interurban cars, whether in the forward or the rear portion of the car. If there are any peculiar advantages of either location these are lost when the car is operated in both directions, and the fact that the location of these compartments is worthy of consideration is seen to be a point in favor of single-end cars. Strongest car construction favors

single-end operation only. When so constructed there is no necessity of building the front platform to drop below the car-body floor. Constructing the platform on the same level as the floor of the car body not only reduces the cost but it also gives it a much stronger and more solid bottom framing than can be otherwise obtained, as the longitudinal sills may be extended clear through to the bumper. This construction, moreover, facilitates the design of the draft rigging. We see no reason why the overhang on the front end could not be reduced also. In cars where the platform is dropped on one end only it is the usual custom to make the overhang the same on both ends, but we see nothing to prevent the front trucks being placed forward as far as permissible, irrespective of the position of the rear one. The appearance is about the only reason that can be urged against the adoption of this practice.

At the Indiana convention a point brought up in favor of cars equipped for operation from one end only, was that the maintenance costs were less. So far as the electrical equipment is concerned we hardly believe the increased expense of maintenance of a car equipped on both ends is sufficient to have a deciding influence. The only addition to be made is the lengthening of the cables and the addition of a controller and a trolley pole. When two controllers are used on a car, each is subjected to but one-half the wear that one would get, so the cost of maintenance is about the same. This also applies as well to the use of two trolley poles. But there are brake rigging, sanding devices, headlights, marker lights, pilots and many other parts, all of which when double equipments are used on each car contribute to add to the total expense of maintenance. About the only argument that can be urged against running cars in one direction is that the loops and Y's at the terminals cost considerable. So far as the time required to turn the cars on these loops and Y's is concerned, this may be neglected, since it is about offset by the time usually taken by the motorman and the conductor in changing the headlight from one end of the car to the other, and possibly the fender also, changing the trolley poles, and carrying personal effects from one vestibule to the other.

### Training for Emergency Stops

Instinct or habit constitutes a considerable factor in the make-up of every person. Although human beings are rational in a great many actions, it is a characteristic of the race that if they acquire or fall into a certain habit under a given set of conditions, they will repeat the same actions involuntarily when those conditions are repeated; in fact, the tendency so to act will be more rapid than the brain can work in logically analyzing the problem. This faculty, we believe, could be taken advantage of more than it is in the training of motormen to make emergency stops. If a prospective motorman were put to work making emergency stops until he would involuntarily make them on the mere indication of danger, we believe some serious accidents would be avoided.

An incident within the writer's experience has impressed upon him the idea that more could be done toward training motormen to this end. While riding in the motorman's cab of a heavy city car, a large ice wagon backed over the track just ahead. The motorman had evidently been told the proper course under the circumstances, and probably knew what should be done if given a few minutes to think about it, but at any rate, he began tugging at the reverse handle, first with one hand and then with both. The handle, of course, would not move, as



the power had not been first shut off. The writer's wits came to him suddenly, and, reaching beyond the motorman, he threw the controller handle to the "off" position, after which the car was stopped, but not before the wagon had been given a smart jolt. After the stop had been made, the motorman gave the usual excuse for such incidents. That is, when asked, he informed the conductor that "the brakes refused to work."

But the point of the incident is that had that motorman spent a few hours in actually making emergency stops, and in trying to make them in as short a time as possible, no doubt he would have first involuntarily thrown off the power before attempting to pull the reverse lever. It is possibly the practice of some roads to give a great deal of attention to this part of a motorman's training, but we know that such schooling is neglected on many roads.

Of course, it would hardly be advisable to encourage or to permit motormen to practice making such emergency stops on cars in service when at the end of the line they have a little spare time. Such practice should be carried out on a car on which less damage to the body and equipment would result. In fact, on some roads, the tendency of motormen to take emergency measures too frequently in ordinary service without any occasion has had to be repressed.

### Hand Versus Automatic Stoking

This topic is one that is steadily at the front, both here and abroad. It is brought again to mind just now by some discussion in England involving the results of a series of competitive tests. The use of mechanical stokers is steadily on the increase, responsive to that general tendency toward the replacement of human labor by machinery. It seems just as natural to substitute an automatic stoker for firemen as it does to use a steam shovel and conveyor for making a railway cut. Yet there is this difference between the two things: that the former is intended to replace intelligent labor, while the latter replaces labor of a singularly low grade. There are distinctions even in rough labor, as witness the foreman of a street sweeping gang, who, in answer to an inquiry as to the capability of one of his charges, responded: "Yes, Rafferty is a good man, but he's no artist; he can't sweep around a post." So there is no denying that firing is a fine art as compared with ditch digging, and the machine that does it has a careful task before it. The practical question is whether mechanical stoking can regularly be depended upon to fire a boiler more economically than it can be fired by manual labor. It is not merely necessary that the machine should raise a little more steam per pound of coal; it must do it at a lower total cost, including repairs and depreciation, and with at least equal reliability.

The English comparative tests to which we refer were conducted in various industrial establishments, and with various kinds of boilers and coal. Using low-grade coal, the gains shown by mechanical stoking were most conspicuous, the evaporation per pound of coal reaching in one case an increase of more than 30 per cent. This is quite in accordance with the general trend of results here. In using poor coal, the relative cost of firing is increased, since much more coal has to be handled and more ash has to be disposed of. More than this, the poor fuel demands more attention, the fire doors are oftener open, and good economical results demand a care on the part of the fireman seldom attainable. As the fuel improves in quality, the cost of hand firing diminishes, and it is quite possible that a point may be reached at which the general and labor charges on the automatic stoker more than balances any sav-

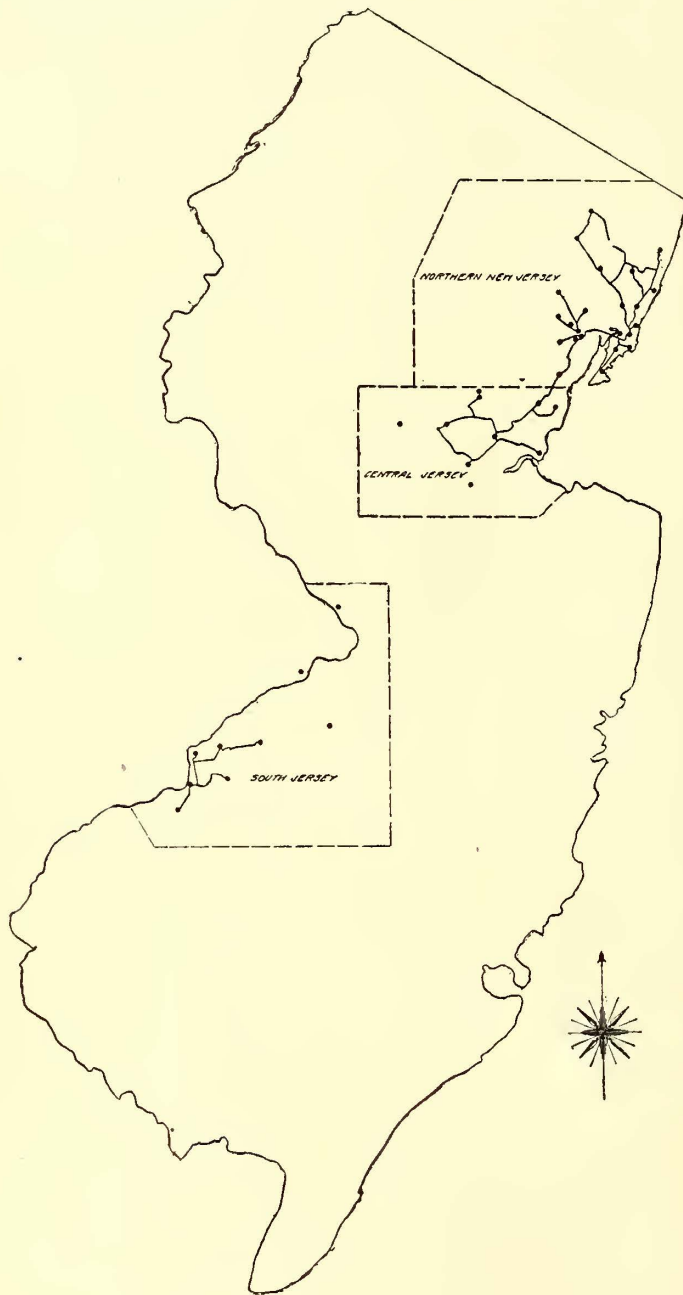
ings by its use. It is very dangerous to argue from one plan to another, on account of wide differences in load conditions, but it is a curious fact that in the reports of power station operation on the system of the Boston Elevated Railway Company it appears that the combined fuel and labor cost in the great Lincoln power station, fitted with mechanical stokers, is greater than in the Central power station, with its hand-fired boilers, and this in spite of the fact that the latter has much smaller generating sets and is the older station. With high-grade fuel, too, the care required in firing is decreased, so that it may well be doubted whether the favorable results shown in the English test could be repeated with first-class coal. One of these tests, by the way, shows an evaporation of 11.96 lbs. of water from and at 212 degs. per pound of coal, which is a high figure for any conditions, but this was under a water-tube boiler and with a fine grade of Welsh steam coal, the only case in which such fuel appeared. As this result has been equaled not infrequently by hand firing with similar fuel, one is only justified in drawing the conclusion, which one is inclined to dispute, that a first-class mechanical stoker is capable of doing work as good as the best.

We are very favorably disposed toward mechanical stoking. When properly conducted it gives very favorable and uniform results, and by its steadiness of fuel and air supply tends greatly to reduce smoke. In fact, we know of isolated plants that would certainly have been shut down long ago had they attempted to use their present soft coal with hand firing. It was a choice between mechanical firing and anthracite, with all the advantage on the side of the former. There are likely to be many more such cases, in which mechanical firing is imperative, even in plants of very moderate size. It is quite certain that stoking machinery has been greatly improved in the last few years, so that the questions of maintenance and depreciation are no longer what they were, and the care required to keep them in order has now been reduced to a very modest amount. It is a pity that more data on their performance with the best fuel are not attainable. It would be very interesting to see two batteries of boilers under test side by side using the same fuel, in one case delivered by a first-class modern stoker, and in the other by expert firemen, not for a few hours, but for a week, and then to compare the results. Some large electric plant considering the adoption of mechanical stokers could have the experiment tried to very great advantage. An allied question is the minimum size of plant in which it pays to use machine firing. Of course, when the employees are so few that they would be needed to look after the boilers and machinery generally, even if they gave over the coal shoveling to the machine, nothing is to be gained by the change unless the hand firing has been more than usually bad. One authority sets the critical capacity at 500 hp, another at as little as 300 hp. Evidently this depends again on the conditions of load and on the grade of fuel. It is difficult to show any gain up to the point at which a single fireman is unable to handle the necessary fuel comfortably. This would be at a point above 500 hp in the case of good fuel and boilers, and, in general, the more efficient the plant the bigger output one man can manage. With poor fuel and a rigidly enforced smoke ordinance, the machine would have the better of the argument, even at these small duties. But data on the continuous performance of mechanical stokers in plants of small and moderate size are badly needed. The question of their usefulness there is constantly being raised, and the most that can now be said is that they are advisable under especially favorable conditions.



## POWER GENERATION AND DISTRIBUTION ON THE SYSTEM OF THE PUBLIC SERVICE CORPORATION OF NEW JERSEY—II

The electrical distribution problem confronting the Public Service Corporation of New Jersey after its acquisition in June, 1903, and subsequently, of what were fifty odd plants supplying electric light, power and railways, has been enormous. Twenty central stations and twenty-four sub-stations comprised the list of active plants, and some of these had pre-



MAP OF NEW JERSEY, SHOWING TERRITORY COVERED BY THE PUBLIC SERVICE CORPORATION

viously replaced a multitude of others since the history of applied electricity began.

The following article gives the capacity and equipment of the more important present active stations which are used in whole or in part for supplying the railway end: The newly completed plant of 13,000 kw capacity at Marion, N. J., with its provision for enlargement to 64,000 kw, which was described in the last issue of the *STREET RAILWAY JOURNAL*, is an earnest of the units of high economy to be located at tidewater points. Thus the future will develop the further abandonment of the comparatively inefficient smaller stations and the

increase of sub-stations for the supplying of electric light, power and railway energy.

An outline map of the State of New Jersey is given herewith, upon which the territory served by the electric lighting and power station is divided into three groups. For convenience these groups are designated Northern Jersey, Central Jersey and South Jersey. The locations of generating stations and sub-stations in the separate groups are indicated on the sectional maps herewith.

The stations are represented by solid circular spots and square spots, the sub-stations by hollow squares and by circles. The solid spots are stations in use now and which are to be retained. The solid squares represent abandoned stations or stations to be abandoned. The circles represent present sub-stations and the outline squares represent sub-stations abandoned or to be abandoned. The circles with a center line are sub-stations in course of erection. The letter *P* signifies power, *R* and *L* signify railway and light, respectively. Thus when *R* and *L* are indicated, the station or sub-station is for railway and light.

It will be noted from an inspection of these district maps that many generating stations are being replaced by sub-stations, and in some instances present sub-stations are being replaced by new sub-stations in better locations. This, of course, is to place them in the centers of distribution occasioned by the readjustment of load as planned by the engineers.

In the North Jersey group are comprised the new Marion station on the Hackensack River, between Jersey City and Newark; Coal Street and City Dock stations, on the Passaic River, in Newark; the Fourteenth Street station in Hoboken, on the Hudson River; the Secaucus station, near the Hackensack River; the Paterson station, on the Passaic River; the Elizabeth station, at Elizabeth, and two small independent stations at Morristown and Boonton. It will be noticed that all these stations except the two last and Hoboken are tied together by virtue of line connections each to the other, so that it would actually be possible to supply energy from Paterson to Elizabeth through the sub-station at Passaic, the Secaucus station, the Palisade Avenue sub-station in Jersey City, Marion station and the Newark stations at City Dock and Coal Street. This tying in of these stations has proved highly useful and guarantees practically continuous service by eliminating interferences in service from breakdowns in any of these stations.

In general the system of lighting circuits is 60-cycle alternating. The direct railway system is fed direct by 550 volts direct current with 13,200 volts, 25-cycle, alternating-current generators. This diversity of the generating supply was determined by the large investment in both classes of apparatus, about \$2,000,000 having been invested in 25-cycle machines for railway distribution just prior to control of the various companies by the Public Service Corporation. Therefore, it was determined to carry in future plants and extensions both 60-cycle and 25-cycle apparatus. Thus in the new plant at Marion is 10,000-kw capacity of 25 cycles and 3000-kw capacity in 60 cycles, the former for railway and the latter for lighting and power work.

The Coal Street station at Newark contains the following generator and engine units:

Three 850-kw Westinghouse, 550-volt, direct-current generators, direct-connected to a Watts-Campbell cross-compound engine.

One 350-kw Westinghouse, 550-volt, direct-current generator, direct-connected to an Allis cross-compound engine.

Five 1800-kw General Electric, 13,200-volt, 25-cycle, three-phase generators, each direct-connected to vertical cross-compound Brown-Corliss engines.

One 3000-kw General Electric Curtis turbo-generator, 6600-volt, 60-cycle, three-phase.



There is one 1000-kw General Electric, 25-cycle rotary supplied by step-down transformers and providing 600 volts direct current.

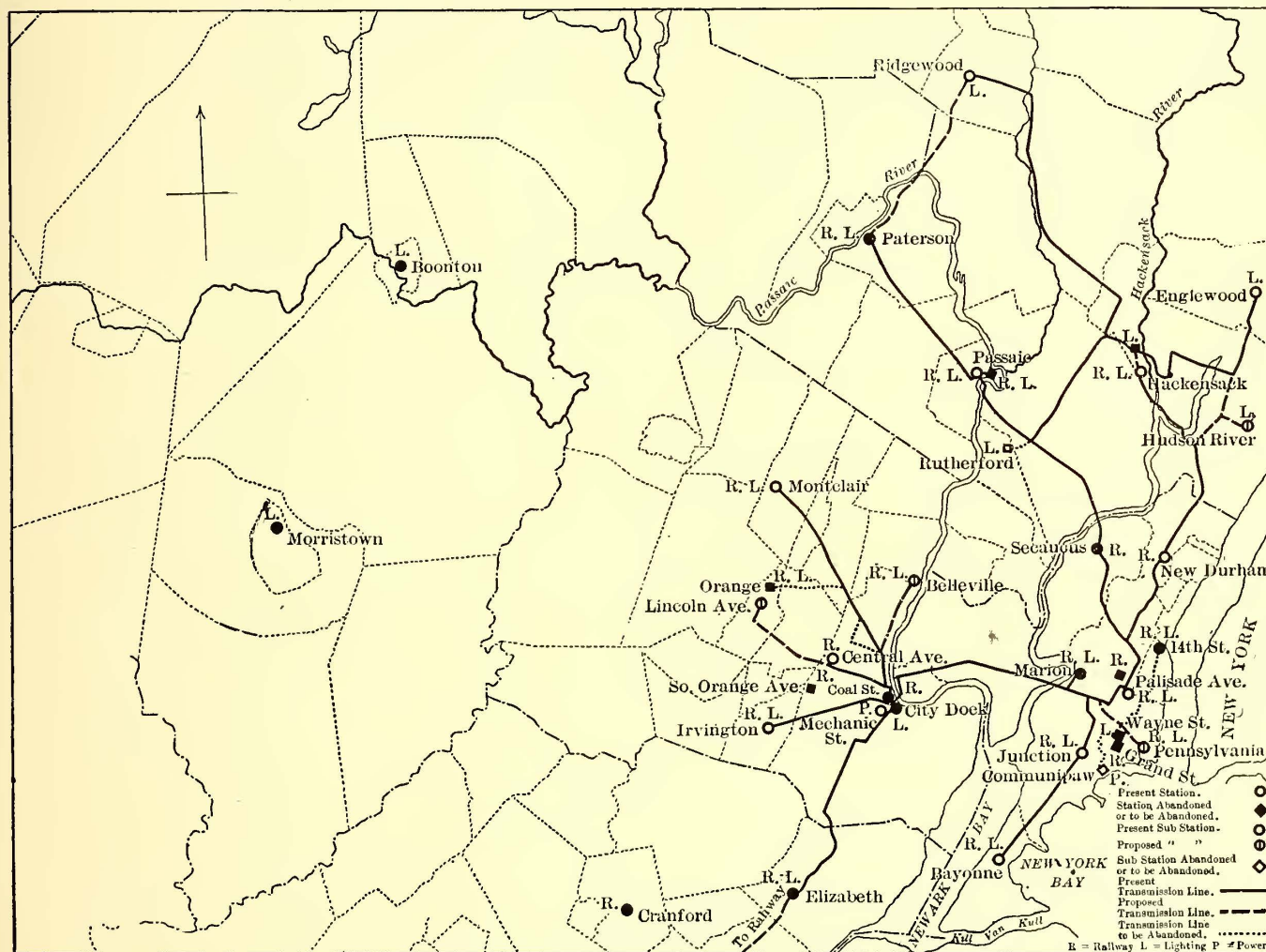
All the engines are condensing. The boilers are Babcock & Wilcox, there being 15 of 250-hp and 12 of 500-hp each, run at 155-lb. pressure.

The turbine unit in this station is controlled in the adjacent City Dock station, the generator being classed as belonging to the City Dock station. Thus all units controlled at the Coal Street station are for the railway needs. The sub-stations are fed from this station by 13,200-volt, three-phase cables run in conduits. Central Avenue sub-station has two 1000-kw General Electric, 25-cycle, three-phase rotaries, 2½ miles away from Coal Street station, supplying 550 volts direct current.

Railway 550-volt current is supplied by the Coal Street sta-

tion, which is solely used for power supply, and six street lighting transformer stations.

The City Dock station in Newark is a lighting and power station. The apparatus consists of seven Westinghouse 850-kw, 2300-volt, two-phase, 60-cycle generators, each direct-connected to a Pennsylvania Iron Works horizontal, cross-compound, condensing engine, and one Westinghouse 500-kw, 550-volt, direct-current generator, direct-connected to a Watts-Campbell horizontal cross-compound condensing engine. There are seven 500, two 600 and four 800-hp Climax boilers at 150-lbs. pressure. This station up to a year ago contained arc lighting machines that were thrown out by the present use of alternating-current arc lamps. The City Dock station, besides supplying the Irvington and the Montclair sub-stations in common with Coal Street, supplies Mechanic Street sub-



MAP OF NORTHERN NEW JERSEY SECTION SERVED BY PUBLIC SERVICE CORPORATION

tion to the sub-stations at Irvington and Montclair, 4 miles and 7 miles away, respectively. Conduits in the streets of Newark carry 13,200-volt cables to the outlying district and thence the energy is taken overhead on 70-ft. poles.

The Irvington sub-station contains one General Electric, 1000-kw, three-phase, 25-cycle rotary and one 500-kw, General Electric, three-phase, 25-cycle rotary, both for railway 550-volt direct current. This sub-station contains five 17½-kw, constant-current transformers used for incandescent street lighting distribution, receiving its energy from the City Dock station at 2200 volts, 60 cycles.

The Montclair sub-station contains three 500-kw, General Electric, three-phase, 25-cycle rotaries, receiving their energy from Coal Street station at 13,200 volts alternating current and supplying 550 volts direct current for railway use. In this sub-station is also 2500 kw in General Electric, two-phase,

station, which is solely used for power supply, and six street lighting transformer stations.

An examination of the map of the district supplied by Coal Street and the City Dock stations with both light, power and railway service, reveals the fact of the present abandonment of the generating stations at Orange and South Orange, and the installation of two sub-stations; one at Lincoln Avenue, to take the Orange station load, and one at Belleville, to fill the increased requirements for railway and lighting in that section. The South Orange station's load is to be divided between the present two sub-stations at Central Avenue and at Irvington.

The new Marion station will play an important part in the more economical supply of light, power and railway energy in this section. Grand Street and Wayne Street stations, two old, small unit stations, and one sub-station (Communipaw), are to be replaced by the new sub-station (Pennsylvania) in



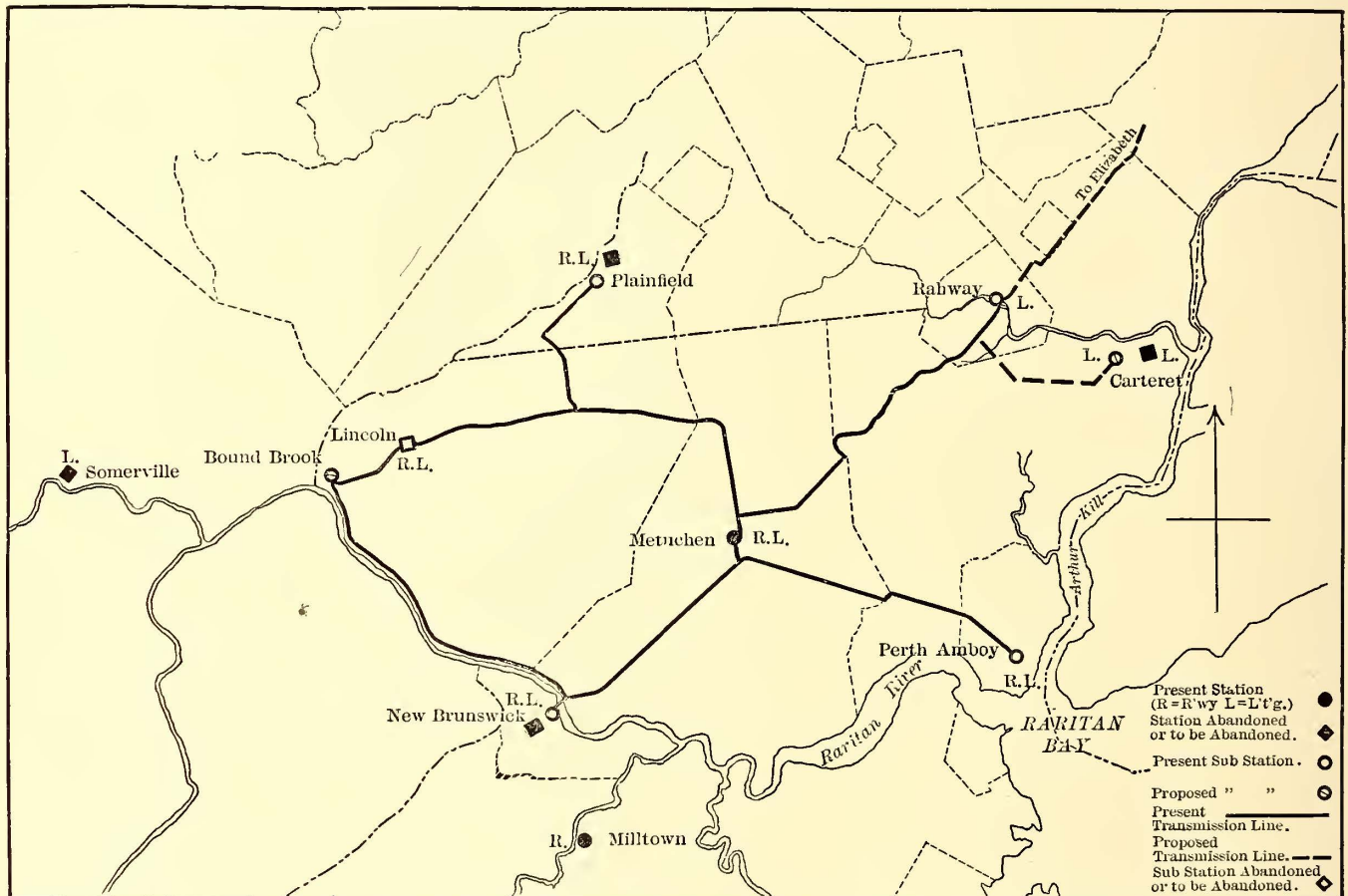
this same district, and the present tie feeders connecting the three sets of apparatus with the Hoboken Fourteenth Street central plant, will be taken out.

The Grand Street station contains nine railway generators of 500 volts direct current. Wayne Street is also an old plant, consisting mainly of slow-speed engines belted to a jack shaft. It also contains one Westinghouse 300-kw, 6600-volt, 550-volt, 60-cycle rotary, used for power service and fed from the City Dock station at Newark through the feeder across the Hackensack Meadows, built over a year ago in anticipation of future use by the new Marion plant. This tie consists of three feeders, each of three No. 00 copper, stretched across the Hackensack marshes on two cross arms supported by two poles. Where the feeders run under the Passaic and the Hackensack Rivers three conductors, lead-covered, iron-armored and paper-insulated cables are used. There are cable and lighting ar-rester houses on both sides of the Hackensack River and on

60-cycle, 13,200-2600-volt, oil-cooled, Westinghouse transformers, fed from City Dock station, Newark.

The Secaucus plant is temporarily connected with four sub-stations—Palisade Avenue, New Durham, Hackensack and Passaic—with 13,200-volt, 25-cycle energy for railway distribution. The plant contains one three-phase, 25-cycle, 13,200-volt, General Electric, 1800-kw generator, direct-connected to an horizontal compound Brown-Corless condensing engine; two three-phase, 25-cycle, 13,200-volt, General Electric, 400-kw generators, each direct-connected to an horizontal compound condensing Watts-Campbell engine; three direct-current, 550-volt, Westinghouse, 350-kw generators, each directly connected to a Bass horizontal, cross-compound condensing engine. The boilers are two 500-hp and four 250-hp Babcock & Wilcox, at 200-lb. pressure, and four 320-hp Climax at 200-lb. pressure, run at 125 lbs.

The New Durham sub-station contains two General Electric,



MAP OF CENTRAL NEW JERSEY SECTION SERVED BY PUBLIC SERVICE CORPORATION

the east side of the Passaic. Three conductors, No. 00, lead-covered, paper-insulated cables are run underground from the east cable house to the Marion power house. There are also in Wayne Street eight 100-kw Wagner, oil-cooled, 6600-2400-volt transformers, used for commercial incandescent lighting as step-down transformers from the Newark station. The concentration of service supply for railway and lighting to the Pennsylvania sub-station and the abandonment of the comparatively uneconomical plants of Wayne Street and Grand Street will make for economy in copper and in kw-hour cost.

The Palisade Avenue plant has been shut down since last spring. It consisted of small generators belted to jack shaft and slow-speed engines. The Palisade sub-station, temporarily fed from Coal Street and Secaucus, will be fed entirely by the Marion plant and consists of three 1000-kw, three-phase, 25-cycle, General Electric, 13,200-550-volt, direct-current rotaries for railway and two 500-kw, three and two-phase,

1000-kw, 13,200-volt, 25-cycle rotaries giving 550 volts direct current. The Hackensack sub-station contains two 300-kw, General Electric, 13,200-volt, 25-cycle rotaries feeding 550 volts direct current. This sub-station can also be fed from the Marion and the Coal Street plants by way of Secaucus station and Palisade Avenue sub-station, as the Secaucus bus can be tied in to the Coal Street plant. The Passaic sub-station contains one 1000-kw and one 300-kw, General Electric, 13,200, 25-cycle rotary, giving 550 volts direct current for railway service. The Passaic sub-station, feeding from Secaucus, can also be fed from the Marion and Coal Street plants. The capacity in 13,200-volt, 25-cycle generating apparatus given by the Marion station permits the shutting down of the Passaic generating plant, as the Passaic sub-station contains also step-down lighting equipment supplied from the Paterson plant as follows: Two Wagner 100-kw, 6600-2600-volt, two-phase, 60-cycle, oil-cooled transformers; two General Electric trans-



formers of like capacity and style, and one Stanley 2000-1000, 60-kw, single-phase, 133-cycle transformer used for incandescent street lighting.

The Paterson plant, as soon as changes can be made, will naturally go the way of the small unit plants, but cannot be spared for some time to come. It contains a number of small units for railway and incandescent lighting.

The Hackensack plant has lighting apparatus only and will be shut down.

The Ridgewood, Rutherford and Englewood sub-stations contain lighting apparatus only. These three sub-stations will be fed from the Marion plant and a new sub-station, called the Hudson River, is to be erected part way between Englewood and New Durham.

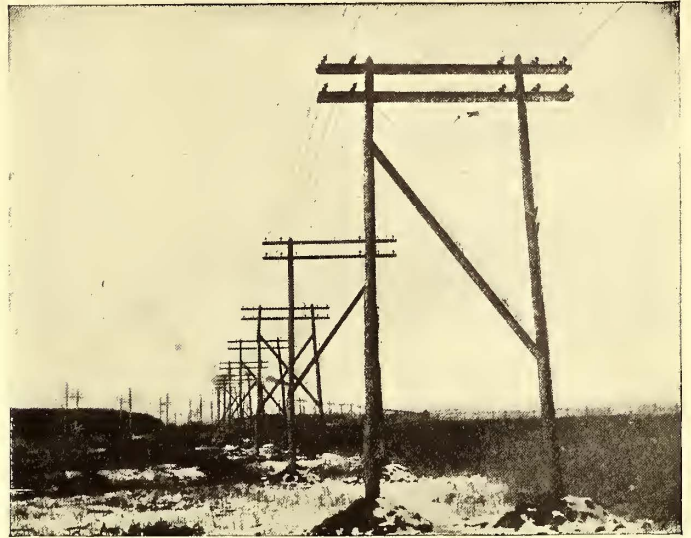
The Hoboken plant at Fourteenth Street and the Hudson River will be retained, as all its capacity is required in the immediate vicinity. The district is rich in possibilities for power distribution. The present tie line with Jersey City at the Wayne Street station is to be dispensed with and the Hoboken plant relieved of this portion of its load, will permit the plant to better care for its own requirements for several years to come. In addition to lighting apparatus, this plant contains three 850-kw, direct-current, General Electric, 550-volt generators, each direct-connected to a Pennsylvania Iron Works cross-compound condensing engine.

The other stations in this section contain a miscellaneous assortment of generating apparatus for railway and lighting, some of it modern and some more or less antiquated.

CENTRAL JERSEY SYSTEM

The Central Jersey system, which at present consists of five central plants and three sub-stations, will shortly be supplied from two plants and seven sub-stations, and the light and rail-

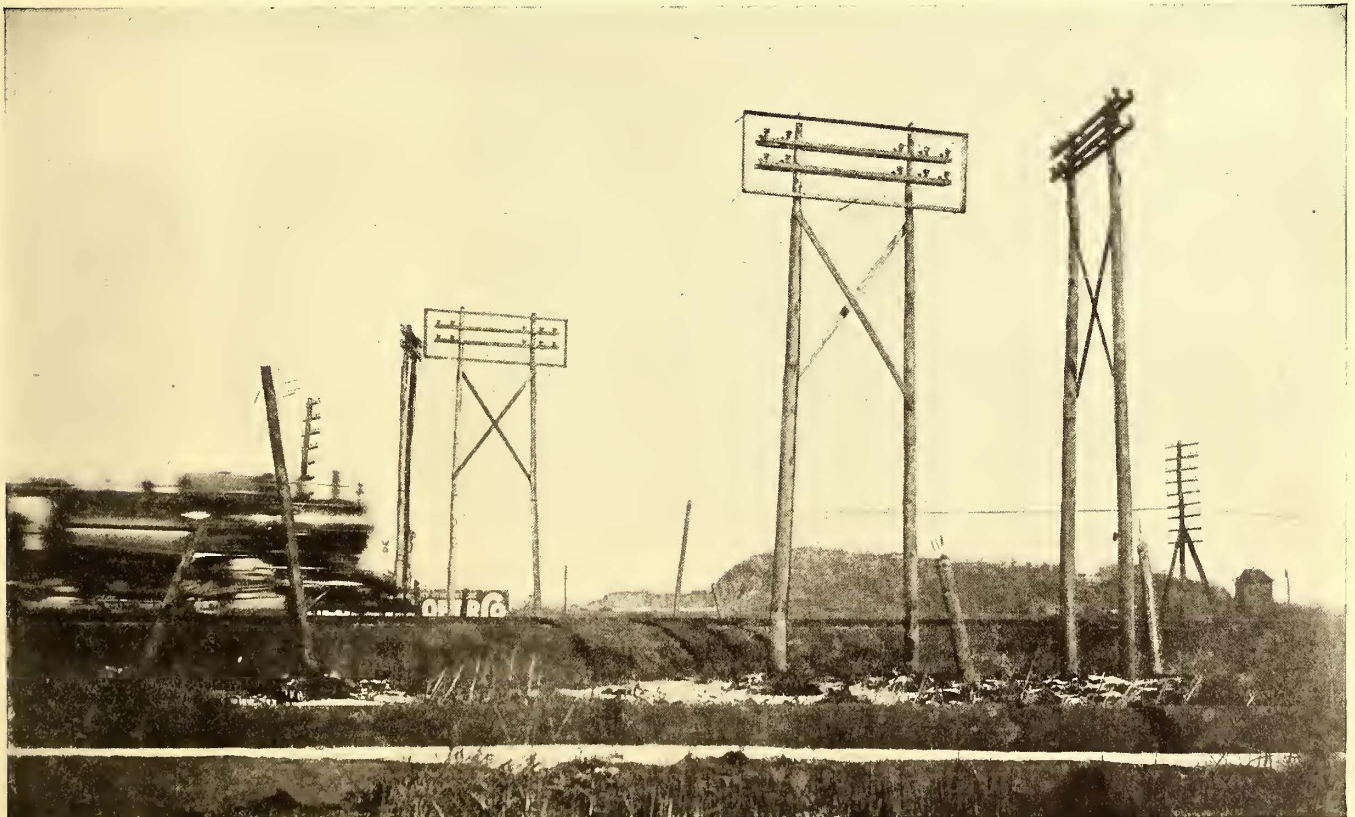
ing sub-stations in Rahway, Carteret, Perth Amboy, New Brunswick, Bound Brook and Plainfield. Each of these sub-stations replaced generating plants, which in general consisted of countershafting and old type generators with slow-speed simple engines, or small units driven from simple high-speed



TYPICAL TRANSMISSION LINE, PUBLIC SERVICE CORPORATION

non-condensing engines. The locations of all these plants made it necessary to cart all coal used at a cost of from 28 to 40 cents per ton, and every one except Bound Brook was obliged to purchase water for boiler supply.

The Metuchen station consists of two 1000-kw Curtis-Gen-



VIEW SHOWING IRON WIRE CAGE AROUND HIGH-TENSION LINES OVER STEAM RAILROAD CROSSING, PUBLIC SERVICE CORPORATION

way plant at Metuchen will be connected with the plants of the Northern New Jersey system by means of the tie feeders from the sub-station at Rahway to be run to Elizabeth, the latter already being connected with Newark.

The important plant in this section is at Metuchen, supply-

eral Electric turbo-generators, 13,200-volt, three-phase, 60-cycle; two S. K. C. 500-kw, 6600-volt, three-phase, 60-cycle generators, direct-connected each to a Pennsylvania cross-compound condensing Corliss engine; three Stanley 50-kw, 6600-2300 volts, three two-phase, 60-cycle, oil-cooled trans-



formers; two three-phase, 500-kw, 60-cycle transformers for stepping-up the Stanley generators to the bus-bar 13,200 voltage, and one 300-kw, three-phase, 60-cycle rotary, transforming to 600 volts direct current. There are two 600, one 700, and two 800-hp Climax boilers at 150-lb. pressure.

#### SOUTH JERSEY SYSTEM

The present South Jersey system consists of the lighting stations at Trenton, at Bristol and at Mount Holly, together with the light and railway plant at Camden and the sub-stations supplied by the Camden plant at Moorestown, Merchantville, Haddonfield, Gloucester and Woodbury. The Gloucester sub-station is now replacing the old plant at that point.

At Camden the railway end is supplied by one General Electric, 200-kw and one Westinghouse, 225-kw, 550-volt, direct-current generator, each belted to one of two vertical cross-compound condensing Ball engines; two Westinghouse, 800-kw, 550-volt generators, each direct-connected to a Pennsylvania Iron Works horizontal cross-compound condensing engine, and one General Electric, 600-amp., 100-volt booster, driven by a direct-current, 500-volt motor on the same shaft. As the South Jersey distribution system is used largely for electric lighting, an enlarged map diagram of it is not reproduced.



### THE EFFECT OF CONSOLIDATION OF PUBLIC SERVICE INTERESTS ON THE LOCAL REPRESENTATIVE

BY WILLIAM PESTELL

The striking modern tendency of electric railway and lighting companies has been toward consolidation of the controlling interests. In these days, when every industry, from the growing of lobsters to the manufacture of steel, is being or has been "organized," it is not surprising to see the same trend in the fields of electrical and mechanical engineering, nor is the intention behind the great movement hard to find. From the smallest local industry to the great aggregations of capital controlling public service corporations, success depends upon "organization." Its aim, in short, is this: To secure economy and a larger field of operation by, first, a centralization of executive power which assures a consistent and recognized general policy, the highest efficiency of superintendence, a minimum of waste of both energy and material by preventing duplication of effort, and by intelligent buying in large quantities. The second object sought is to secure efficiency of operation by the most minute specialization, by which is meant that the man is perfectly adjusted by former training and experience to his work, rather than that the work is adjusted to suit the abilities of the man. By this method, each man knows the exact limitations of his field of work, and his duty is to cover this field thoroughly, quickly and for the highest interest of his employer. He is a cog in a perfectly regulated machine.

The utility of centralization and specialization is unquestioned in commercial life of to-day. Its present application to public service corporations, however, is unsatisfactory in some details of practical operation. I do not in the least underestimate the immense advantages it has bestowed, but I believe it is time to call attention to one salient point where friction exists in the machine. I have mentioned the advantages of consolidation—which connotes centralization and specialization—and they are many. In the first place it has gathered into compact groups the highest engineering and executive talent of the country. It has enabled the small properties to employ this talent in supervision of improvement; expense alone, apart from other obstacles, would render this impossible but for perfect organization. Moreover, by a magnificent system of reports, it makes possible a comparison of the operation of various properties, which, in the case of properties on a poorly-paying basis, is of inestimable benefit.

In the face of such advantages conferred, it is perhaps excusable if any accompanying detriment has been overlooked. Nevertheless it exists. It exists in the local representative and in his relation to the central organization. Public opinion of a company, an unassailable asset when once established, is, in a public service company, largely based on two things—services rendered and local administration. The average commuter knows little and imagines less of the perfected systems developed to facilitate his transportation. They mean nothing to him. But if his car is 10 minutes late on a stormy morning, or if he is unable to get a prompt decision on an apparently trivial matter, he is loud in his denunciations. Public opinion of a company depends no less surely, but in a less degree, upon the employee's opinion, which is based upon the treatment he receives and upon the apparent authority of his local superior. If, in the development of its central organization, the company has dwarfed or belittled the local organization by presuming to dictate a hard and fast policy, regardless of local conditions or opinions, as reflected by its representative on the ground, the company is bound to suffer. If the company has curtailed too greatly the authority vested in either its local manager, superintendent or engineer, it has lost sight of that important factor, the personal element, so necessary in the handling of men, be it its employees or the public. Since the company's reputation depends so greatly upon its local representative, he should be a man carefully selected and should be given authority in accordance with his responsibility. He should be vested with authority to settle on the spot all matters not affecting the general policy, and therefore he should be so thoroughly informed in regard to the general policy as to be able, before rendering a decision, to use judgment in determining the necessity of consulting higher authority.

It may be said that it is impossible to get suitable men for the large number of positions now open. This appears true, as is evidenced by the comparatively large salaries paid to responsible men for the management of properties at great distances from the central organization. But it is a fact that the present practice of seriously limiting the authority of local representatives is not only spoiling men now in such positions, but is slowly and surely obliterating all possibilities for development of good material. The first requisite of a successful public service corporation manager is a thorough understanding of human nature, and no man can acquire this thorough understanding who is not allowed to think and act for himself in his dealings with other men. And this the "average" local representative is not privileged to do under the present system.

Anyone who has served a modern consolidated company as local representative will fully appreciate the truth and validity of this assertion. Managers and officials of large companies, who have seen scores of apparently able men, the graduates of our colleges and technical schools, make dismal failures when put into responsible local positions, would do well to ascertain whether this relation of utter dependence of the local representative upon the central organization is not the cause of these apparent failures.

If it be urged that many such graduates are placed in responsible positions before they have acquired sufficient experience in the handling of men, whether employees or the public, I repeat that the present system is absolutely inadequate, in that it affords such men no opportunity to develop the requisites for successful management, but rather places them in a position of dependence, which ultimately destroys initiative power and firmly shackles the most potent individuality.



F. H. Thomas, passenger and excursion agent of the East St. Louis & Suburban Railway Company, has adopted a novel method of advertising the excursion business of that railway by issuing a keyring tag which bears a view of one of the cars of the company, a short advertisement and a space for the name of the owner.

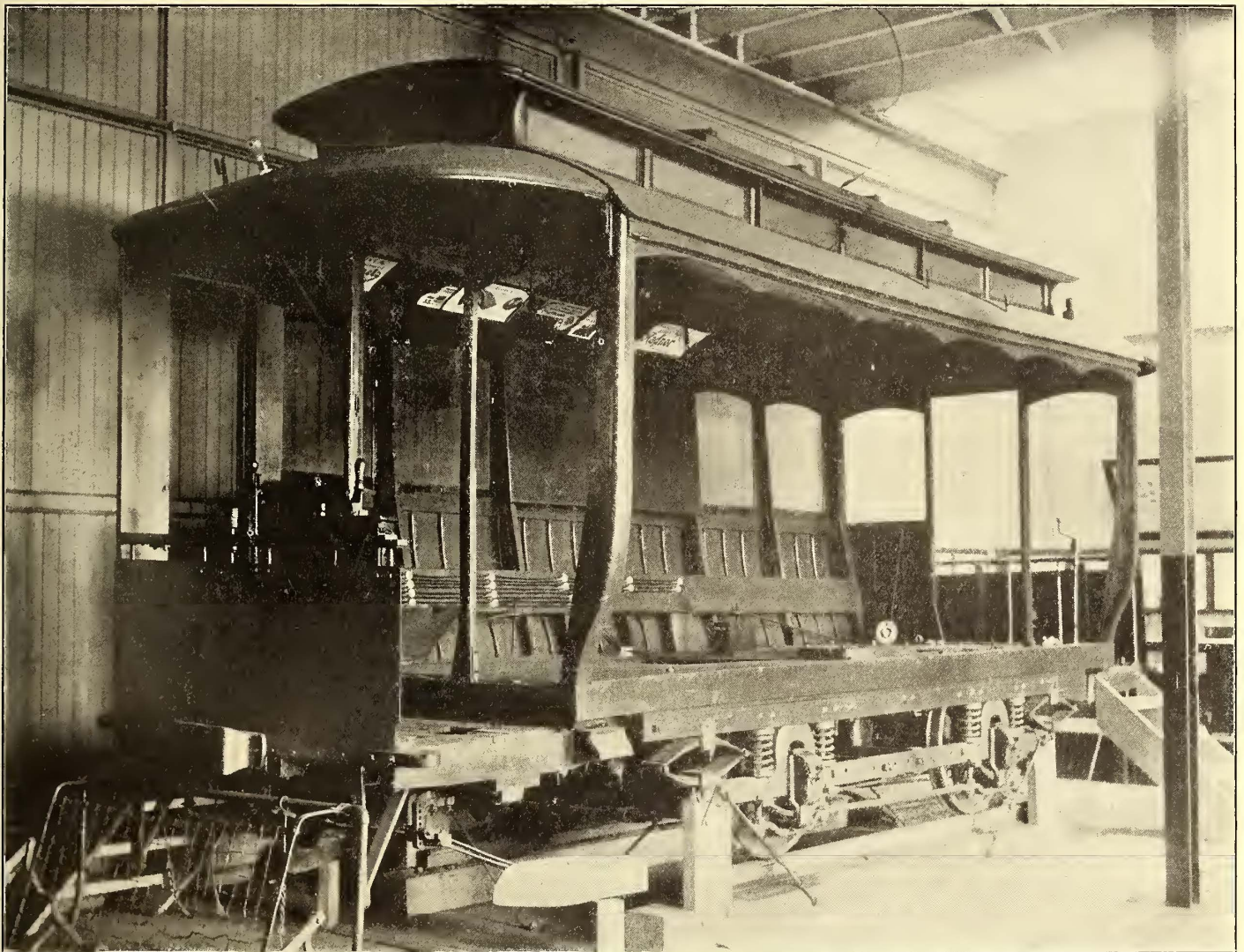


## EMPLOYEES TRAINING SCHOOL AT MONTREAL

In order to assist in the training and the educating of its men, the Montreal Street Railway has a training school in which ambitious recruits are systematically taught how to become not only acceptable motormen, but fairly good electricians, thoroughly familiar with the mechanical and electrical equipment of a car and the proper manipulating of the apparatus. The men employed by the company are required to present a neat and tidy appearance, and before they are admitted to the training school they are examined by the company's doctor. Applicants who have successfully passed the physical examination are allowed to fill out an application blank and are ad-

plained. The men are also taught how to cut out a disabled motor and how to manipulate the reverse. The school is equipped with an operative skeleton car jacked up from the track so that the wheels may spin even more freely than they would on the road.

At this period the men enter upon the most difficult part of their education. On the road they must be able not only to run their cars in a manner which would be a credit to them, but they must also be able to do slight repairing whenever occasion may require. Accidents of all kinds may happen and they must be able to cope with them. Before they graduate they are placed on the skeleton car and instructed how to operate the apparatus of which they are in charge and how to



SKELETON CAR—MONTREAL SCHOOL FOR EMPLOYEES

mitted to the school. Each recruit is assigned to one of the dummy car platforms in the school room, which are fitted with controller, brake, gong and sand lever. During the few days passed on the dummy platform the prospective motorman is taught how to start his imaginary car without hurling the passengers from their seats, and how to stop gradually under ordinary circumstances, and quickly in case of emergency. The advisability of turning the controller handle on one point at a time, also the limit of time on each point, is forcibly impressed on the students. In order that the men may become familiar with the conductors' signals, the chief instructor conveys his orders by means of an ordinary car bell. When they have become familiar with the working of the controller and brake, they are then taught something about the mysteries of electricity. The casing of a controller is opened so they may see how it is constructed, and the meaning of each point is ex-

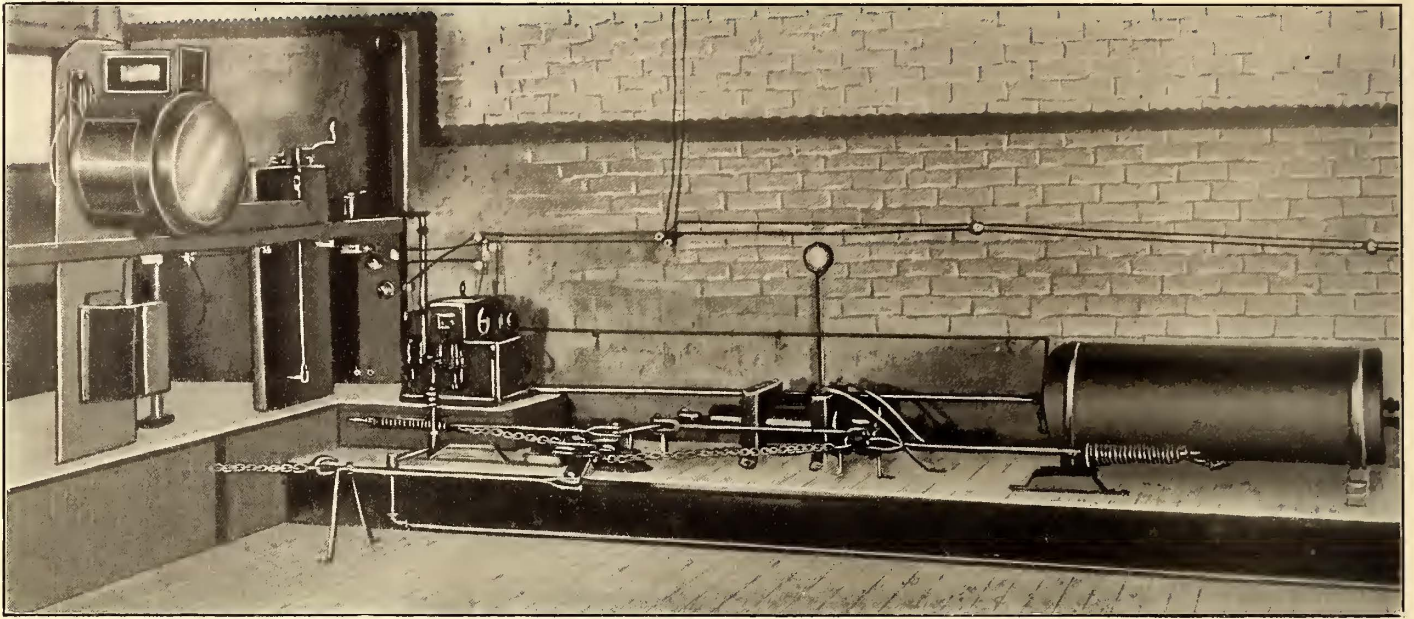
locate open circuits. When the applicant has learned in the school all that he need know, he must pass through a post graduate course on the road under the guidance of an expert motorman, and is required to stay on the first line seven days. After he has trained over all the various lines, the new man then goes to the repair shops for a period of five days, where he must learn how to do slight repairing on the road.

After he has concluded his course in the shop the student then comes back to the chief instructor, who in turn takes him over some of the various lines in order to determine his capabilities of operating a car on the road. If he should not prove competent he is sent back for a more thorough training, providing there is still hope of his becoming a motorman, but if in the event the chief instructor sees that his incompetency is due to carelessness and neglect other than lack of training or nervousness, he is summarily dismissed. All men who prove



to be competent are taken back to the training school for their final examination, where they are required to answer in a satisfactory manner all questions put to them by the chief instructor.

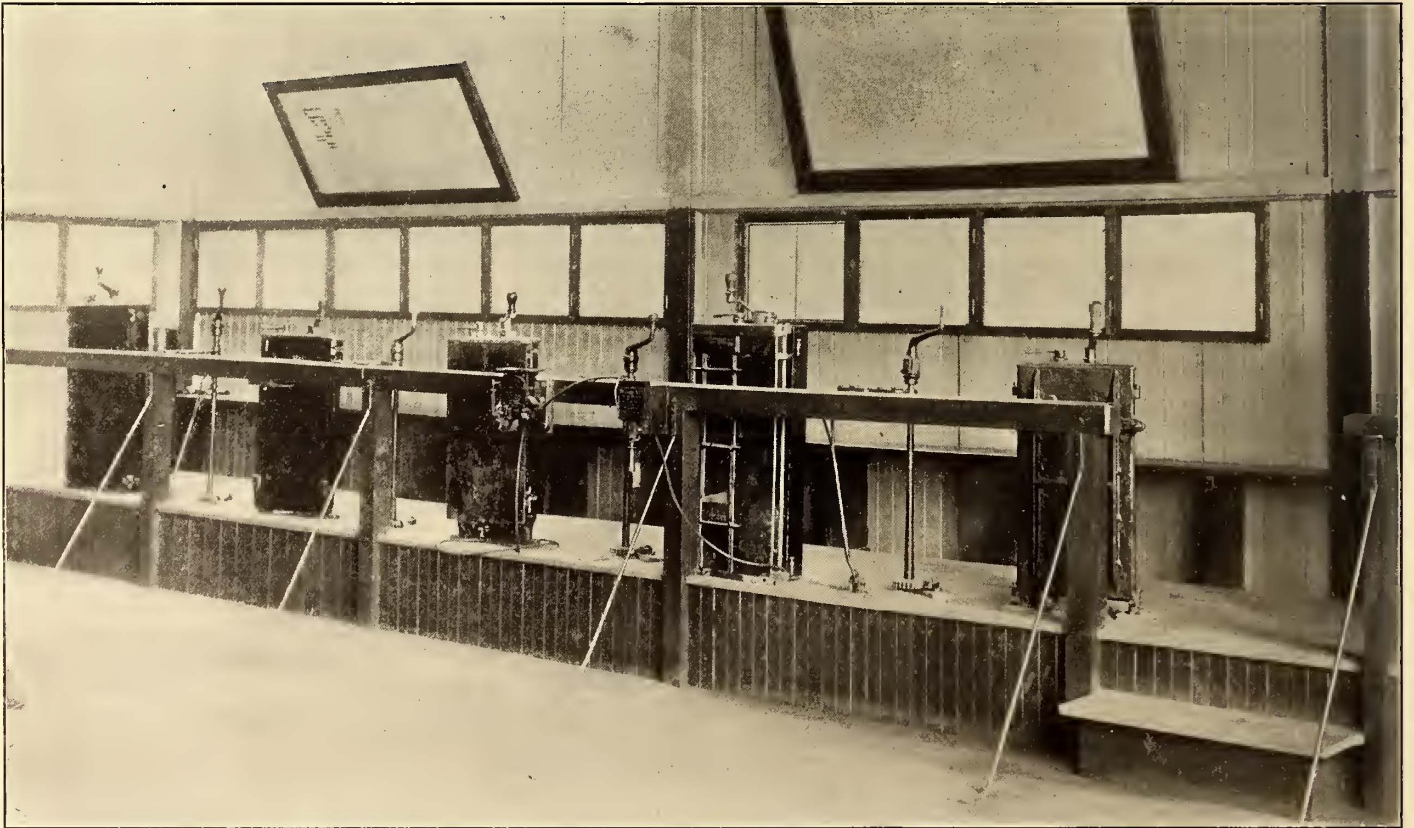
so that their cars may stop gradually without jerking. The importance of releasing the brake before the car comes to a stop is also explained. They are warned that on a slippery rail they must apply the air very gradually in order to avoid skid-



AIR-BRAKE APPARATUS, CONTROLLER AND HEADLIGHT—MONTREAL SCHOOL

After the new men have been in the company's service for about a month and have proven to be good, careful motormen they are allowed to train on the air-brake cars, which up to that

ding the wheels, and are told that, as a matter of fact, even should the rail be in perfect condition, if the air brake is applied too suddenly the wheels are likely to skid and flat wheels



CONTROLLER PLATFORM, SHOWING CONTROLLERS, CIRCUIT BREAKERS, FUSE BOXES, MAPS AND DIAGRAMS USED IN MONTREAL SCHOOL FOR INSTRUCTING CONDUCTORS AND MOTORMEN

time they are not allowed to run. The training school is equipped with air brake apparatus which consists of exactly the same parts as are mounted underneath the car, with the air brake and the hand brake connected up in the same manner as in actual operation. The men are taught how to apply the air

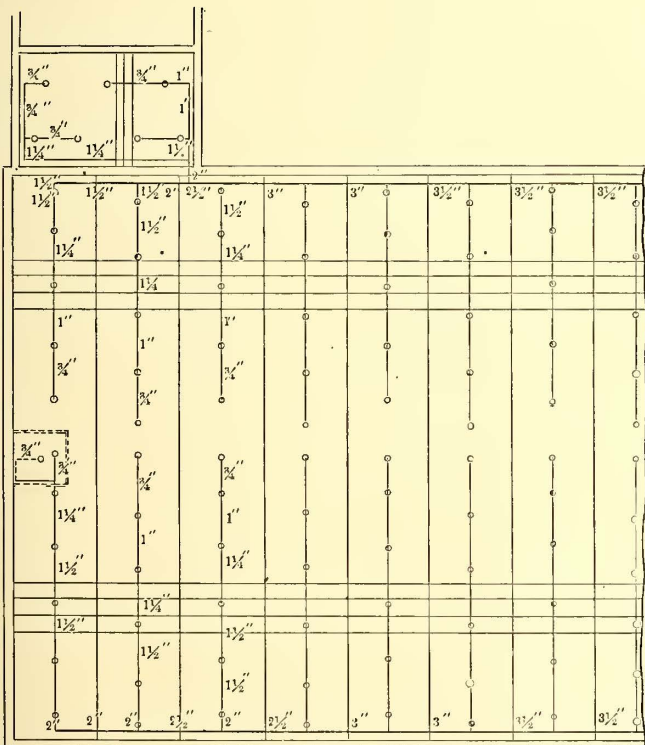
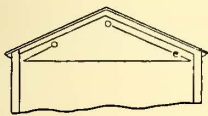
will be the result. By having the air brake equipment in the training school, it is found possible to give each motorman a thorough understanding of the operation of the brake. The school and work of training employees are in charge of J. Callaghan, inspector and chief instructor.



**CAR HOUSE SPRINKLERS AT ALBANY**

The United Traction Company, of Albany, N. Y., is equipping all of its car houses, shops, stables and emergency stations with automatic sprinkler systems, including side line, or aisle sprinklers, for extinguishing fires in cars. These buildings are grouped in four plants, located respectively at North Albany; Quail Street, Albany; Albia and Lansingburg.

The North Albany car house includes two main operating and storage buildings, separated by a narrow alleyway, and also a repair shop, emergency station, stables, storage house and sub-station. The capacity of the plant is seventy cars. The buildings are brick throughout, with concrete pits and floors, and plank roof supported on light steel girders, with a covering of five-ply slag roofing on top of the plank roofing. The Quail Street plant, which has capacity for about 100 cars, is built with brick walls and reinforced concrete roof. The Lansingburg plant, which has storage capacity for about 200 cars, comprises a brick building with plank roof supported on steel trusses and covered with five-ply slag roofing. Adjoining this building there is a small heating plant and a small reserve power station, and these buildings are also included in the general protection scheme. The Albia plant, which is



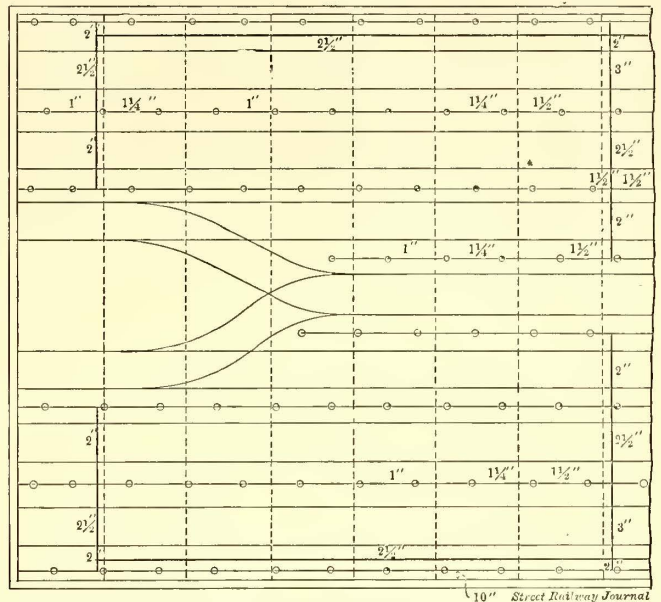
PLAN SHOWING ARRANGEMENT OF CEILING SPRINKLERS, NORTH ALBANY CAR HOUSE, UNITED TRACTION COMPANY

practically a duplicate of the Lansingburg house on a smaller scale, has a capacity of fifty cars.

These plants include all of the buildings owned by the United Traction Company, with the exception of the main office building, which is a fireproof brick and steel structure; the steam power plants of the system and two buildings used for freight and express. The reason for not installing sprinklers in the steam plants is found in the fact that the United Traction system is now operated entirely by power purchased from a water-power company, and the steam stations are merely held in reserve for emergencies, and as no occasion has arisen for their use in the past two years, they will doubt-

less be dismantled some time in the future. The express buildings were not included in the scheme inasmuch as the express business is still in a transitory state and the plans for permanent buildings are not fully perfected.

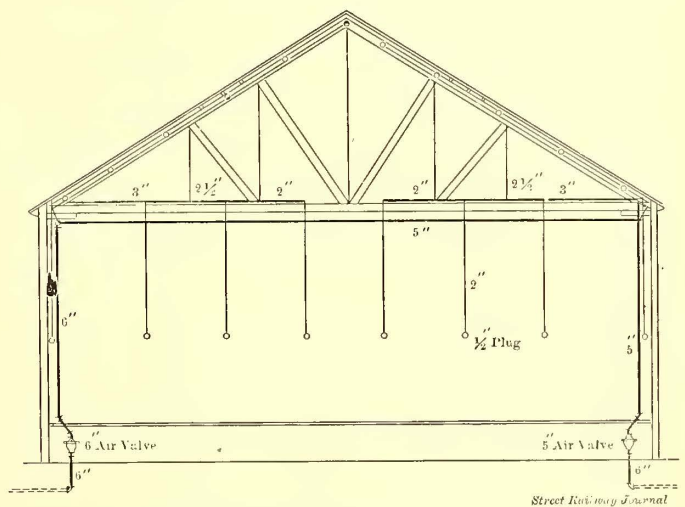
After consultation with the Board of Fire Underwriters of the State of New York, an agreement was finally reached be-



PLAN SHOWING ARRANGEMENT OF SIDE-LINE SPRINKLERS, NORTH ALBANY CAR HOUSE, UNITED TRACTION COMPANY

tween the underwriters and the traction company whereby the insurance rate would be materially reduced providing the traction company would do the following things:

Put in ceiling sprinklers and side line or aisle sprinklers between tracks at the car house in Albia, Lansingburg and



SECTION THROUGH NORTH ALBANY CAR HOUSE, SHOWING COMBINATION OF CEILING AND SIDE-LINE SPRINKLERS

North Albany, and side line or aisle sprinklers only in the car house at Quail Street. As the Quail Street building has a concrete roof it was not deemed necessary to install ceiling sprinklers in this plant. The traction company also agreed to install at each plant, as auxiliary to the city water supply, a 25,000-gal. tank supported on a 75-ft. structure. The sprinklers are to be on the dry-pipe system in all car house and other buildings where there is possibility of freezing. The company also agreed to put in automatic air compressors at each of the four plants to maintain suitable air pressure for the dry-pipe system. These compressors will consist of a Christensen motor-driven air-brake



compressor, of the type ordinarily installed on cars for air-brake operation. All of this work is to be done under the direction and supervision of the Board of Fire Underwriters of the State of New York.

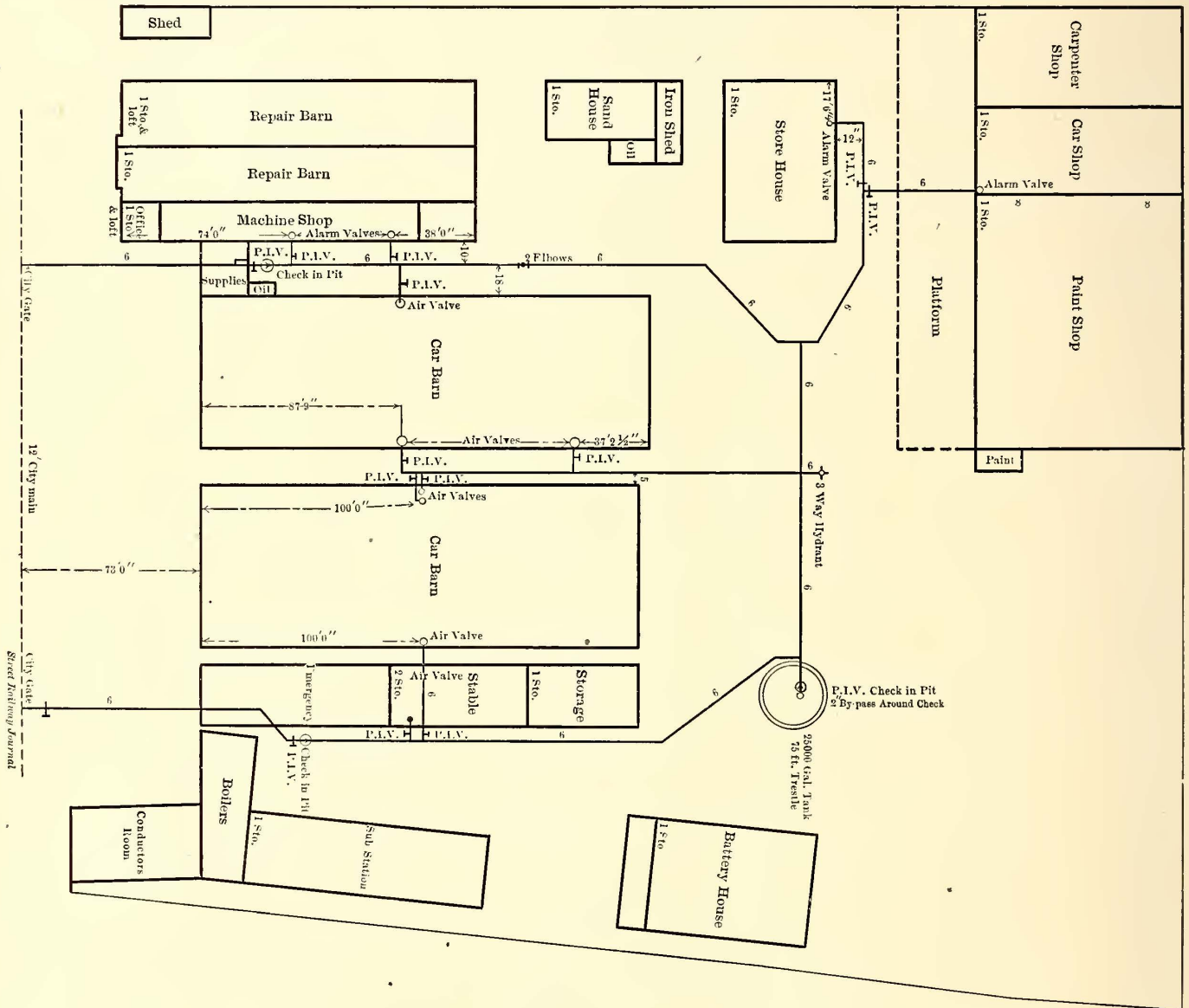
It may be stated that in consideration of the installation of fire extinguishing apparatus as outlined, the underwriters have guaranteed a reduction in fire insurance rates which, at the cost of installing the entire apparatus, will pay for the sprinklers, compressors and tanks at all the plants in approximately five years, neglecting the single item of maintenance. The United Traction Company has contracted with the General Fire Extinguisher Company, of Providence, R. I., to install the com-

as this building has a concrete roof, and the ceiling sprinklers have been omitted. In all cases the side lines will be placed about 8 ft. above the car house floor, in line with the top of side windows of the cars.

Owing to the general construction of the buildings, the ceiling sprinkler heads have been spaced so that each one covers approximately 70 sq. ft.

The aisle sprinklers are placed not over 7 ft. apart midway between cars, and where cars are over 4 ft. apart two lines have been put in.

At each of the four plants the 25,000-gal. tank will be placed outside of the building on a steel tower 75 ft. high. From the



MAINS FOR SPRINKLER LAYOUT, NORTH ALBANY PLANT, UNITED TRACTION COMPANY

plete systems, including, in addition to the Grinnell automatic sprinklers, the tanks, hydrants, underground piping and post-indicator valves controlling each branch into the buildings.

The installation in the Lansingburg buildings includes a wet and dry-pipe system of 2674 Grinnell automatic sprinklers, and fire extinguishing apparatus distributed on the ceiling of the car house proper, on the ceiling of the loft and between the tracks on side line piping placed about 8 ft. above the car house floor. Grinnell sprinkler heads will also be placed in the engine room and boiler room at this plant.

The North Albany plant includes 1920 sprinkler heads, and the Albia plant 661 heads, properly distributed in the ceiling and on the side lines between the tracks. The Quail Street plant will have 725 heads, placed for the most part on side lines,

tank in each case a 6-in. pipe connection runs to the system of underground piping constituting the supply main for the sprinkler pipes in each building. At all the plants the sprinkler main is also connected with the city water supply, and the tank serves as an auxiliary reserve to fill the sprinkler system in case the pressure in the city mains drops below 60 lbs.

To prevent water in tanks from freezing, a coil supplied with live steam is placed in each tank. The 6-in. connection supplying sprinkler systems and steam supply and return for coils are all boxed in with frost-proof covering.

In each case the installation includes Grinnell dry-pipe valves, variable-pressure alarm valves and necessary gages, electric circuit closers, drop annunciators and water-motor alarms with gongs located at convenient points in the plant.



## NEW ENGLAND STREET RAILWAY CLUB

The December meeting of the New England Street Railway Club was held in Boston at the American House on the evening of Dec. 28. The topic under consideration was a paper on "Lightning Protection," by H. W. Young, of the Boston office of the Westinghouse Electric & Manufacturing Company.

In beginning his paper, Mr. Young pointed out the necessity of appreciating the fundamentals of lightning protection for both the high and low-tension ends of electric railway work if a maximum degree of protection is to be obtained with a minimum expenditure for original outlay and upkeep. In planning a new station, space should always be allowed for the protective apparatus, in order that it may have proper insulation, ventilation and accessibility. Each separate line leaving the building should be provided with one arrester having a voltage rating somewhat exceeding the voltage existing between line and ground when one of the wires of the system is grounded. If the local conditions in the way of thunder storms and winds are severe, specially heavy insulation is needed. When transformers are placed between the generators and the line, the requirements are simpler. The value of protection is directly proportional to the difference in resistance to static discharges offered by the protective device and the apparatus shielded. Preference should naturally be given to devices having the lowest equivalent spark gaps—by which is meant that length of gap which, when placed in parallel with the apparatus, will just fail to take the discharge.

The most modern apparatus for testing arresters is that designed by P. H. Thomas. A high-voltage transformer connected to the supply circuit through an impedance coil, charges a condenser capable of being intermittently discharged by means of a swing switch. The resulting current is purely electrostatic, owing to the fact that the flow of transformer short-circuit current at the interval of closing is so limited by the impedance that it becomes negligible. The condenser discharge breaks down the series gap, and the charge is thrown upon the arrester or other object under test. A measuring or equivalent spark gap is placed in multiple with the arrester, and the opposite side of the circuit is grounded. Tests requiring considerable power can readily be made with this equipment.

The equivalent spark gap of an arrester should be of considerably lower value than that of the apparatus to be protected. With new equipment, the relative strengths can easily be determined, but after apparatus has been in service, and especially if it has been overheated or otherwise abused, the relative protection offered by such a device becomes lower and lower. Finally a point might be reached where the insulation would be so poor that it would afford a far freer discharge path than the protective devices themselves. In a new plant these considerations need not be specially borne in mind.

Mr. Young's paper was illustrated by lantern slides, and a large variety of apparatus was shown, together with experiments in high potentials, the latter being clearly photographed. The speaker described the various types of arrester which have given the best results in practice, notably the multigap arrester with resistance pencils in series, the multigap with non-arc metal cylinders, and the horn type. He stated that the arrester with non-arc cylinders has the lowest equivalent spark gap of any arrester for the service for which it is designed. It has an instantaneous current carrying capacity, which aids in clearing the line of surges, and operates with such freedom of discharge that it does not open the circuit breakers on systems where they are particularly lightly set. The degree of protection with this type of arrester depends upon the number of series gaps, the shunted gaps being so proportioned that they will break down when subjected to the potential which results from the discharge of the series gaps. The number of series

gaps is just enough to withstand normal voltage and allow a proper margin of safety for the severest condition, which is one line grounded. Arresters for potentials exceeding 18,000 volts are adjustable to meet local conditions. In the event of a hold-over with this type of arrester—called the "low-equivalent" type, frequently—the only failure of the arrester would be in the fusing of its resistance, which would immediately open the circuit. This fusing action, however, is a remote one, and in consequence of the great life of the arrester, is relatively unimportant.

The horn type of arrester requires the addition of a resistance to cut down the flow of current on short-circuits, if its life is not to be seriously impaired. Even then the time element in extinguishment, common to all forms which have proven to work, is several seconds in duration, which would doubtless impair the usefulness of this type for railway work. It is an undesirable type for indoor service, and thus far the resistance used has proven extremely fallible.

Choke coil protection in the form of a simple choke coil or a static interrupter is desirable in all high-potential installations. The choke coil may be placed directly in the line leads or in the terminal leads of the apparatus; the static interrupter is applicable only on the terminals of apparatus between the switches and the equipment protected. The placing of coils in the line leads is not in general considered as satisfactory as placing them in the leads of apparatus. For, in the latter case, they allow of the most economical expansion of the station and give a desirable protection against the strains arising from switching. The static interrupter differs from the choke coil in the addition of a condenser between the coil and the apparatus protected. The condenser has the effect of increasing the effective impedance of the coil to high frequency discharges, although the insulation must be designed to protect the coil from side flashes.

Mr. Young then discussed the protection of low-potential circuits of 600 volts or less, stating that while the feeders require little protection, the arresters should be spaced so as to drain the trolley of as much of the disturbance as possible before it reaches the cars. Five or six arresters per mile is the proper number, determined by tests. The speaker stated that he was not aware that this installation of five or six arresters per mile had ever been consistently carried out, which perhaps accounts for the lack of complete success so far reported in this phase of the service.

Every car should have a lightning arrester, for the relative freedom of discharge of arresters and apparatus is no more important than at this part of the equipment. The speaker described several different types of arresters, laying special emphasis upon the "fixed coherer" type, or "multipath" arrester of the Westinghouse Company. This arrester resembled in action the coherer used in wireless telegraphy, and it is essentially a small number of air gaps in series with a so-called discharge block which may be conceived of as possessing a large number of conducting particles suspended and separated by an ordinarily non-conducting medium. On either side of the discharge block are fastened brass plates, connected respectively to the ground wire and line. As the static discharge comes in it jumps the primary gap, and, meeting slight opposition in the coherer element, or discharge block, passes freely to earth. The line current cannot follow, for the conducting particles do not cohere, as in wireless telegraphy. The discharge block is so proportioned that the length of discharge path is short as compared with the surface presented for discharge; therefore the static charge spreads out over numerous paths.

Mr. Young then referred to the records obtained from operating companies during the past year and a half under actual service conditions, discussing the special paper records taken from arrester discharge gaps, and illustrating his remarks by



actual test sheets. The method and results were described by N. J. Neall in a paper read Oct. 27, 1905, at the 200th meeting of the American Institute of Electrical Engineers. He also showed a slide owned by Prof. A. E. Kennelly, of Harvard University, which well illustrates the work which lightning arresters are at times called upon to do.

The speaker concluded by emphasizing the advances which have lately been made in the study and production of lightning protection apparatus by the manufacturers. He urged that a more thorough study be made by operating companies of this most important question, in fairness to the manufacturers; advocated the placing of a trained graduate engineer in charge of the lightning arrester problem, its records, maintenance and improvement on each system; and contended that the moderate initial and maintenance cost of a proper equipment will in a short time be fully justified by the decreased repair bills, increased revenue and better service rendered by the apparatus protected.

### FREE BAGGAGE ON THE INDIANA UNION TRACTION COMPANY

Since the beginning of the new year the Indiana Union Traction Company has begun carrying baggage free of charge. Through the courtesy of General Manager H. A. Nicholl, it is possible to give herewith some of the details of the new arrangements.

The following notice, signed by S. R. Dunbar, passenger agent, was sent out to other electric lines and to hotels and theaters in the vicinity of the Indiana Union Traction Company lines, with the request that it be posted in a conspicuous place:

On and after Jan. 1, 1906, the Indiana Union Traction Company will carry, free of charge, 150 lbs. of baggage checked on a full first-class ticket. To avoid delay of trains at stations, however, small pieces which can readily be handled by passengers in the cars will not be checked.

For baggage weighing in excess of 150 lbs. the charge will be based on the full one-way passenger fare between stations shown on ticket held by passenger, according to table below. The rate per 100 lbs. is shown in the second column, opposite the proper fare in the first column:

Full One-Way Passenger Fares	Rate Per 100 Lbs.
\$0.05 to \$0.60, inclusive.....	\$0.15
0.65 to 0.80, " .....	0.20
0.85 to 1.05, " .....	0.25
1.10 to 1.25, " .....	0.30
1.30 to 1.45, " .....	0.35
1.50 to 1.65, " .....	0.40

Above \$1.65—24 per cent of full one-way passenger fare.

The minimum charge, however, for excess baggage will be 25 cents, and no free allowance will be made when the one-way fare is less than 25 cents, but the charge will be computed on the full weight of baggage, with a minimum charge of 25 cents.

This information is tendered you for the information of the traveling public and representatives of theatrical companies.

The subject of free baggage has been receiving a great deal of attention from the traffic managers of the interurban lines centering at Indianapolis. As reported in the STREET RAILWAY JOURNAL of Nov. 25, the November meeting of the Indiana Electric Railway Association actively discussed a paper by F. D. Norveil on this subject, entitled "Shall Baggage Be Carried Free?" In his paper, Mr. Norveil, who is superintendent of the freight and baggage departments of the Indianapolis & Northwestern Traction Company, gave figures showing that while quite a large revenue was lost when his road began to carry baggage free, the increased travel resulting more than offset this deficit. At this meeting, President Brady, of the Indiana Union Traction Company, stated that his road was carrying more than 5000 pieces of baggage per month, and that the revenue was considerable.

The decision of the Union Traction Company to carry baggage free has been arrived at in the belief that the increase of travel will compensate for the loss of this revenue. The change in the method of handling baggage has necessitated special instructions to baggagemen and station agents. These are embodied in a pamphlet compiled by Mr. Dunbar, the text of which is as follows:

#### INSTRUCTIONS TO AGENTS AND EMPLOYEES REGARDING FREE AND EXCESS BAGGAGE

1. Agents are required to be at stations in ample time to attend to the weighing and checking of baggage before arrival of trains. They will not allow passengers to open baggage while bearing checks or remove anything therefrom. They will be held responsible for the safety of baggage while in their charge, and will be required to pay all claims arising from loss or damage to baggage through negligence on their part.

2. For passengers holding first-class tickets, agents will check free of charge personal baggage weighing not over 150 lbs. on each first-class ticket; except that hand satchels, valises, grips, etc., which are not too heavy or bulky to be handled by passengers in the cars will not be checked. Check no baggage on excursion tickets.

3. Baggage consists of wearing apparel or personal effects that may be necessary for use and comfort of passengers while traveling. Articles that may be checked are trunks, heavy and bulky valises, satchels, grips, etc. (See exception in No. 2 and charges in No. 10.) Commercial men's sample cases, tool chests, packs, etc., and property of theatrical companies. But in the case of theatrical scenery you must have it clearly understood that it is accepted only subject to delay, as it will be forwarded only on freight trains and not in passenger trains, except under special arrangements. Bicycles, baby carriages, etc., will also be checked, but are subject to special charges. (See No. 10.)

Articles that are not baggage and which must not be checked are jewelry or goods of extraordinary value, perishable or fragile goods, explosive matter, household effects, camp equipage, typewriters, calcium light tanks, bundles in shawl straps, bundles of miscellaneous articles, open baskets or bags, etc. Baggage with bundles or other articles attached, or two pieces of baggage tied or strapped together will also not be checked.

4. Passengers must present tickets before baggage will be checked. Check to no other place than to destination shown on ticket. Stamp each ticket on which baggage is checked with the rubber stamp "Baggage Checked," provided for that purpose. This will prevent the checking of baggage twice on the same ticket, as you are not to check on a ticket so stamped.

5. Do not check any baggage free when the full one-way fare is less than 25 cents. But make the minimum charge same as for excess baggage (see below) of 25 cents, and if the baggage weighs more than 150 lbs., charge 15 cents per 100 lbs. for the full weight. For example, if baggage weighed 225 lbs., the charge would be 35 cents; 300 lbs., 45 cents; 350 lbs., 55 cents., etc.

6. Excess Baggage.—Baggage weighing in excess of 150 lbs. (or baggage for points taking a one-way fare of less than 25 cents) will be considered as excess baggage, and a charge will be made for checking same. Excess baggage is computed by weight, regardless of the number of pieces.

7. Charges.—The minimum charge for excess baggage will be 25 cents. Never collect less than that. The rates are shown in the table below. To determine the charge, multiply the number of pounds in excess of 150 lbs. free allowance (see No. 5 for exception) by the proper rate per 100 lbs., always bearing in mind the minimum charge. For example, you find a lot of baggage weighs 310 lbs. and the proper rate is 15 cents, deduct free allowance of 150 lbs. and your excess is 160 lbs., charge 25 cents.

8. Table of Rates.—To determine the rate, first ascertain the full one-way passenger fare. Locate this amount in first column of table below and in the same line in the second column will be found the proper rate per 100 lbs.:

Full One-Way Passenger Fares	Rate Per 100 Lbs.
\$0.05 to \$0.60, inclusive.....	\$0.15
0.65 to 0.80, " .....	0.20
0.85 to 1.05, " .....	0.25
1.10 to 1.25, " .....	0.30
1.30 to 1.45, " .....	0.35
1.50 to 1.65, " .....	0.40

Above \$1.65—24 per cent of full one-way passenger fare.

In computing charges, enough should always be added when necessary to make the weight and rate end in 0 or 5.



9. No single piece of baggage weighing in excess of 250 lbs. will be checked.

10. Special Charges.—The following flat rates will be charged per piece. Each article must be checked and charged for separately, whether passenger has other baggage or not, and will be checked only at owner's risk:

(a) Bicycles and tricycles, 25 cents each. But they will not be checked when there are bundles or lanterns attached.

(b) Baby carriages and go-carts, 25 cents each. But they will not be checked when they contain articles other than pillows, robes or blankets belonging thereto.

(c) Ice cream coolers, 5 gals., 25 cents; 10 gals., 50 cents; 15 gals., 75 cents.

When checking any of the above use "Excess Baggage Check" and mark thereon name of the article checked and do the same in reporting.

(d) The charge for transporting a corpse to any point on the system will be \$5, except for the corpse of an infant, which be \$2.50. Note: You will in no case, however, receive a corpse for transportation unless it is accompanied by a physician's, coroner's or Board of Health certificate, also an undertaker's certificate that the body has been prepared for burial and shipment in accordance with the rules of the State Board of Health; nor will you receive it with or without such certificates if fluids are escaping from the case or it has become offensive in any degree.

The transportation of a corpse dead of smallpox, Asiatic cholera, yellow fever, typhus fever and Bubonic plague is absolutely forbidden.

11. Baggage will be checked only at owner's risk to points where no regular agencies are maintained (cross-roads and stops) or where the agency is distant from our tracks. (See 12.) The company assumes no responsibility for the protection, care or delivery of baggage unloaded at these points. When checking to such points, a minimum charge of 25 cents will be made for such service. (See article No. 5, and charge accordingly when weight of baggage is in excess of 150 lbs.)

12. Stations on time-tables and tariff sheets where no agencies are maintained or where agencies are distant from our tracks are at present as follows:

Howlands, Dickeys, Smiths, Hunts, Armstrongs, Gas City Junction, Orestes, Dundee, Welsh's, Corner, Forty-Second Street, Nora, Pleasant Grove, Grays, Jackson, Fairfield, Jewell, Lincoln, Cassville and Greeves Overway.

"Double Check" (see No. 13) to all these points, as well as to all points not shown on time-tables and tariffs.

13. "Double Checking."—When checking baggage, etc., at owner's risk (see Nos. 10 and 11) pieces must always be double checked—that is, you will not give the passenger any receipt for the baggage. You will use the excess baggage check and leave the passenger's stub attached to that part of the check which is fastened to the article checked. (Conductors have instructions to remove all checks and parts of checks before unloading baggage which is "double checked.")

14. Baggage agents must examine all baggage carefully when received, and if any has the appearance of being in bad order, hinge or lock broken, they will decline to check the same unless the owner's attention is called to it and he is notified that it will be checked only at his own risk, and agents will then make notation on their books, "Received in bad order." When receiving baggage at junction, transfer and terminal points, carefully note the condition of each piece, and if any is accepted in bad order, call the trainmen's attention to the condition of same when delivered to the train.

15. Agents will issue no checks until the baggage is in their actual possession, and will in no case check more than one piece of baggage with one check. An exception will be made to this rule in that you may exchange checks with reliable transfer or railroad companies, provided you have had written instructions from the proper officer to do so. But in all such cases be careful to explain to the owner of baggage that we assume no responsibility for damage or delay until such baggage is in our possession.

16. Baggage Checks.—(A) For both local and foreign free baggage you will use the duplicate form of check provided, showing on both portions, in ink, or by rubber stamps, never in pencil, the stations from and to which baggage is checked, together with junction points, in accordance with ticket held by passenger. In checking to foreign lines be sure to show the complete route, giving initials of each road to be traveled over, together with junction points, exactly in accordance with through interline ticket held by passenger. You will hand duplicate portion of check to passenger and attach the original to baggage by means provided.

(B) The prepaid or excess baggage check, the triplicate form, must be used whenever a charge of any kind is made for trans-

porting baggage, whether for local or foreign excess, for transfer charges, or for single pieces going via lines which do not carry baggage free.

For excess baggage, checks must be filled out same as instructed in "A" of this section, and in addition, on each portion of check in spaces provided, must be shown in ink, the date, the amount collected, whether in cash or coupons, the net excess weight, the rate, etc.

If excess charges are collected on more than one piece of baggage belonging to the same person, a free check will be used on each of the pieces, except one, on which an excess check will be placed, which must be filled out for the entire overweight of all the pieces, and must show the number of passengers, number of pieces and the numbers of the free checks used on the other pieces. For example: If a passenger should have five pieces, four of the pieces would be checked with the free checks and the excess check would be used on the fifth piece, and should show the numbers of the other four checks.

Use one excess check for each separate collection—that is, for any one lot of baggage, checked on same ticket, use only one excess check.

In the case of special charges (see No. 10), show on each part of check the name of article checked.

When checking one piece of baggage to points on lines which do not carry any baggage free, show only the amount collected, and the complete route, stations from and to, etc., as instructed in "A."

A daily report of baggage collections made must be furnished accounting department, together with stubs of all prepaid or excess checks issued.

17. Before delivery of baggage is made to any claimant, collect and examine carefully the duplicate portion, or claim check, presented and see that the number, destination, etc., agree with the original portion attached to baggage. Send both portions of all used checks—that is, the duplicates collected from passengers and the portions removed from baggage—to the accounting department at frequent intervals.

18. Agents will keep complete record of baggage handled in the baggage books furnished, and will make such reports in connection therewith as may be required by the accounting department.

19. Agents will report to the superintendent of transportation, without delay, all complaints relative to loss, damage or delay to baggage, and will give all information possible relative thereto.

20. When (1) a check is presented for which there is no baggage, or when (2) a duplicate check calls for a piece of baggage which does not belong to the passenger, notify the superintendent of transportation at once, giving as complete description as possible of baggage wanted, and any marks thereon, and state when and where baggage was checked, what route traveled over and where last seen. Also give numbers, kind and description of the checks. In the second case (2) be particular to describe the baggage which had the wrong check on it and hold the same for instructions.

21. In case passengers have lost their checks or excess baggage receipts, require them fully to identify their baggage by describing the principal contents and produce the keys and open it. If satisfied that the claimant is the owner, take receipt on blank, Form 268, with full name and address, collecting 50 cents for the lost check, and send the baggage check, receipt and money to the superintendent of transportation.

22. When baggage is claimed by parties holding mismatched checks, agents will proceed as directed by No. 21, except that the mismatched duplicate check will be collected instead of the 50 cents, and the mismatched checks and receipts forwarded to the superintendent of transportation.

23. You will closely watch and place in the baggage room all baggage, mail or company's supplies, or other articles, as soon as received; never leave baggage, mail or supplies on the platform without carefully watching them. You will receive and protect all unchecked baggage sent to your depot by passengers with the same care as checked baggage received from trains. Care should be exercised in the handling of baggage and to protect it from the weather and theft, especially small pieces, which are liable to be carried away by mistake or otherwise. Never allow owners of baggage, express men, hack men, porters or any person to take checks from baggage, but attend to the delivery of all baggage yourself, and know that the checks are properly matched before the baggage is delivered. No person should be allowed in the baggage room except on business; the windows and baggage room doors should be securely locked during your absence.

24. Storage of Baggage.—On each piece of baggage, whether inbound or outbound, checked or not checked, remaining at any station over 24 hours, storage will be charged as follows:

The first 24 hours, free; the second 24 hours or fraction thereof,







## THE SCHENECTADY MEETING OF THE NEW YORK STATE ASSOCIATION

The first quarterly meeting of the Street Railway Association of the State of New York, held at Schenectady, Jan. 10, was an unqualified success. About seventy-five delegates from electric railway companies in New York State, Canada, New Jersey and Pennsylvania were present. The meeting was called at 10 o'clock in the morning, and, with the exception of a short recess for luncheon, the session continued until evening. The entire day was devoted to discussions on car inspection, car cleaning and maintenance. It is safe to say that in the freedom with which detail figures and statistics of costs were exchanged, opinions expressed and information given, this meeting stands pre-eminent in the annals of electric railway gatherings and conventions.

The following is a brief extract of the papers and discussions. The complete verbatim proceedings will be printed by the association in pamphlet form, a copy of which will be sent to each person who attended the conference:

President Danforth, on opening the meeting, expressed his pleasure on seeing present so many members of the association, as well as guests. He hoped that the discussion on the topics to be taken up would be of benefit to all, and that the delegates would return to their homes with the feeling that they had gained data well worth the trouble and expense they had undergone to enable them to attend the meeting. The problems to be considered were of a purely practical character, namely, methods of car maintenance and inspection that would reduce the cost of these items to a minimum and at the same time satisfy the public by having less cars pulled off the line every day on account of some breakdown which could have been avoided by proper attention to the rolling stock while in service during the day. He invited those present not to be backward about giving out detail figures of operation, saying that they would not be accessible for general distribution, going only to those companies which are members of the association or outside companies which, by sending representatives to the conference, had shown their willingness to cooperate in this interchange of statistics.

Upon the conclusion of President Danforth's address, the secretary read a letter of welcome from the Schenectady Railway Company, extending the courtesies of the road to the visiting delegates. The Schenectady Railway Benefit Association also sent a hearty invitation through E. F. Peck, general manager of the Schenectady Railway Company, asking the delegates to attend a smoker and athletic entertainment at the rooms of the society on the evening of Jan. 11. In addition to these communications, letters of regret for inability to attend the conference were read from W. Caryl Ely, president of the American Street & Interurban Railway Association; H. H. Vreeland, president of the New York City Railway Company; F. L. Fuller, vice-president and general manager of the New York & Queens County Railway Company, and many others. The president then called upon D. F. Carver, general superintendent of the Rochester Railway Company, to read a paper on "Lay-Over Inspection vs. Night Inspection."

In his paper, Mr. Carver described an experiment now being carried out by the Rochester Railway Company on one of its lines on which inspection of cars is to be done between trips instead of at night. The paper described in minute detail the method adopted, and was replete with figures and statistics taken from the company's records, giving the cost of getting crippled cars into the car house, cost of repairs to cars in detail, cost of making inspections and other statistical data in regard to costs. The author's conclusion indicated that trip inspection, while somewhat more expensive than night inspection, will give much more satisfactory results in every way, providing certain required conditions of construction and oper-

ation favorable to trip inspection are present or can be attained at reasonable cost.

Upon the conclusion of Mr. Carver's paper and some supplementary remarks in which he gave further detail figures, President Danforth presented a résumé of the facts he had gained recently on Cleveland practice in layover inspection. He gave the exact number of cars operated, the number of car cleaners, car washers, inspectors and employees for making minor repairs, from which it appeared that, taking the whole number of cars and layover inspection employees into consideration, one man was required to look after 4.3 cars. The sentiment in Cleveland seemed to be that while this was a large organization for trip inspection work, the cost was more than made up by the reduction in maintenance expenses, as little chance was left open for the occurrence of break-downs, and less cars were pulled in than where the rolling stock is kept going for 18 hours a day without inspection.

The secretary read a letter from Paul Winsor, chief engineer of motive power and rolling stock of the Boston Elevated Railway Company, outlining the day inspection practice in Boston.

Mr. Harvie, electrical engineer of the Utica & Mohawk Valley Railway Company, said that it might be of interest to the members of the association to learn something of layover inspection on interurban lines. Formerly, when several crews were used on one run, his company found that the cars were not kept in the best shape. During the last year, however, a regular inspector was appointed to look over the cars when they enter the terminal for 15 minutes' layover. The conductor goes through the car to pick up papers, rubbish, etc., the motorman examines the controller, while the inspector takes care of the trucks and makes minor repairs, such as putting in a new trolley wheel, replaces marker lamps, or even a pole or wheel. These he has time to prepare for installation during the one-hour intervals between cars. The inspector does little oiling, lubrication being generally required but once a day. This arrangement has been found very satisfactory. In conclusion, Mr. Harvie told how much his company was paying its inspection and repair men.

Mr. Maize, master mechanic of the Rochester Railway Company, explained his company's method for keeping track of the maintenance cost per mile of the various types of field and armature coils used in Rochester, giving detail figures in connection therewith. He also spoke fully on the Rochester Railway Company's car-cleaning practice, giving the number of cars, employees and wages paid for the work.

Mr. Clark, master mechanic of the 146th Street car house of the New York City Railway Company, said he was very much interested in car inspection, but the point was—are the cars really inspected. In none of the preceding speakers' remarks had anything been said about the inspection of brake rigging. By going down into the pit himself he had often found troubles overlooked by the pit men. While the inspector may be depended upon to look for proper armature clearance, examine the controller fingers, commutator and brushes, he often neglects the brake-pin, which is a fruitful cause of accidents. The brake-staff and chain are also worthy of careful attention. Many master mechanics would find that an occasional trip to the pit would bring excellent results in keeping the repair force up to the best efficiency.

W. R. W. Griffin, superintendent of the Rochester & Eastern Rapid Railway Company, said that his inspector was a practical shop man, who had to make out a signed card for every inspection made by him. The cars are completely overhauled every three months. He agreed with Mr. Clark that more attention should be paid to details of inspection, such as connecting pins and brake rigging.

Frederick H. Beach, of the Ballston Terminal Railroad, wanted to know the causes of black spots on commutators, and how to prevent their formation. Nelson Graburn, master



mechanic of the Montreal Street Railway, replied that his company had decreased this trouble 35 per cent by substituting rolled for drop-forged commutator bars. There was a saving of 30 per cent in wear in favor of the rolled bar. Mr. Graburn also gave some figures on the relative costs of both types of commutator bars. Fred. Du Bois, master mechanic of the Syracuse Rapid Transit Company, said that he had overcome the same trouble by changing the type of the brush. F. H. Lincoln, assistant general manager of the Philadelphia Rapid Transit Company, said he had also found a change of brushes satisfactory, and especially when the motormen were changed at the same time, his company having found that lazy motormen were responsible for commutator troubles by putting too much work on the motors by dragging the brake-shoes, sudden starts and stops, etc. Geo. C. Graham, superintendent of car equipment of the International Railway Company, said that in Buffalo more trouble had been found with the commutators on the cars using electric braking than on other cars, so that it would seem that electric braking is also responsible for commutator troubles.

Mr. Harvie, of the Utica & Mohawk Valley Railway Company, referred to the subject of car inspection costs, and gave the time of layovers, wages and working time of employees on his road.

H. A. Benedict, electrical and mechanical engineer of the United Traction Company, of Albany, N. Y., told how, when the rolling stock of the company was increased in weight by the addition of vestibules, and the old Westinghouse 12-a, 30-hp motors were unable to carry the greater load, he put in new strap-wound field coils with asbestos and mica insulation. These changes have raised the motor to practically 40-hp capacity.

L. L. Smith, master mechanic of the Schenectady Railway Company, asked how effective mica had been found in correcting commutator trouble. He mentioned a prominent railway motor which had given some trouble in this respect. The commutators were turned, to no avail, but the experiment was tried of changing the brushes and using grooved mica.

C. B. Fairchild, Jr., secretary of the association, told of a handy shop kink in Toronto. The practice has been adopted there of painting the car number on the bottom of the car, so that the pit men are not obliged to go out of the pits and walk along for a greater or less distance to find the number of the car on which they are working. This has been found to avoid errors in the car records. Another Toronto kink is to stencil at the end of the truck the number which indicates the man who overhauled that end of the car. The repair-pit men are all given numbers, the odd-numbered men working on motors Nos. 1 and 3, and the even-numbered on motors Nos. 2 and 4. This method, of course, quickly fixes the responsibility for the repair work done, thereby making the men more careful.

Mr. Graham, of Buffalo, said his company's practice was to put two men on repair work, holding the higher-priced man responsible for the work done by both.

Mr. Lincoln, of Philadelphia, outlined the Philadelphia Rapid Transit Company's organization methods for following up the nature and amount of repairs on each car. The inspector's report covers the name of the line on which the car was pulled in, the number of the car, the type of equipment, cause of trouble, what was done to remedy it, and if the trouble is of such character that the repairs cannot be quickly made, the car is sent to the regular repair shops. By keeping such exact records of each motorman's work and making comparisons, the company has been able to find out if cars had to be pulled in on account of ignorant or malicious handling, and the motorman is disciplined accordingly. In the grease-lubricated motors it was found that the grease would get on the commutator and into the segments, but this trouble was reduced to a minimum by having men clean the commutator ends

carefully and keep them clean. Each month a statement is sent out to all of the company's car houses giving complete details of all the cars pulled in during the month. This custom has led to a healthy rivalry among the shops to see which can present the best monthly record.

L. L. Smith, master mechanic of the Schenectady Railway Company, then read a paper on "Operating Conditions as Affecting Car Cleaning," in which he outlined an original and valuable scheme for plotting in diagrammatic form records of number of cars in operation at each hour of the day. He gave graphically, by means of charts, the total cost of cleaning cars and the cost per 1000 car-miles on the Schenectady Railway. The method of plotting the records as well as the data given aroused great interest and valuable discussion.

In connection with Mr. Smith's paper, President Danforth presented some detailed statistics on car-cleaning costs gathered by him from certain lines in Michigan. He compared these figures with those current in Rochester and other New York cities, and pointed out how the difference in operating conditions necessarily affected the cost of the various items.

J. H. Pardee, general manager of the Rochester & Eastern Rapid Railway Company, said that in running interurban cars through the country they appeared to gather tiny specks of grease on the varnish, which are very hard to remove. C. S. Banghart, master mechanic of the New York & Queens County Railway Company, said that in his experience, the way to remove such grease spots without injuring the varnish was to wash the car with castile soap about once every 5000 miles.

President Danforth asked if castile soap was a better preservative for varnish than linseed oil soap. Mr. Clark cited his car-washing experiences in Pittsburg, which city, on account of its smoky atmosphere, is exceptionally hard on paint and varnish. After many experiments, he adopted what is known as Pennsylvania Railroad car-cleaning soap. With regard to the question about linseed oil soap, one of the delegates said that in his experience such soap will give trouble unless the men using it are very careful in washing it off. He had also tried castile soap, and was now experimenting with still another car cleaner. If the soap is not thoroughly removed from the car body, he found that it would destroy the varnish in a short time. H. H. Collins, master mechanic of the Fonda, Johnstown & Gloversville Railroad, said that he used a linseed oil preparation, which tends to preserve the varnish, and a neutral oil soap is used for inside cleaning. C. Gordon Reel, vice-president and general manager of the Kingston Consolidated Railway Company, also gave some data regarding his company's car-cleaning preparation. Mr. Benedict, of Albany, said his road used nothing but water and a sponge, but that the cars received this treatment every night. Remarks were also made on this subject by other delegates whose companies are testing certain proprietary articles.

The discussion on car cleaning naturally brought up the question of car painting. The consensus of opinion seemed to favor yellow for city service, both for its durability and ease with which new panels can be matched. The International Railway Company, however, favors a dark green for city service, but will retain the yellow for interurban cars, largely on account of the advertising feature and the fact that a yellow car can be more readily seen at a distance.

Mr. Pardee asked if there was any method of dry cleaning car windows during layovers. Mr. Collins, of Gloversville, stated that his company wipes the windows after each trip with dry waste.

The subject of lubrication was next discussed, and several representatives gave the cost of lubricating per 1000 miles on their roads. The consensus of opinion seems to be that oil is the proper lubricant, but no entirely satisfactory lubricating device has yet been developed. Records were also presented on the life of bearings and armatures.



The conference then adjourned for buffet luncheon, which was served in the billiard room of the Schenectady Railway Mutual Benefit Association.

After lunch the subject of lubrication was continued. Mr. Clark, of the New York City Railway, spoke at length on the necessity for using just the right quantity of oil and putting it where it would do the most good. He described a novel type of oil cup that he had devised.

The subject of life and cost of trolley wheels was then taken up, and several representatives gave their records and described methods by which they had reduced the cost of wheels per 1000 miles. It was pointed out that the type of trolley base and the tension maintained on the pole have a great deal to do with the life of trolley wheels.

Discussion was next started on maintenance, and comprehensive data were given on the cost of maintenance of different types of motors per 1000 car miles under various classes of service. A number of suggestions were made as to methods of reducing cost of maintenance on motors. Mr. Danforth stated that a road in Pennsylvania had kept accurate records for a number of years as to the saving by scraping old motors and buying several new motors each month, and charging these to maintenance of equipment account.

Then followed an exchange of experience on brake-shoes.

The remainder of the afternoon was devoted to discussion on brake hangers, controller troubles, axles, flat wheels and other topics and the costs of maintaining these parts on several roads were given.

A resolution was passed authorizing the president to appoint a committee of five, consisting of the president, the secretary and three mechanical members, to collect statistics on maintenance of equipment, and present them to the association. It was also decided to prepare a list of items concerning which each member could keep records on his respective road, so that better comparisons can be made in the future.

The meeting then adjourned.

### SINGLE-PHASE LOCOMOTIVE IN SWEDEN

Experiments are being conducted on the Swedish railways at present with single-phase, 25-cycle current for traction. These tests are made with a view of introducing later on single-phase traction in general on the Swedish railways, since Sweden is rich in water power, but not in fuel. Two locomotives and two motor cars have been ordered, partly from the Allgemeine Elektrizitäts Gesellschaft and the Siemens-Schuckert Works, in Berlin, and partly from the British Westinghouse Company. Single-phase commutator motors are used throughout. One of the German papers had an extended article recently on the locomotive furnished by the Siemens-Schuckert Works. It has a weight of 36 tons, and is intended for freight trains with speed up to 45 km (28 miles) per hour on a level road and about 24 km (15 miles) per hour on grades of 1 per cent. By changing the ratio of gearing, it is intended to increase the speed later on to 65 km (40 miles) per hour. The locomotive has three driving axles, each being driven by a compensated series motor of similar design as those used on the Murnau-Oberammergau single-phase road. The normal capacity of the 320-volt, 25-cycle motors is 110 hp, and with the ratio of gearing of 1 to 5, which is used at present, the maximum tractive effort of the three motors is 6000 kg (13,200 lbs.) at the wheels. In the front of the locomotive a transformer is placed with a normal capacity of 300 kva., the primary of which consists of a series of windings, the connections of which may be changed so that the voltage supplied to the primary may be varied between 5000 volts and 20,000 volts. One of the chief purposes of the tests is to find the highest voltage with which a safe and satisfactory traction service can

be maintained. The voltage of the secondary of the transformer can be varied between 160 volts and 320 volts. A controller contains ten positions, of which the first one is intended for very slow speed, and a special device for blowing out magnetically the spark due to the short-circuiting of coils. The motors are artificially cooled with air. The locomotive has two aluminum bows for taking off the current from the trolley wire.

### REORGANIZATION AND REJUVENATION OF AN IMPORTANT BRUSH MANUFACTURING COMPANY

The Le Valley Vitæ Carbon Brush Company has recently been reorganized and important changes, both in factory and office organization, have been made, with a view of improving the company's manufacturing methods and general service to patrons. It will be remembered that this company is one of the oldest in the country which has given special attention to the manufacture of carbon brushes for electrical apparatus, and that it was built up and enjoyed a large and successful business under the management of the late John V. Clark. Mr. Clark died about a year and a half ago, and following his death there was a period during which there was a disruption of the organization and no definite management. Realizing the importance of maintaining the business and reputation which had been established by her husband during so many years, Mrs. L. C. Clark, the widow of the former head of the concern, decided to take personal charge of the business, and as she possessed good executive ability, and as she was thoroughly conversant with the details of the business during her husband's life, she is well fitted to conduct its affairs. At the time she took charge, she decided to increase the field of action of the company. She has placed it on a strong financial basis, and plans are now being perfected for prosecuting by far the most extensive and aggressive campaign of publicity ever employed by any concern in a similar line.

Mrs. Clark possesses the distinction of being one of the very few, if not the only woman, who is conducting the affairs of an important electrical manufacturing company, and the indications are that she will succeed in making the Le Valley vitæ carbon brush better known and better in quality, if possible, than ever before.

### REFUNDING FARES TO BUFFALO

Out-of-town customers of the firms which are members of the Retail Merchants' Board of the Buffalo Chamber of Commerce are refunded the fare which they pay in traveling to Buffalo to do their shopping. One round-trip railroad, steamboat or trolley fare from any city or town within a radius of 40 miles of Buffalo is refunded to each individual whose purchases from any or all of the firms shall amount to at least the sum of \$25. Round-trip fare is likewise refunded to any person who comes from a point within 80 miles and over 40 miles of Buffalo whose total purchases amount to at least \$50. Persons living at a greater distance than 80 miles have their fares rebated. To illustrate: If one lives 100 miles away he pays for only 20 miles, and the association pays for 80 miles both ways. When a rebate book is applied for, before it is issued, the customer must show his or her return ticket, and the ticket is then stamped on the back with a star. Customers are requested to apply for rebate book at the store where first purchase is made. Fares are refunded on rebate book after ten days from date on which the book is issued. No rebate is allowed unless application for same is made at time of purchase. The purchaser of the required amount of goods must apply for refund at the office of the secretary, Room 39, Chamber of Commerce Building, Seneca Street, which is open from 9 a. m. to 5:30 p. m.



## THE CONSTRUCTION OF MODERN AMUSEMENT PARKS

The railway park, which had its origin in the small grove tenanted by merry-go-rounds and popcorn stands, has been developed within recent years to the point where it requires the attention of the specialist in the art of providing entertain-

which have proved profitable sources of income to the electric railways in their respective territories. The work shown was carried out by Edward C. Boyce, Inc., of New York, which firm designs, constructs and operates amusement resorts, either as independent enterprises or as a park adjunct to the business of a transportation company.

In a recent interview on the subject of amusement parks as an investment, Edward C. Boyce, the president of this com-



FIG. 1.—NIGHT VIEW OF THE "WHITE CITY," NEW HAVEN, CONN.



FIG. 2.—ENTRANCE TO THE "WHITE CITY," AT NEW HAVEN, CONN.



FIG. 4.—A CROWDED DAY SCENE IN THE "WHITE CITY," CHICAGO, SHOWING THE GREAT POPULARITY OF THE OPEN-AIR CIRCUS

ment for the masses. A study of some of the parks built within the past two or three years shows how easily profitable traffic can be created if the amusement grounds are properly located and furnished with suitable attractions. In presenting the accompanying illustrations and descriptions, it is desired to give some characteristic examples of parks and park attractions

pany, said to a representative of the STREET RAILWAY JOURNAL:

"The chief factor in making possible the remarkable progress which has been made is the modern street railway system or trolley. Prior to its introduction on an extended scale it was physically impossible to transport large numbers of people to



any given point with comfort, speed, and at nominal expense. By the complete solution of these difficulties the success of amusement resorts has been made possible, and some idea of the magnitude and profit of such enterprises may be conveyed by the fact that one resort, erected during the season of 1905, cost a little over \$600,000 and returned a net profit of close to \$500,000 as a result of its first season's operation. A number of new amusement parks for various traction companies are being built for the coming season. The success of last season has convinced these companies that not only is the modern amusement park a safe, sound and very profitable investment, but it does more to increase summer traffic than any other

quently they can afford to be more liberal in providing for suitable lighting effects.

An example of what good judgment and experience can do in this regard for a park of moderate size is shown in Fig. 1, which is but a faint reproduction of the central tower and part of the grounds in the "White City," New Haven, Conn., as seen at night. This park has become a very popular resort, and has shown that places of this character can be made a success, even in small towns, where good returns can be secured only by the continued patronage of the same people. The imposing entrance to this park is shown in Fig. 2, while Fig. 3 gives an excellent view of the arrangement of the



FIG. 3.—GENERAL ARRANGEMENT OF THE ATTRACTIONS IN THE "WHITE CITY," NEW HAVEN, CONN., SHOWING THE "SHOOT-THE-CHUTES" POOL, THEATER, CAFÉ, DANCING PAVILION, TOWER, MINIATURE RAILWAY, GARDEN PLATS, ETC.

medium known. One may safely predict that within the next few years every large company will arrange to have along its lines a complete resort operated by a single individual or corporation."

A striking feature of all the parks built by the Boyce Company is their artistic and elaborate illumination. As a general rule, most of the patrons of "built up" parks come at night, and it has been demonstrated over and over again that nothing is more effective for attracting visitors and keeping out undesirable persons than plenty of light. The installation of parks of this kind should be especially attractive to railway companies, because they have the facilities to produce current more cheaply than could be done if a separate plant is erected at the grounds for use three or four months a year, and conse-

various attractions. The high column seen at the left of Fig. 3 is the main lighting tower, which was nearing completion at the time the picture was taken. Additional attractiveness is lent to this park by the large garden plats placed here and there, and the background of trees, whose quiet green forms a pleasing contrast to the white show structures. Among the installations embraced in this view are a dancing pavilion, fairy theater, a large lagoon used in connection with shoot the chutes, miniature railway, tower, part of a circle swing, restaurant, etc.

Another example of a well-designed amusement ground is the "White City," in Worcester, Mass., of which a general view is presented in Fig. 5. It will be noticed that this park also has a lagoon in the center with a shoot the chutes, the



usual attractions being in artistically designed buildings placed around the water, but at a distance great enough to allow room for a boardwalk between the lagoon and the buildings.

One of the most conspicuous successes in the amusement field during the past year was the "White City" opened last season in the South Side district of Chicago. Despite the fact that this park is located several miles away from the center of population and has no aquatic sports of any kind, its up-to-date attractions and splendid illumination led many Chicagoans of the distant North and West Side districts to go to the "White

### SEMI-CONVERTIBLE CARS FOR THE MEMPHIS STREET RAILWAY COMPANY

The John Stephenson Company, of Elizabeth, has delivered to the Memphis Street Railway Company thirty-five double-truck cars of the semi-convertible type built under the Brill patents and mounted on Brill No. 27 GE-1 trucks. The new cars were ordered on account of a new extension for the system which has lately been completed. Within the past year

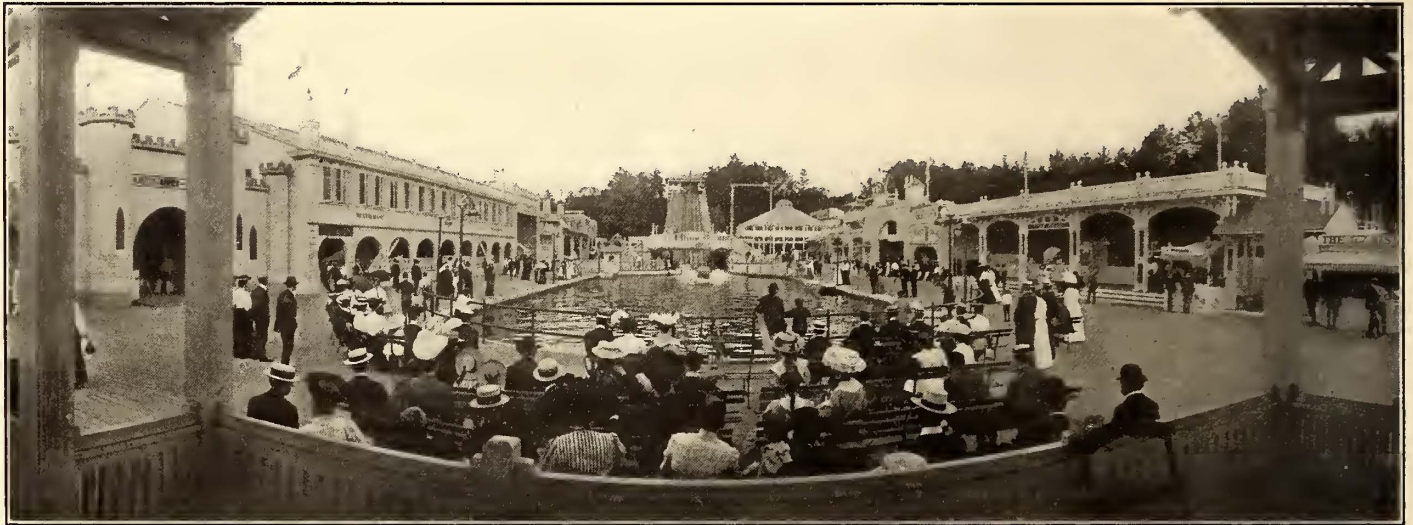


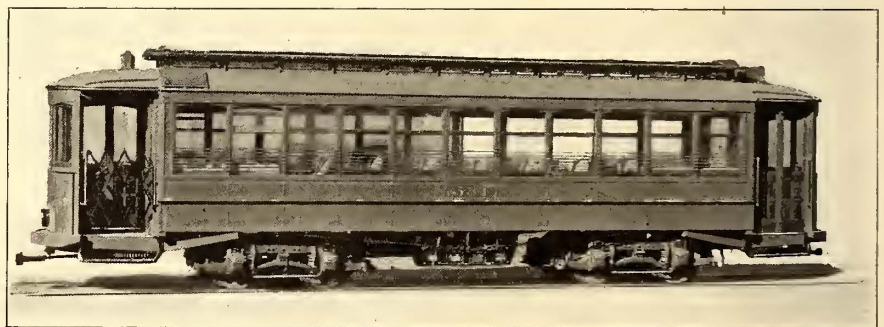
FIG. 5.—A GENERAL VIEW OF THE "WHITE CITY," WORCESTER, MASS., WITH CENTRAL LAGOON

City" in preference to other parks much nearer to them. In addition to the numerous enclosed shows at this resort, the park management provided a fine open-air circus which was very popular, as can be seen by looking at the great crowds shown in the engraving. This illustration, which was taken during the day, when the patronage is much less than at night, shows how well the new park must have been patronized. Like Dreamland, Coney Island, the "White City" has a brilliantly illuminated tower visible for miles around and sure to excite the admiration and curiosity of all who see it.

Besides the design, construction and operation in their entirety of parks of this character, the Boyce Company gives much attention to designing and installing amusement specialties. These are so many in number that lack of space prevents more than a brief mention of some of the more important ones. Among the latter are "Canals of Venice," a miniature reproduction of the Queen of the Adriatic, requiring the installation of  $\frac{1}{4}$  mile of winding canals which flow by the famous plaza of St. Mark, Palace of Doges, Rialto Bridge, Desdemona's Palace, Bridge of Sighs, etc.; "Great Coal Mine," giving an instructive trip through an imitation coal mine; "The Bumps," consisting of a hardwood incline full of unsuspected knobs and depressions, which cause the sliders to assume the most ludicrous positions, much to everybody's amusement; a "Shooting the Chutes," which is equipped with a moving stairway to carry the passengers from the bottom to the waiting platform at the top; "Circle Swing," a device consisting of a central pole around which torpedo-shaped boats are arranged to swing, remaining at all times in perfect equilibrium no matter how unequally the load is distributed; scenic railways; figure-eight roller-coasters, etc.

Each employee of the Boston Elevated Railway who on Jan. 1 had been in the service of the company six months or longer and possessed a satisfactory record was given \$15 in gold.

the company has had twelve single-truck closed cars from the American Car Company and twenty double-truck open cars from the G. C. Kuhlman Car Company. Memphis has over 100,000 population and is the chief commercial point on the Mississippi River between St. Louis and New Orleans. The population is increasing rapidly, and the railway company has aided in the development of the city and its environs by many improvements in its equipment besides the additions to the



ONE OF THE NEW DOUBLE-TRUCK, SEMI-CONVERTIBLE CARS FOR MEMPHIS, TENNESSEE

rolling stock. These cars are quite similar to the double-truck semi-convertibles with which the Nashville lines are equipped.

The new cars are handsomely finished in mahogany with bird's eye maple head linings, and the seats are of the walk-over type upholstered in spring cane. Although the climate at Memphis is comparatively mild during the winter, the rainfall is heavy and the vestibules will be much appreciated. With windows which can be raised entirely into roof pockets the cars are always ready for any kind of weather. Seven-bar bronze window guards prevent passengers from putting their arms outside the windows. The bottom framing is of the substantial form usual with this type, and besides having 12-in. x  $\frac{3}{8}$ -in. sill plates, the inside of the sills has under trusses with queen posts. The outside platform knees are reinforced with angle iron and the center knees are composed of angle irons offset for the purpose and which extend well back of the body bolsters.



The general dimensions are as follows: Length over the end panels, 30 ft. 6 ins. and over the vestibules, 40 ft. 6 ins.; width over the sills, including the panels, 7 ft. 8½ ins., and over the posts at the belt, 7 ft. 11½ ins.; center of posts, 2 ft. 8 ins.; height from the floor to the ceiling, 7 ft. 9 ins.; from the track to the under side of the sills, 2 ft. 8¼ ins.; from the under side of the sills over the trolley board, 8 ft. 8 ins.; from the track to the platform step, 16½ ins., and from the step to the platform, 13¾ ins.; length of the seats, 34 ins.; width of the aisle, 22½ ins.; wheel base of trucks, 4 ft.; diameter of the wheels, 33 ins., and diameter of the axles, 4½ ins. Four 50-hp motors are used per car. The weight of the car and trucks without the motors is 33,300 lbs., and including the motors, 45,700 lbs.

**SOME RECENT INNOVATIONS IN TRANSFER TICKETS**

To prevent the abuse of exchanging of round trips, W. C. Pope, vice-president of the Globe Ticket Company, of Philadelphia, has designed a novel form of transfer ticket which gives the railway using it a distinctive transfer for A. M. and P. M. use without causing any more trouble to conductors than the old-fashioned style. Although this coupon transfer

existing on a large transfer system is well shown in Fig. 1, which is a reproduction of the transfer issued on the main line of the Public Service Corporation of New Jersey. It will be noticed that the date of issue is plainly printed across the face

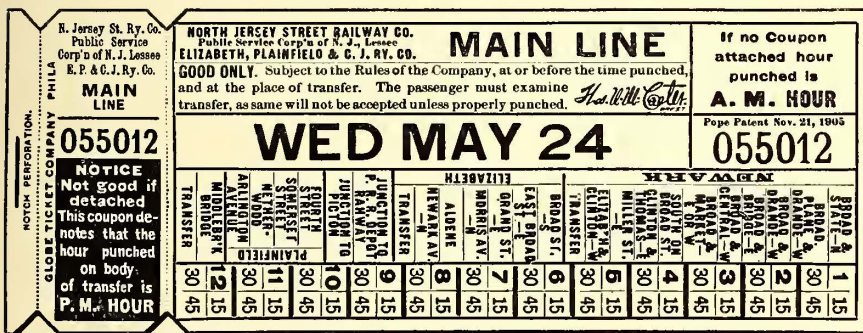


FIG. 1.—TRANSFER USED ON THE MAIN LINE OF THE PUBLIC SERVICE CORPORATION OF NEW JERSEY, WITH COUPON ATTACHED FOR P. M. HOURS ONLY

has been on the market but a few months, contracts have already been made to supply over 200,000,000 annually.

As will be seen from an inspection of the transfers reproduced in Figs. 1 to 4, all the transfers for A. M. use are issued without a coupon, and those for P. M. use with a coupon. This gives, therefore, a different appearing transfer for post-meridian and for ante-meridian. The change in length also enables the

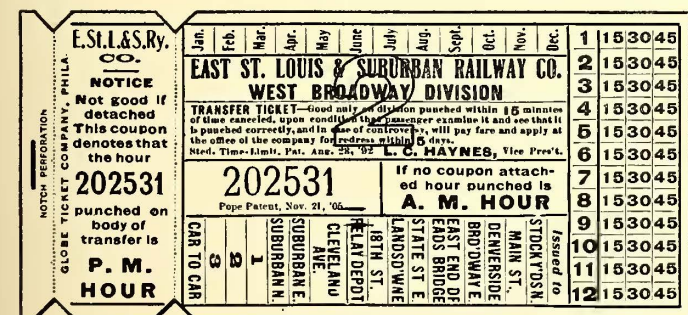


FIG. 2.—COUPON TYPE TRANSFER EMPLOYED BY THE EAST ST. LOUIS & SUBURBAN RAILWAY COMPANY

conductor to tell at a glance if the right transfer is presented. The use of the coupon is also a great help to the auditing department in checking up the transfers, all of which are numbered in duplicate, with their accompanying coupons. Should an attempt be made by tearing off the coupon, to use a P. M. transfer the next morning, it would result in failure, because every transfer is made to show the date of issue.

The successful application of this ticket to the conditions

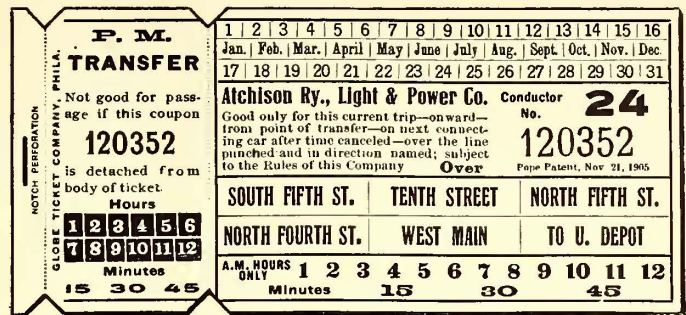


FIG. 3.—REPRODUCTION OF THE ATCHISON RAILWAY, LIGHT & POWER COMPANY'S TRANSFER, SHOWING HOURS AND FRACTIONAL DIVISIONS ON P. M. COUPON

of the ticket, making it necessary to punch only the fractional hour in the proper square and the line to which the transfer is given. The transfer shown in Fig. 2, which is used by the East St. Louis & Suburban Railway Company, has the day of the month stamped across its face, and therefore requires three punches, covering the month, fraction of the hour and the transfer line. As a matter of fact, the conductor makes the month perforation in advance, so that when issuing the tickets he is obliged to punch only for the fraction of the hour and the transfer line. The Atchison Railway, Light & Power Company's transfer, reproduced in Fig. 3, is typical of a system with few transfer points. On this ticket the conductor can make two perforations in advance, those for the month and the day; but on issuing the transfer must punch the ticket for the line on which the transfer is given, the hour and the fraction of the hour.

The Topeka Railway Company's ticket, shown in Fig. 4, is practically the same as Fig. 2, except that it also indicates from what corner the transfer was given.

Another valuable innovation in transfers designed by Mr. Pope is illustrated by the time-limit tickets reproduced in Figs. 5 and 6. In this form no intricate punching of the fraction of the hour is required, the arrangement at the left-hand end of the ticket being so plain that all disputes are avoided. In the transfer reproduced in Fig. 5, A. M. and P. M. are indicated

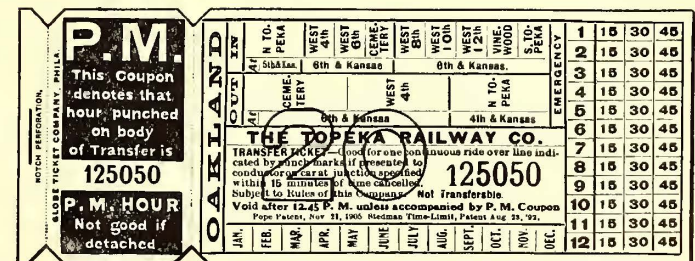


FIG. 4.—THE TOPEKA RAILWAY COMPANY'S COUPON TICKET, SHOWING ALSO POINTS WHERE TRANSFERS ARE GIVEN

by the light and dark divisions of the line to which the transfers are issued, while on the Elmira Water, Light & Railroad Company's transfer, shown in Fig. 6, the distinction is made still clearer by confining the difference in coloring to the left-hand end of the ticket, which is reserved for indicating the fractions of the hour.

These transfers are issued with the Globe Ticket Company's special holder, which will hold a pad of any number of trans-



fers, and is so simple that no delicate adjustment is needed. The conductor detaches any number of transfers required at the proper place by sliding the pad once every 15 minutes. This

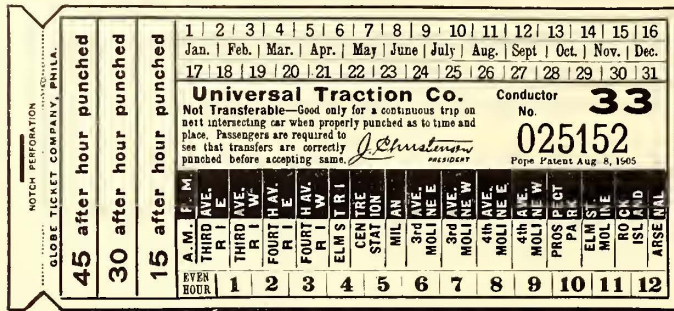


FIG. 5.—TYPE OF TRANSFER WITHOUT P. M. COUPON, BUT INDICATING A. M. AND P. M. HOURS BY THE BLACK AND WHITE DIVISIONS, SHOWING THE TRANSFER LINES

can be performed so readily that it consumes practically no time, as it is done by the thumb while taking the pad in the hand. As the pad is held firmly in place at the proper adjust-

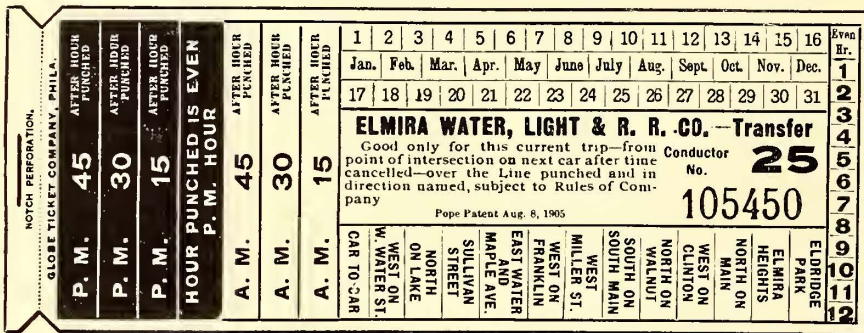
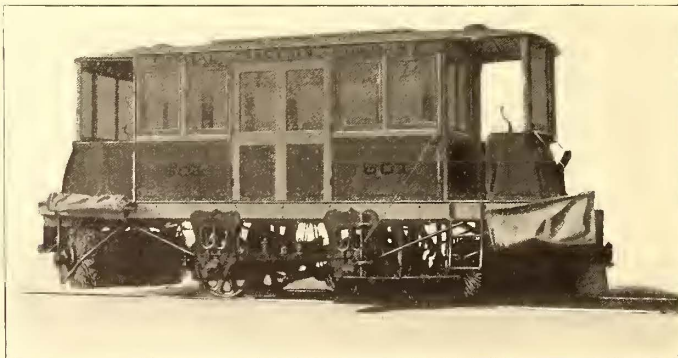


FIG. 6.—THE ELMIRA WATER, LIGHT & RAILROAD COMPANY'S TRANSFER SHOWING THE DISTINCTION BETWEEN A. M. AND P. M. ISSUES BY PUNCHING THE BLACK OR WHITE QUARTER-HOUR DIVISIONS

ment, it is impossible to issue transfers wrongly. If the holder is not needed, these transfers can be issued quite easily with an ordinary metal strip.

**SNOW-REMOVING EQUIPMENT FOR CAPITAL TRACTION COMPANY, WASHINGTON, D. C.**

The Capital Traction Company, of Washington, D. C., has received another snow sweeper from the J. G. Brill Company, which is similar to those which the company has used



NEW WASHINGTON SNOW SWEEPER, SHOWING THE STORM SHIELDS FOR PROTECTING THE PLATFORMS

for several years and is known as the Brill standard sweeper. A large number have been furnished to the New York City lines and other prominent systems in different parts of the country. This, however, is the first to have storm shields to protect the platforms. It is a powerfully built machine, weigh-

ing about 16,000 lbs. without motors, and has short revolving brooms at either end which are capable of a vertical adjustment up to 9 ins. from the pavement. They measure 5 ft. 6 ins. over the rattan and extend 10 ins. beyond the rail.

The builder claims another advantage in using short brooms instead of the long or double type, namely, that the brooms can be set at a greater angle and thereby throw the snow immediately clear of the track and not ahead to be handled a second time. The brushboard and wing, which extend from the broom across the track in front of the right leading wheel, remove most of the snow from that side of the car to a distance of 3 ft. or more outside the rail, and the snow that is left on the pavement is entirely cleared away by the revolving broom at the rear. The illustration of the interior of the car shows the convenient arrangement of the levers for raising and lowering the brooms and the brushboards. The motor for driving the brooms was not installed when the photograph was made. At either end of the motor shaft are casings which cover sprocket wheels and chains. These chains consist of drop-forged links manufactured by the builder. Sand boxes of the "Dumpit" type with large hoppers are enclosed in boxes and are located at diagonally opposite corners of the cab. They are operated by hand levers from the platforms.

As the illustration shows, the cab is well lighted and has double swing doors at the sides and single doors at the ends. The sash next the door at each end is arranged to drop into a pocket; the other sashes are stationary. The car measures 21 ft. over the sills and is 6 ft. 10 1/4 ins. wide over the sides. It is mounted on a gear truck of Brill manufacture, which has a wheel base of 6 ft. and 33-in. wheels. Two 35-hp motors are used for propulsion, and one of the same capacity for operating the brooms.

The Capital Traction Company operates about 625 cars and has over 40 miles of trackage, 30 miles of which are equipped with wires in conduits. Within the last



INTERIOR OF SNOW SWEEPER, SHOWING THE CONVENIENT ARRANGEMENT OF THE LEVERS FOR RAISING AND LOWERING THE BROOMS AND BRUSH-BOARDS

year or two the Brill Company has furnished a large number of standard open and closed cars and its convertible and semi-convertible cars to this company.

The Cleveland & Southwestern Traction Company has instituted limited service between Cleveland and Norwalk, and last week took a party of newspaper men over the line in fast time in one of the new coaches recently described in this paper.



**ELECTROSTATIC VOLTMETER FOR TESTING**

In electrical testing and experimental work, high pressures are continually being used, and the measurement of these potentials is very often a perplexing problem. A number of different methods of high-pressure measurement have been used with varying degrees of success as to their accuracy, but all involve some uncertainty as to results. Where it is required that such apparatus as dynamos, transformers, cables, insulators, etc., be subjected to a specified pressure test as a condition of their acceptance, controversy often arises as to whether the required voltage has been applied. The ideal and theoretically correct method of high-potential measurement is that employing an electrostatic voltmeter, but certain obstacles, the principal one of which was the lack of an insulating medium of sufficient dielectric strength, have heretofore prevented the development and application of this type of instrument. The Westinghouse Electric & Manufacturing Company has succeeded in overcoming these difficulties and in producing a meter that requires for its operation a negligible amount of energy, that is free from the effects of variation of wave form, and is direct reading. The faults inherent in other methods of high-potential measurement are claimed to be entirely absent from this meter.

The operating elements of this instrument are immersed in oil contained in a metal-lined wooden case with an insulated cover. The metal lining acts as a screen to prevent outside fields or influences from affecting the meter. As the insulation is one of the most important parts of an instrument of this type,

charges induced on the two extremities of the moving element are of such a nature that they exert forces of attraction on the charges on the plates, which bring about such a movement. The turning of the moving element is restricted by a spring and the deflection of the pointer is read on the scale. The condensers *C 1* and *C 2* are in series with other parts of the instrument, one plate of each being metallically connected to a curved plate and the other to a terminal. The instrument may

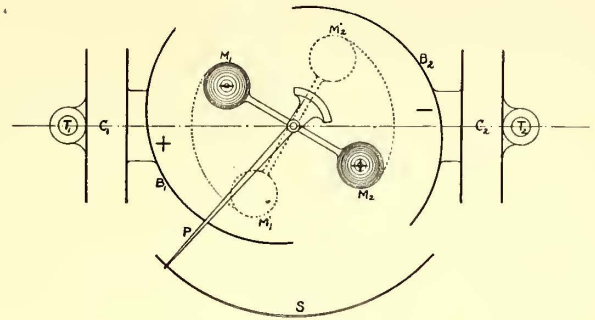


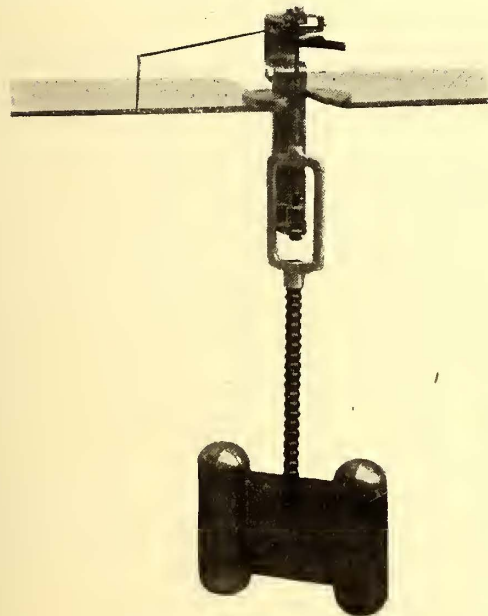
DIAGRAM SHOWING CONSTRUCTION OF VOLTMETER

be operated with either or both condensers short-circuited, thus giving a wide range to the meter.

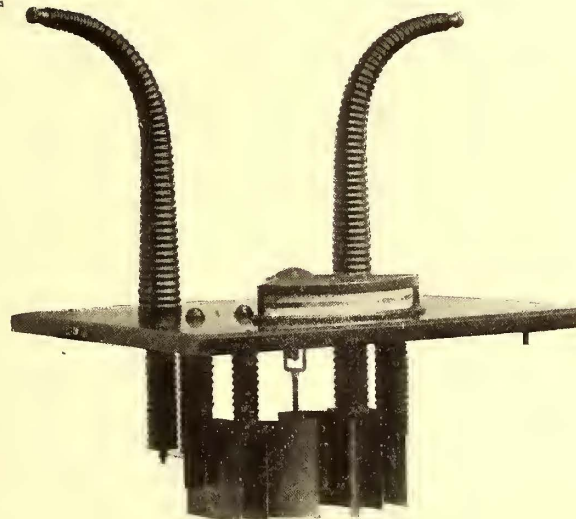
The curved plates with the condenser plates attached are supported from the insulated cover by means of grooved posts of suitable insulating material. The separate condenser plates are supported in a similar manner. As all parts are firmly fastened to the same base, they are held in constant relation to each other, and no error can result due to disarrangement of parts. The height of the oil in the case, together with the long paths over the suspension posts, prevents leakage between the plates. The horn-shaped terminals extend to the same distance below the oil as the suspension posts, and are also grooved so as to prevent leakage over their surface.

The bearing springs and adjustments are similar to corresponding parts of Westinghouse standard indicating instruments. The cylindrical parts of the moving elements are hollow and so proportioned that the buoyant effect of the oil removes almost all weight from the bearings, thereby eliminating friction and wear. The scale over

which the pointer passes is placed on an edgewise cylindrical form similar to the scale of an edgewise switchboard instrument, and the reading may be taken from a safe distance. With the exception of the glass window through which the scale is read, the cover over the pointer is all metal, and acts as a screen to prevent external static fields from affecting the pointer. Instruments of this type may be obtained for potentials as high as 200,000 volts. The one shown in the illustrations may be used for voltages up to 100,000 volts with the condensers in circuit, or for approximately 50,000 volts or 25,000 volts with one or both condensers short-circuited.



ELEMENT IN STATIC VOLTMETER



VOLTMETER WITH CASE REMOVED

a few of the advantages derived from the use of oil may be summarized as follows:

The distance between the operating elements may be greatly lessened, thereby reducing the size of the instrument; the actuating forces are greatly increased, due to the smaller distances between active parts and the high specific inductive capacity of the oil; the reduction in distance between working parts of the meter makes possible a better form of scale; the oil acts as a damper and makes the instrument nearly dead beat and easy to read; the oil buoys up the moving element, thus removing practically all weight from the bearings.

The arrangement and relative position of the parts of the meter are shown in the diagrammatic sketch. The curved plates *B 1* and *B 2* are of such a shape and so arranged with respect to the moving element that a deflection in a positive direction shortens the gap between it and the plates. The

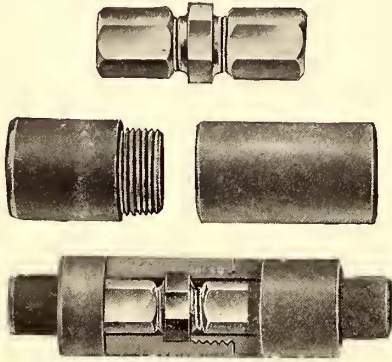
In a recent rear-end collision on the Long Island Railroad, a train of steel motor cars, when going at a high rate of speed, demolished three freight cars, without damage to themselves. There were no passengers on the train.



## AN IMPROVED METHOD OF CONNECTING MOTOR LEADS

The inconvenience of the present method of connecting motor leads to the car wiring has long been obvious. The length of time required to make the present connections and tape them, when added to the cost of the tape used and lost in the operation, has proven a serious item in the cost of supplies and a source of vexation to all connected with this branch of the street railway service.

To obviate this difficulty, Dossert & Company, of New York, have brought out a modification of their well-known solderless



CONNECTOR FOR MOTOR LEADS

wire and cable connector, especially adapted to the use of motor leads. The accompanying engraving illustrates the connector, insulating cover and a sectional view showing how the cover is locked over the metal portion. The joint consists of a regular type A solderless connector, composed of two double beveled, split cones, two compression nuts and a nipple, the latter having a center of larger diameter than the nuts. The method of making up the connectors is as follows: The two parts of the insulating cover arc separated by unscrewing and one piece is slipped over each end of the wire, care being taken to have the threaded ends toward the end of the wire. The cable is then thoroughly cleaned of insulation a little longer than the length of the nut. The nut is then backed off two or three turns and the wire inserted, after which the nut is tightly screwed back in place. After proceeding in the same manner with the other end of the cable, the insulating cover is brought down over the connector and tightly screwed together, so that there is no danger of its becoming loose. The insulating cover is made of a composition which is a perfect insulator, not readily broken, and is impervious to dampness or oil. The joint has just been put on the market and is receiving much favorable commendation.

## SINGLE-PHASE LOCOMOTIVES FOR THE SARNIA TUNNEL

The important announcement was made Jan. 8 that the St. Clair Tunnel Company, which is a subsidiary company of the Grand Trunk Railway system, had awarded a contract to the Westinghouse Electric & Manufacturing Company for a complete electrical installation to operate freight and passenger trains through the tunnel under the St. Clair River, which connects the American and Canadian divisions of the Grand Trunk Railway system.

The plans and specifications were prepared by Bion J. Arnold, of Chicago, whose pioneer work in single-phase alternating-current traction is known to all engineers. The work of installation will be conducted under Mr. Arnold's supervision.

The equipment includes a complete power station, containing boilers, stokers, coal and ash-handling machinery, feed-pumps, feed-water heaters, condensers, water supply, fire protection and heating systems, piping, electric crane, steam turbine generating units, engine-driven exciting unit, motor-driven exciting unit, switchboard, feeder and distributing system, bridge and pole lines for catenary trolley construction, overhead work, bonding, transformers for power and light, light and power distributing systems, lightning protective apparatus, arc and

incandescent lamps, roundhouse motors, motor-driven pumps, drainage and sewer systems for buildings and yards, and electric locomotives.

Interest centers largely in the locomotives equipped with the series-wound single-phase motors developed by the Westinghouse Company. There are to be six similar units, each of which will exert a draw-bar pull of 25,000 lbs. on a 2 per cent grade at a speed of 10 m.p.h. The locomotives may be operated from either end, and two or more may be coupled together and controlled in multiple from a single unit, so that there is practically no limit to the size of train which may be taken through the tunnel by the electrical equipment—other than that imposed by the limited mechanical strength of the coupling from car to car.

These locomotives are of the rigid frame type, with driving axle boxes and draft gear mounted on the same frame. Each unit will have three pairs of 62-in. driving wheels, with a motor on each axle connected with a gear reduction of 18 to 95. It will weigh approximately 62 tons, all of which is on the driving wheels. Equalizer beams similar to those used in standard steam locomotive practice will distribute the weight among the six drivers. The frames will be made of cast steel and will be placed outside the wheels. The locomotives will be equipped with the Westinghouse friction draft gear. The power equipment of each unit comprises three 250-hp, single-phase, series-wound motors with unit-switch type, transformer-tap control. Pneumatically-operated trolleys of the pantagraph type will collect the current from the overhead catenary trolley line outside the tunnel.

The Sarnia tunnel is 6032 ft. long. A single track leads through the tunnel, but the approaches are double track up to a point about 300 ft. from each portal. From terminal to terminal, a distance of 19,348 ft., will be electrically equipped.

At the present time passenger and freight trains arriving from either direction are hauled through the tunnel by steam locomotives. Almost all of the freight trains must on arrival be divided, as they are too heavy for a single locomotive. The result has been that traffic is congested at the terminals and the entire service of the system impaired. It is expected that the electric locomotives will greatly relieve this congestion, as their greater capacity and flexibility will eliminate or largely reduce the necessity of dividing trains. Alternating current at 3000 volts, 25 cycles, will be delivered to the locomotives. Outside the tunnel the current will be fed through a No. 0000 grooved trolley wire.

## POWER FOR FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD

The Fonda, Johnstown & Gloversville Railroad Company calls attention to the fact that all the power used by its cars on its own line is generated in its station at Tribes Hill, N. Y., and is not purchased from the Hudson River Electric Power Company, as might be inferred from a recent article in this paper. The Tribes Hill station, located just outside the city of Amsterdam, is one of the largest and most complete in the East, and also supplies power to the Edison Electric Light & Power Company, of Amsterdam. The station was fully described in the STREET RAILWAY JOURNAL for Aug. 29, 1903.

The employees of the St. Louis Car Company enjoyed their fifth annual New Year's banquet Dec. 30 at the company's plant in Bremen. President Kobusch, General Manager Vogel, Secretary Mills and other officers were present. The company has made it a custom to bring its employees together at this season every year and to provide a banquet of generous proportions. Addresses were delivered by officers and employees.



## FINANCIAL INTELLIGENCE

WALL STREET, JAN. 10, 1906.

### The Money Market

There has been a very material improvement in the monetary situation during the past week. The heavy arrival of funds from all parts of the country and from Canada, together with the return to the banks of a considerable portion of the funds disbursed for interest and dividends on Jan. 1, and the Government expenditures on account of the Panama Canal, have materially increased the supply of lendable funds, and this has been reflected in a sharp decline in the rates for all classes of accommodations, despite the continued active demand resulting from a heavy speculation in the securities market. Money on call was freely supplied, at an average rate of 6 per cent, while short-time maturities were obtainable at 6 per cent, as against 8 and 9 per cent asked at the close of last year. Six months money was offered freely at  $5\frac{1}{2}$  and  $5\frac{3}{4}$  per cent, but there was no disposition on the part of borrowers to make contracts for that period. In some quarters a further relaxation in money rates are expected, as a result of the return movement of funds from the interior, which is now fairly under way, and which is likely to assume much larger proportions in the near future, but the opinion prevails in conservative banking circles that the market will rule at near the present level for some time to come. It is pointed out that the reserves of the New York City banks are very low, and with the strength in foreign exchange, which makes possible the shipment of gold to Paris, will prevent any material reduction in interest charges, at least for the present. A feature of the week has been the heavy demand for high-grade commercial paper at rates ranging from 5 to  $5\frac{1}{2}$  per cent, showing a disposition on the part of the banks to lend for mercantile rather than for speculative purposes. The amount of prime material coming upon the market, however, has been extremely small, merchants as a rule being well supplied with funds. The foreign markets have remained firm, with an upward tendency, but as yet there has been no appreciable demand in either money or discount rates at the principal European centers. The bank statement published on last Saturday was very disappointing. Instead of an increase in cash, as indicated by the preliminary figures, the banks reported a decrease in this item of more than \$2,000,000. The surplus decreased \$3,721,575 to \$571,000, as compared with \$11,608,250 in the corresponding week of 1905, \$14,686,975 in 1904, \$14,810,300 in 1903, \$12,958,450 in 1902, \$22,398,050 in 1901, and \$11,757,725 in 1900.

### The Stock Market

At the outset of the past week the general stock market received something in the nature of a mild shock from the speech made by a very prominent banker before the Chamber of Commerce, relative to the monetary laws of this country, which the banker in question maintained made possible the great stringency and attendant exorbitant high rates in the money market witnessed during the closing days of 1905. For a brief spell there were evidences of a desire on the part of stockholders to liquidate, and momentarily prices fell away quite sharply. However, the remarkable power of absorption which the market has displayed for so long a time, and to which allusion has frequently been made in this column, again demonstrated itself, and the securities thrown over as a result of the incident above referred to found ready takers. In consequence of this and a subsequent clearer understanding of the remarks made by the banker referred to, there was a quick and substantial recovery in values, and throughout the latter portion of the week the tendency of prices was once more immediately upward, although there were occasional intervals of irregularity. These were due to no considerable extent to realization of profits, still a decided strengthening in the foreign exchange market, which rendered possible exports of gold to Paris, and the continued unsettled foreign political situation, played some part in holding the upward movement in check. At the same time local monetary conditions improved very considerably, and the call loan market may be said to have returned to a normal state. Equally important as this, however, was a noticeable infusion of new blood into the stock market, in the nature of a considerable increase in outside buying orders. It may be said that the accession of outsiders was more apparent in the bond market than in that for stocks; nevertheless, the enlarged orders received by commission houses for purchases

of stocks were certainly encouraging to the bull cause. Apart from the factors mentioned these purchases were based upon continued unprecedented conditions in the iron and steel, copper metal and other leading industries of the country, the maintenance of railroad earnings on a large and expanding scale, and the exceptional character of the winter thus far, which permitted of unusual activity in many lines of business. In response to the general buying noted, many stocks sold at higher prices than ever before, a notable case in point being Union Pacific, which was helped along by talk of a possible increase in the dividend rate. The shares of the grain-carrying roads, those of the trunk lines as well as the anthracite coal properties and some of the Southern systems, all played a more or less conspicuous part in the activity and improvement. The United States Steel stocks occupied a more prominent position in the dealings than heretofore, and the common, on talk of a resumption of dividends, sold at the highest figure in years, while the preferred made a new high record. The stocks of the Southern iron and steel properties were again strengthened by revived talk of a merger, and the copper stocks again responded to the strength of the metal, though the latter subsequently reacted some on profit-taking sales.

The local traction stocks attracted comparatively little attention during the week, and generally moved in sympathy with the balance of the market. News in reference to these properties was unusually scarce, and even rumors were conspicuously absent. In short, speculation in this class of securities appeared to be resting, following the recent announcement of the deal between the Interborough and Metropolitan interests.

### Philadelphia

Dealings in the local traction issues have been considerably larger during the past week, and in most instances they have been accompanied by substantial advances in values. Philadelphia Rapid Transit was again the leader of the group, both in point of activity and strength, the price rising  $2\frac{1}{4}$  points to 33 on reports of heavy earnings and on persistent buying, said to be for New York account. Upwards of 23,000 shares were traded in. Philadelphia Company common was under pressure during the greater part of the week. In the early dealings the price sagged off to 31, but later there was an advance to  $32\frac{1}{2}$ . In the final dealings there was a reaction of a point. About 5500 shares were traded in. The preferred stock advanced a full point to 51, on extensively light purchases. A special meeting of the United Railway Investment Company of San Francisco has been called, at which the stockholders will be asked to authorize an increase in the capital stock from \$10,000,000 to \$25,000,000. It is understood that part of the proceeds of this stock issue will be used to acquire the Philadelphia Company. Philadelphia Traction rose  $\frac{1}{2}$  to 101, on the exchange of less than 500 shares of stock, and Fairmount Park Transportation rose a full point to  $17\frac{1}{2}$ , on a single transaction involving 100 shares. American Railways was steady at 52, and Union Traction held firm at  $62\frac{1}{2}$ , with sales of nearly 1000 shares at that figure. Other transactions included West Philadelphia Passenger at 250, Railway General at  $7\frac{1}{2}$  and 7, United Companies of New Jersey at 270, Consolidated Traction of New Jersey at 80, and United Railways of Indiana at 91.

### Baltimore

There was a decided improvement in tractions at Baltimore. The market was broader, and prices generally displayed a decided upward tendency. United Railway issues constituted the leading feature, prices for both stock and bonds advancing sharply on heavy transactions. The 4 per cent bonds sold to the extent of \$90,000, at from 93 to 94 and back to  $93\frac{3}{8}$ , while the free incomes rose from 66 to  $67\frac{1}{2}$ , on the exchange of about \$175,000 bonds. The pooled incomes brought prices ranging from  $64\frac{1}{2}$  to  $66\frac{1}{2}$  for \$84,000 bonds. Of the free stock 150 shares brought 15, while 500 shares of deposited stock sold for  $15\frac{3}{4}$  and 16. Norfolk Railway & Light 5s sold at  $96\frac{1}{4}$  and  $96\frac{1}{2}$  in the early dealings, and later \$50,000 sold at 98. Virginia Railway & Development 5s were active, \$31,000 changing hands at from 99 to  $99\frac{3}{4}$ . Other sales included North Baltimore 5s at 119, United Traction of Pittsburg 5s at  $112\frac{3}{4}$ , Lexington Street Railway 5s at  $104\frac{1}{2}$ , Macon Street Railway 5s at  $98\frac{1}{2}$ , Washington City & Suburban 5s at 106, Charleston Electric 5s at  $97\frac{1}{2}$ , and 100 shares Norfolk Railway & Light stock at  $13\frac{3}{4}$ .



**Other Traction Securities**

Trading in the Chicago market was quiet, but prices held firm. Chicago City Railway sold at 200 for a small lot. Nearly 1000 shares of Chicago Union Traction brought 117½ and 12¾, and an odd lot of North Chicago sold at 82. West Chicago sold at 54½. South Side Elevated lost a point to 96. Northwestern Elevated common was strong, with transactions at 25½ and 26½, while the preferred stock brought 65 and 66. Metropolitan common sold at 28 and 27½, and the preferred changed hands at 70 and 70¼. Chicago & Oak Park common brought 7¾ and 7¾. The Boston market was extremely quiet. Odd lots of Boston Elevated were marketed at prices ranging from 156 to 157. Massachusetts Electric issues were active, about 1000 shares of the common selling at 17 and 18, while about 1200 shares of the preferred sold at from 60 to 64 and back to 62½. Boston & Suburban preferred sold at 63. West End common brought 101 and 99½, while the preferred brought 112 and 113. In the New York curb market Interborough Rapid Transit developed considerable activity, and although the dealings were accompanied by an erratic price movement, it ended the week with a substantial net gain. From 233¾ the price ran off to 230, and later advanced to 236. At the close there was a reaction to 234. Upwards of 10,000 shares were traded in. The securities to be issued by the new Consolidated Company were active, upwards of 4000 shares of the new common selling at from 58¾ to 60, while nearly \$1,000,000 of the new 4½ per cent bonds changed hands at from 96 to 95½. New Orleans Railway & Light 5s sold at 91¾ for \$5,000.

Cincinnati, Newport & Covington common continues to be the active issue in Cincinnati. About 1000 shares changed hands with a fractional decline from 52½ to 51¾; the preferred declined from 99 to 98¼. The 5 per cent bonds showed a fractional advance to 110½. Cincinnati, Dayton & Toledo advanced a point to 26¾, and \$15,000 worth of the bonds sold at an advance from 97¼ to 97½.

Little activity in Cleveland. Northern Ohio Traction & Light moved up from 22¾ to 33½ on reports of heavy sales to Canadian parties, but the early part of this week it went off a point. Western Ohio made a gain from 20¾ to 21½ with the opening of its new extension, and its bonds were slightly stronger, several blocks selling at 87¼. Lake Shore Electric common has been showing a fraction decline from 17 to 16½. There was some trading in Cleveland & Southwestern common at 15, several points below previous sales. Cleveland Electric was weaker at 84. A small lot of Aurora, Elgin & Chicago common sold at 36, an advance. Toledo Railways & Light sold at 22¼, and Elgin, Aurora & Southern at 52. Several small blocks of Washington, Baltimore & Annapolis underwriting sold at 108, a fractional decline, due to a recent call for the second payment on the subscription. Eastern bond buyers have closed a deal for \$225,000 of Western Ohio 5s.

**Security Quotations**

The following table shows the present bid quotations for the leading traction stocks, and the active bonds, as compared with last week:

	Jan. 3	Jan. 10
American Railways .....	52½	52
Boston Elevated .....	156	157
Brooklyn Rapid Transit .....	86½	88¾
Chicago City .....	210	197
Chicago Union Traction (common).....	11½	107%
Chicago Union Traction (preferred).....	—	—
Cleveland Electric .....	80	83
Consolidated Traction of New Jersey.....	81	81
Consolidated Traction of New Jersey 5s.....	107	107½
Detroit United .....	94½	94%
Interborough Rapid Transit .....	231½	234
International Traction (common).....	—	26
International Traction (preferred) 4s.....	—	75½
Manhattan Railway .....	161¼	160
Massachusetts Electric Cos. (common).....	16¾	18
Massachusetts Electric Cos. (preferred).....	59	62½
Metropolitan Elevated, Chicago (common).....	28	27
Metropolitan Elevated, Chicago (preferred).....	70	70
Metropolitan Street .....	122½	124¾
Metropolitan Securities .....	72¾	73½
New Orleans Railways (common).....	39½	38½
New Orleans Railways (preferred).....	84¾	84
New Orleans Railways, 4½s.....	91	91
North American .....	98	101¾
North Jersey Street Railway.....	25	25
Philadelphia Company (common).....	51½	51¾
Philadelphia Rapid Transit .....	31½	32
Philadelphia Traction .....	100½	101

	Jan. 3	Jan. 10
Public Service Corporation 5 per cent notes.....	95½	95½
Public Service Corporation certificates.....	68	69
South Side Elevated (Chicago).....	97	96
Third Avenue .....	135	138
Twin City, Minneapolis (common).....	117¼	120
Union Traction (Philadelphia).....	62	62½
West End (common).....	98	99
West End (preferred) .....	113½	113½

**Iron and Steel**

According to the "Iron Age," the principal event of the week in the iron and steel trades has been the advance in prices on the greater part of all the lighter finished products. There are further indications of a revival of buying of pig iron, although the movement is not yet quite general. In the heavy trade there has been no very pronounced movement, and no very large contracts have been closed in structural material.

**EARNINGS WORCESTER RAILWAY & INVESTMENT COMPANY**

The trustees of the Worcester Railways & Investment Company have issued their annual report for the fiscal year ended Dec. 30, 1905. This company owns the control of the Worcester Consolidated Street Railway Company. The income account for the year is as follows:

	1905	1904
Gross earnings .....	\$237,282	\$315,138
Previous surplus .....	149,761	162,732
Total .....	\$387,043	\$477,870
Expenses .....	4,411	4,567
Balance .....	\$382,632	\$473,303
Dividends .....	359,490	323,541
Surplus .....	\$23,142	\$149,762

**CLEVELAND FRANCHISE SITUATION—TEMPORARY INJUNCTION AGAINST LOW-FARE COMPANY LIFTED**

The Common Pleas Court has refused to grant a permanent injunction restraining the Forest City Railway Company, the so-called 3-cent fare company, from occupying Denison Avenue, and has lifted the temporary injunction, so that the company can go ahead with its work, providing the case is not carried higher. The City Council adopted a resolution requesting the Cleveland Electric Railway Company to permit the judgment to stand as final, so as not to further delay the building of the low-fare line. The appeal was on the ground that further continuation of the struggle would forfeit the good will of the public. The company has not yet replied to the request.

The village of Newburg, adjoining Cleveland, recently granted the company a twenty-five-year franchise for an extension of the Woodland Avenue line. Negotiations were under way at the time for the admission of the village to the city, and the City Council intimated that if the franchise was allowed to stand, the village would be refused admission. The village Mayor thereupon vetoed the franchise ordinance, but a new Council, now in office, is endeavoring to put it through again.

The Chamber of Commerce committee is now investigating the franchise situation with a view to a settlement. In accordance with its announced plan, the investigations are carried on behind closed doors. In giving testimony last week Mayor Johnson carried his point about making his portion of the testimony public property, by taking with him a stenographer, who read his notes to the reporters after the meeting. Mayor Johnson reiterated a plan which he has talked of for a long time for the formation of a company or commission to acquire the property by an option for the future, and paying for the properties with securities which would be a lien on the property. He paid a high tribute to the business integrity of President Horace Andrews, but he expressed the opinion that the city and the company could not get together on a reduced rate of fare.

Mayor Johnson is endeavoring to have the present Legislature pass a measure permitting municipalities to own and operate street railway systems. His hope is to sell city bonds for acquiring the existing property or building parallel lines.



## PROPOSED AMENDMENTS OF THE CHICAGO FRANCHISE ORDINANCES

John M. Harlan, recently appointed by Judge Grosscup to represent the interests of the people of Chicago in the traction issue, on Jan. 1 made an extended report to Judge Grosscup, in which the following points were brought out:

"There should be some effective provision to prevent the lien of existing bonds upon the companies' unexpired franchises, licenses and rights, whatever they may be, from being utilized through foreclosure as a means of nullifying the express waiver or release of those rights.

"The Consolidated Traction Company should be made a party to the proposed settlement. Its franchises vary in unexpired length from about six years to nearly fifty years. If settlement is not had now with that company, the city in a very few years will be again confronted by a traction problem.

"Each of the settlement ordinances should contain a provision that it shall not become operative until and unless the others are accepted."

As a result of this report the following amendments to the franchise extension ordinance have been proposed and are being considered:

"That the Union Traction Company shall, within three years, either retire or provide for the payment of \$11,000,000 of its outstanding bonds, and, failing to do that, forfeit its franchise.

"That the consolidated companies shall agree to surrender all their present franchises and accept in lieu a new one from the city.

"That the ordinances, both for the Union Traction and the Chicago Companies, must all be accepted before any one of them becomes operative."

The committee on local transportation met in special session Monday to discuss the traction franchise ordinance and the proposed amendments to it. The session lasted six hours, after which it adjourned until Thursday, to await an answer from the traction companies as to whether or not the proposed amendments can be accepted. At the close of the day there seemed to be a general idea that there was little chance that an ordinance suitable to the railway companies would be agreed on in time for presentation to the people at the spring election.

In the discussion of the ordinance, the views of several gentlemen were given. Walter L. Fisher, secretary of the Municipal Voters' League, was the principal speaker. He endorsed the Harlan amendments and recommended that the clause by which the city protects the companies in their franchise taxes be stricken out. He objected to the clause providing that only granite blocks be used in paving the tracks, and also suggested a prohibition against the issuing of passes.

Secretary Hooker, of the City Club, did not think the committee was warranted in framing franchise ordinances to the exclusion of an effort to find some means of carrying out the express will of the people.

Mr. Harlan explained that he was employed by the Federal Court to see that the ordinances were in such shape that the court could assure the people that they had been safeguarded in their rights. Regarding his amendment providing for the retirement of bonds, he said he had found it extremely doubtful that the bondholders could be bound by an order from the court. He had therefore suggested the retirement within three years of all bonds over the \$20,000,000 of bonds which live for more than twenty years.

"What I meant by this," explained Mr. Harlan, "was the \$5,000,000 of bonds which expire in the twenty years' period, not the \$5,500,000 of floating debt and receiver's certificates, which can look out for themselves. As \$4,250,000 of this \$5,000,000 of bonds mature inside of three years, they will have to be taken care of anyhow, leaving only a negligible remainder.

"In the matter of the Consolidated Company, what I have to say is in opposition to the views of Judge Grosscup. He holds that to give that company new franchises would give value to the \$6,500,000 of bonds which can be styled Chicago's involuntary contribution to the late Mr. Yerkes.

"As I look at it, however, the bonds are there and must be taken into account, and it does not matter if some value is given them if by so doing the city of Chicago is more fully protected. Under these ordinances the Consolidated Company has a right to the through loops, and if its franchises expire it can use the tracks of the Union Traction Company by virtue of its contract with that corporation."

Regarding his provision that unless all the ordinances were accepted by the guarantee companies, none of them become operative, he said:

"Suppose the matter was left as it is now, and after the ordi-

nances were passed the Chicago City Railway were to accept and the Union Traction did not. Good service installed on the south side and the rest of the city left to stew. What would the west and north side people think of that?

"I do not believe, if the ordinances were absolutely perfect in every other particular, the people would be satisfied if this amendment were left out. Let it be said to the voters of the north and west sides that the south side is to have good service and they are to be left out, and you won't have a corporal's guard back of your ordinances in those two sections. If you leave the common acceptance clause out, you are wasting your time on those ordinances. Look out for the election returns from the north and west sides.

"The only objection I have heard to this amendment has been that the South Side road is the stronger financially, and if it had to depend on the other roads' acceptances for its ordinance some holder of Union Traction securities might make unreasonable demands. If it did the Chicago City would not have to yield."

## AMERICAN LIGHT & TRACTION MAKES PURCHASES

The reason is divulged for the increase in the stock of the American Light & Traction Company, of which mention was made in the last issue of the STREET RAILWAY JOURNAL. The company is to take over the Lacombe Electric Company, of Denver, Col., and the Muskegon Traction & Lighting Company, of Muskegon, Mich., and the proceeds derived from the sale of the recently issued 7139 shares of stock are to be used to meet the cost of the new properties.

## PROPOSED LEGISLATION IN MASSACHUSETTS

With the opening of the Legislature for 1906 in Massachusetts, street railway and railroad matters are coming promptly to the front. Governor Guild's reference to street and electric railways in his inaugural address is regarded as an attempt to strike the keynote for railway legislation that is regarded as inevitable at this session. In a way, his recommendation for general laws rather than special legislation does little more than urge a continuance of what the Legislature has already declared for in previous years, and what it specifically aimed at in the session of last year, when it broke off abruptly in a heated consideration of special charter rights to refer the whole question of changing the laws affecting street railways and interurban lines in the Commonwealth to a special committee.

The controversy at that time was over a new interurban line between Boston and Providence, in which Stone & Webster interests, which were back of one project, were vigorously opposed by the combined forces of William A. Gaston, of the Boston Elevated Railway, and James F. Shaw, of the Boston & Worcester Street Railway, in seeking a special charter. The report of the special committee on street railways and railroad laws is expected to recommend a general law under which interurban lines of this kind can be built; and the Railroad Commission, in making their annual report to the Legislature, may make some reference to the general subject which may aid in formulating any amendments or additions that are deemed wise by the General Court. These reports are now being prepared, but have not yet been considered in detail by the legislators. Both are known to favor the thing which Governor Guild has recommended, that is, general law for all kinds of railway development rather than special charters; for the Commonwealth is now definitely committed to this kind of legislation, and special charters can get through this year only by the hardest kind of a contest.

It is evident that there will be no lack of attempts to get some of them through, however. One bill has already been introduced which not only calls for a special charter but which in a way is likely to bring up the whole controversy of last year regarding an interurban line from Boston to Providence. It is a bill providing for the incorporation of the Massachusetts Street Railway Company, naming \$5,000,000 as the desired capitalization, and seeking special rights to purchase land, or to lease it, or take it by right of eminent domain, for construction of a line from Boston to Fall River, New Bedford and Providence, the same to be used for high-speed street railway service. The petitioners named in the document are: Thomas J. Mulvahill, Daniel J. Toomey, John J. McNamara, James J. Connelly, Bernard J. McCarron, William S. Haverty and James T. Cox. These names have not so far been identified with street railway construction in a prominent way, and probably do not represent the real instigators of the bill.

The statistics and computations embodied in the annual report of the Railroad Commission will not be ready until some time later in the year.



## FAILURE OF NEWSPAPER ATTACK

One of the local papers in Minneapolis, for reasons known only to itself, began some time ago an attack upon the Twin City Rapid Transit Company, for the use of gates on its cars. The thing was featured day after day, and was worked as "copy" for all it was worth. Finally, an expression of opinion was asked of the public. Out of a population of 261,974 only 1100 votes were received, fully 30 per cent of which were in favor of retaining the gates. The company did not reply to the attack until the vote had been taken, and the paper which instituted the agitation had acknowledged failure. Then it published, through another medium, a statement refuting the charges made against it. In view of the audacity of this attack, which was wholly without justification and contained charges in themselves preposterous, the reply of the company, over Vice-President Goodrich's signature, is appended in full. A feature of the letter of especial interest is the statement regarding the reduction in the number of accidents which followed the introduction of the gates. The letter follows:

To the Patrons of the Street Railway Company:

We have seen of late some criticism on the use of gates on the cars of the street railway company. In this connection statements have been made to the effect that the gates were put on the cars—

First—Solely for our own benefit.

Second—Contrary to the wishes of our patrons.

Third—In a spirit of reckless defiance of public sentiment, and,

Fourth—That our duty to the public did not require us to do so.

The first statement is true in part.

The second statement could not be true, as our patrons did not have, and therefore could not express, any preferences about gates until after they had been installed.

The third statement is absolutely false. Our respect for "public sentiment" when it is right is supreme. When it is wrong or based upon erroneous assumption, we frankly admit we are afraid of it. In either contingency, however, our respect for it is entirely too healthy to meet it in a "spirit of reckless defiance."

That the fourth statement is also untrue will appear from the following quotation from a Supreme Court decision rendered in one of our cases:

"Street railway companies, as carriers of passengers for hire, are bound to exercise the highest degree of care and diligence consistent with the nature of their undertaking, and are responsible for the slightest neglect. This rule extends to the management of the cars and track, and to all the arrangements necessary for the safety of passengers as respects accidents from collision or otherwise."

If gates on street railway cars are an "arrangement" which will minimize accidents, and are not inconsistent with street railway business, then it not only was our duty to the public to equip our cars with gates, but the above ruling of the Supreme court was tantamount to a mandatory order instructing our company to do so.

It will not be contended that gates to prevent passengers from getting on and off moving cars are inconsistent with the work of carrying passengers.

As to whether gates minimize accidents, the following figures speak for themselves:

In the year 1894, the year before gates were installed, we had 1655 accidents caused by people getting on and off cars.

In 1904, ten years later, notwithstanding the fact that we handled more than twice as many passengers, accidents due to getting on and off our cars were only 259. These figures include both cities.

If the 1894 percentage of accidents to passengers handled had prevailed in 1904 our accidents due to getting on and off cars would have been over 3500 instead of 259.

If human life and suffering are entitled to any consideration, then "our duty to the public" would seem to be apparent. I can and do understand fully that at times the gates may prove an annoyance, but, taking all the conditions into consideration, I do not believe, or at least I do not wish to believe, that anyone familiar with all the facts in the case would wish them discarded.

No consideration of the case will be complete which does not take into consideration the fact that fully 65 per cent of our passengers are either women, children or elderly persons.

C. G. GOODRICH, Vice-President.

## UNITED RAILWAYS TO ADD \$15,000,000 TO STOCK

There will be a meeting of the stockholders of the United Railways Investment Company, of San Francisco, on Jan. 31, in Jersey City, for the purpose of considering a plan to increase the common stock of the corporation to \$25,000,000. It is now \$10,000,000. It is the purpose to use the proceeds from the sale of the new stock for the payment of \$900,000 back dividends on the preferred stock, the dividend rate upon which was recently raised from 4 to 5 per cent, or the full rate to which it is entitled; also, to assist in taking over a majority interest in the Philadelphia Company, of Pittsburgh. This deal was practically consummated some weeks ago, and involved about \$55,000,000.

The United Railways Investment Company controls the United Railroads of San Francisco, and has a capital stock of \$25,000,000, of which \$15,000,000 is preferred. It has acquired and keeps in

its treasury 200,000 shares of 4 per cent cumulative preferred and 199,991 shares of common stock of the United Railroads, that being the total authorized issue, with the exception of nine shares held by the directors.

According to the best advices the offer of the United Railways for the Philadelphia Company was \$37.50 a share in a new collateral trust bond, with its own guarantee attached, and \$20 a share of its own stock for each share of the common stock of the Philadelphia Company. The United Railways is now earning 10 per cent, and because of its prosperity advanced its dividend rate. Two dividends of 2 per cent each were declared in 1905 before the rate was raised to 5 per cent.

The Philadelphia Company was incorporated by special act of the Pennsylvania Legislature in 1871 as the Empire Contract Company. It was organized under its present title in 1884, and has among its holdings 465 miles of street railway in Allegheny County, Pa., controls the bulk of the natural gas and electric light business of that county, as well as of many important manufacturing towns along the Monongahela, Ohio and Allegheny Rivers, and owns and controls 632 gas wells and 3,215,502 acres of oil and gas territory. The allied corporations of the company, covering the cities of Pittsburg and Allegheny, and Allegheny County, are the Equitable Gas Company, the Consolidated Gas Company of Pittsburg, the Allegheny County Light Company, and the Pittsburg Railways Company. The gross earnings of the constituent and subsidiary companies of the Philadelphia Company are now at the rate of over \$15,000,000 a year, and it is estimated by a competent authority that the sum available for the Philadelphia Company from earnings for the year ended Dec. 31 last is not far from \$2,500,000. The capitalization of the company is \$34,697,845, of which \$28,953,029 is common and \$5,744,812 preferred stock. The corporation also has a bonded indebtedness of \$20,000,000.

## PRESIDENT HENRY OF THE INDIANAPOLIS & CINCINNATI COMPANY ENTERTAINS

A party of electric railway officials and their wives were entertained at dinner, Monday evening, Jan. 1, at the Columbia Club, Indianapolis, by Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company. The dinner was preceded by an inspection of the company's property that required several hours to complete. Mr. Henry acted as toastmaster. Hugh J. McGowan, president of the Indianapolis Traction & Terminal Company, sent his regrets. His brother, Joseph McGowan, read the following for Hugh McGowan:

Seven years ago to-night I left Kansas City for Indianapolis, arriving here the following afternoon, since which time I have been a resident of this fair city. Soon after my arrival it was my good fortune to meet the distinguished gentleman who is to act as toastmaster to-night, and to learn of the great projects which he had in contemplation in the interurban field, and also to become acquainted with those gentlemen whose names will go down in history as the first promoters in the work of linking together the thriving cities and villages of Central Indiana.

My first desire was to improve local conditions and bring to the highest standard of efficiency the street railway system of the city of Indianapolis, and next to welcome and assist in every way the projected interurban lines and make it possible for them to reach the very center of our city. \* \* \* From the time I first gave the subject attention, I had implicit faith in the great future of interurban lines in Indiana, and used my best endeavor to promote their welfare.

One by one I have witnessed the completion of seven different interurban lines, made contract for their entrance to the city, and hailed their advent as marking a new era in transportation. Another line is now being built to Brazil, and two more companies have plans under serious consideration. The small towns, as well as the cities, are being benefited, and local travel is created and stimulated.

I cannot let this opportunity pass without complimenting the president of the Indianapolis & Cincinnati Traction Company upon the splendid result of his single-phase system on the Rushville line, which is being watched by many of the greatest electrical engineers of the country with peculiar interest.

That there should be one central station, at which all interurban cars should arrive and from which they should depart, early occurred to me, and this idea took concrete form in the erection of the present Traction Terminal Building, which is conceded to be the first and finest of its kind in the country.

On the first day of the new year it is customary not only to review the past, but also to contemplate the future. We have already seen what has been done during the last seven years, and yet the work of the interurban roads has but fairly begun. As our lofty monument stands in the center of our city, piercing the sky, an object of wonder and admiration to all, so will Indianapolis tower above every city in the United States as the greatest interurban center in the world.

Other speakers were John Shea, of Seymour; Col. Winfield T. Durbin, Ferdinand Winter, Theodore F. Rose, of Muncie, and W. A. Huff, the latter speaking for William L. Taylor. All the speakers paid high compliments to Mr. Henry on the perfection of the road in such short time.



## RIGHT OF EMINENT DOMAIN EXISTS IN ILLINOIS

Considerable interest has been attracted to the statement made recently in the daily press and recorded in the *STREET RAILWAY JOURNAL*, to the effect that, by a decision handed down by Judge Thompson, in the Superior Court, sitting in Chicago, in a suit brought by the Chicago & Southern Traction Company, the right of electric railway companies to condemn land was denied. The real question before the court, and the only one upon which it passed, was the motion to dismiss the petition because it failed to allege that the right of way sought to be condemned under the Eminent Domain Act was necessary for the right of way of the street railway company. Subsequently, Judge Thompson said: "I did not decide that the street car company did not have the right of eminent domain to condemn private property. I did not decide that question because that was not the question in the case. The only question I decided at all in this case was that the petition, failing to allege necessity for the property as a right of way, it was defective, and that the motion to dismiss should be sustained. That is the only point I decided, and I believe that is a proper statement in the case."

## ENTERTAINMENT FOR BROOKLYN EMPLOYEES—CHANGES IN OPERATING DEPARTMENT

Announcement has been made of the date of the entertainment to be given the employees of the Brooklyn Rapid Transit Company by the Brooklyn Rapid Transit Employees' Association, at the main club house of the association at East New York. The entertainment is to run for a week, beginning Jan. 15, with two performances daily, one at 2:30 and the other at 8:15. The bill will be vaudeville, and will include in its nine numbers the best talent showing in New York at the time. This is the second annual entertainment of the kind to be given by the association. The arrangements this year are essentially the same as governed last year's show. One particular in which they differ, however, is in the plan for a matinee every afternoon, instead of a solitary matinee on Saturday for the children, as was the case last year. Upwards of 1000 persons attended each evening last year, but this record, it is thought, will be exceeded this year, even considering the extra performances in the afternoon. The foresight of those who planned the club house makes entertainments of this kind possible. There are provided a permanent stage and stage setting and 500 numbered orchestra chairs, in addition to which there are available more than 500 portable benches with backs, which, when occasion requires, are arranged on the gymnasium floor, which opens into the regular concert and lecture room. Music will be furnished by the association band, composed of employees of the company. The entertainment is free to all employees and their families. Even free transportation is arranged for by the company, two coupons being attached to each ticket, good for passage to and from the clubhouse.

In establishing, on Jan. 1, two positions in the operating department of the Brooklyn Rapid Transit Company, to be known as district superintendents, the four positions of division superintendents have been abolished. Heretofore, two or more depots of the company have been in charge of what was known as a division superintendent, the eleven depots being under the supervision of five superintendents. In order to centralize the operating department, a rearrangement of this service has been made by placing all of the eleven depots under the jurisdiction of two men. William Siebert, who has heretofore had charge of the Ridgewood, Halsey Street, East New York, Bergen and the Bridge Operating Company, in the future will hold the position of superintendent of the Eastern District, and be in immediate charge of Cross-town, Maspeth, East New York, Bergen Street, Halsey Street and Ridgewood depots and Bridge Operating Company, while E. F. Davis, who previously was in charge of the Fifty-Eighth Street, Ninth Avenue and Twenty-Third Street depots, will have the Flatbush and Canarsie depots added to his jurisdiction, and he will hold the title of superintendent of the Southern District, including the operation of cars through lower Fulton Street, into which turn most of the lines crossing the Brooklyn Bridge. Both under the new arrangement will be amply provided with assistants in immediate charge of each depot. This rearrangement abolishes the positions of division superintendents, formerly held by Frank Bush and George Stone, as well as that formerly held by Frank Moshofsky, who was chief clerk. Mr. Bush, it is announced, has resigned from the company. He entered the service as a conductor, and was with the company many years.

## STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

UNITED STATES PATENTS ISSUED DEC. 26, 1905.

808,062. Car Truck for Motor Propulsion and the Like; Walter S. Adams, Philadelphia, Pa. App. filed Nov. 29, 1902. Consists of a side frame, a bolster, a quarter-elliptic spring rigidly attached to the bolster and spring-supported pivoted means for connecting the bolster and side frame.

808,109. Trolley Pole; James F. Osburn and William T. Coad, Pasadena, Cal. App. filed June 21, 1905. To overcome the liability of the wheel leaving the wire the harp is made very wide and is provided on each side of the trolley wheel with guide rollers tapering toward the wheel.

808,139. Electric Trolley Head; John T. Cherry and Edward H. Clive, Plymouth, England. App. filed March 28, 1905. Pivoted jaws adapted to be swung upward to guide the wheel to the wire.

808,163. Trolley Harp for Electric Railways; John Miller, Jr., Amesbury, Mass. App. filed April 10, 1905. Provides a harp having its opposite sides spread and specially shaped to embrace and overlap the elongated conical hubs and bearing of the contained wheel and receive a fixed shaft, binding all the parts together, and so arranged as to receive and transmit current to the best advantage with minimum wear.

808,182. Electric Signal System for Electric Cars; Edwin J. Adams, Waco, Tex. App. filed March 6, 1905. Supplemental trolleys for operating various signal circuits.

808,198. Valve Governor for Trolley-Pole Controllers; Martin O. Dolson, Los Angeles, Cal. App. filed Feb. 20, 1905. Provides a novel device for actuating when the trolley pole makes a sudden movement upwardly to throw a pneumatic valve and cause the trolley pole to be automatically lowered.

808,213. Contact Shoe for Third-Rail Electric Railways; William B. Potter, Schenectady, N. Y. App. filed July 25, 1903. A combined collector-shoe and ice-scraper for a third rail comprising a plurality of runners, rectangular in cross section and arranged at an angle to each other.

808,222. Third-Rail Insulator; Samuel B. Stewart, Jr., Schenectady, N. Y. App. filed July 23, 1903. Comprises a cap composed of two integral parts, each of which consists of a rail-retaining ear and a plug portion, and an insulating support having a socket for receiving the plug portions.

808,231. Automatic Switch; Joseph M. Comer, Seattle, Wash. App. filed April 27, 1905. The switch is thrown by means of magnets in the roadbed. When the magnet is energized a ratchet is stepped around which rotates a vertical shaft suitably connected to the switch point.

808,238. Emergency Brake Valve; George H. Hill, Schenectady, N. Y. App. filed June 24, 1904. Two emergency valves connected in series and arranged normally to establish connections for applying the brakes and independent controlling means for said valves.

808,268. Controlling System; Thorsten Von Zweigbergk, Lancaster, England. App. filed April 25, 1904. A control system having a number of features, among others an automatic controller and a master controller for the automatic controller having a ground connection for the motor at zero or off position.

808,271. Emergency Control System; Frank E. Case, Schenectady, N. Y. App. filed June 24, 1904. Relates to a system in which the power is cut off and brakes applied in case of accident to the motorman, and consists of two operating levers, an emergency device and connections therebetween whereby the emergency device is rendered operative only by a simultaneous release of both levers.

808,298. Device for Operating Street Railway Switches; Albert J. Molina, Havana, Cuba. App. filed Sept. 9, 1905. Details of construction.

808,314. Car Brake; Charles H. Shaner, McKeesport, Pa. App. filed March 31, 1905. A pair of oppositely disposed pivotally mounted levers between the two wheels of a car truck, and carrying rail-contact shoes adapted to be depressed by fluid-pressure means.

808,545. Electric Railway System; William G. Keeler, Philadelphia, Pa. App. filed June 16, 1905. An endless cable mounted underneath the car engages current-supplying contacts spaced in the roadbed.

808,589. Trolley Finder; James Wilhelm, Philadelphia, Pa. App. filed June 20, 1905. Guard arms pivoted in the trolley harp for replacing the wheel on the wire.



## PERSONAL MENTION

DR. H. B. ROCKWELL has resigned as general superintendent of the Mobile Light & Railroad Company, of Mobile, Ala.

MR. R. W. HARRIS, for more than a year superintendent of the Michigan Traction Company, of Kalamazoo, Mich., has resigned from the company.

MR. W. W. STREET has resigned as traffic manager of the Lansing & Suburban Traction Company, of Lansing, Mich., to become connected with the Jackson & Detroit Electric road in a similar capacity.

MR. HENRY T. WAKLEY, who for several years has been employed by the Hudson Valley Railway as motorman, express messenger and despatcher, has been promoted to the position of assistant superintendent of the Saratoga division, with headquarters at Saratoga.

MR. L. W. PRIOR, of Dennison, Prior & Company, of Cleveland, died suddenly in the Hotel Hollenden, Cleveland, on Tuesday, Jan. 9. Mr. Prior is well known in the East and in the Middle West through the connection of his firm with the financing of important street railway projects.

MR. JOSEPH A. MCGOWAN, secretary to Mr. Hugh J. McGowan, president of the Indianapolis Traction & Terminal Company, has been appointed auditor of the company, and Mr. Le Roy E. Snyder has been appointed to succeed Mr. Joseph A. McGowan as secretary to the president.

MR. C. C. REYNOLDS, general superintendent of the merged interurban lines in Indiana, has moved his headquarters from Lebanon to the Traction Building, Indianapolis, and will share offices with Mr. D. G. Edwards, vice-president of the company, who will spend a portion of his time in Indianapolis.

MR. J. G. BAUKAT, who resigned his position as master mechanic of the Schenectady Railway Company about two months ago, has been appointed assistant to Mr. C. H. Quereau, whose appointment as superintendent of electrical equipment of the New York Central Railroad is announced in this column.

MR. A. F. ELKINS has been appointed auditor of the Columbus, Delaware & Marion Railway, with headquarters at Delaware, Ohio, succeeding Mr. Frank W. Rood, who will enter the employ of an Eastern traction company. Mr. Elkins was formerly cashier for the Marion Street Railway & Light Company, of Marion, Ohio.

MR. R. D. BEATTY, of Cleveland, has been appointed general manager of the Eastern Ohio Traction Company. Mr. James Doyle has been promoted general superintendent. Mr. Joseph Emerick has been appointed superintendent of the Eastern division, and Mr. Lawrence O'Toole, superintendent of the Chagrin Falls division.

MR. ALEXANDER E. ORR, chairman of the Board of Rapid Transit Commissioners of New York, which arranged for the building of the subway, has been elected to the presidency of the New York Life Insurance Company. Mr. Orr is a native of Ireland, but has been connected with industrial and civic development in New York since 1851.

MR. WILLIAM S. EARLE, for the past four years connected with the office of the City Engineer, of Worcester, Mass., has resigned, to accept a position under Mr. Frederick A. Huntress, general manager of the Rio Janeiro Street Railway & Power Company, who was formerly general manager of the Worcester Consolidated Street Railway.

MR. WILLIAM F. WHITE, for many years vice-president of the North American Company, has resigned that office, and his resignation has been accepted. Mr. White will go to Europe in a few weeks, and on his return will devote himself to his private interests, prominent among which are a number of rich silver mines near Cobalt, Canada.

MR. THOMAS M. KEELEY, formerly engineer of the Lansing & Suburban Traction Company, has been appointed superintendent of the Kalamazoo city lines; Mr. J. J. Martindale, formerly electrical engineer of the same company, has been appointed superintendent of the Battle Creek city lines, and Mr. E. S. Loomis, superintendent of the Jackson & Battle Creek Traction Company, has had the interurban line between Battle Creek and Kalamazoo added to his division.

MR. HARRY M. BEARDSLEY, secretary and treasurer of the Elmira Water, Light & Railroad Company, of Elmira, N. Y., has been appointed receiver of the Elmira & Seneca Lake Railroad Company in place of Mr. D. A. Hegarty, of New York City. The

line will be operated by the Elmira Traction Company, and Mr. Beardsley, who has had a large share in the negotiations which have been on for some time, is splendidly qualified by virtue of his intimate acquaintance with the affairs of the line to administer the receivership.

MR. PATRICK CALHOUN, who retained a considerable interest in the United Railroads of San Francisco, when Ladenburg, Thallman & Company took over the interest of Brown Bros. in the company, has been elected president of the company to succeed Mr. Arthur Holland, who retired on Jan. 1. Mr. Calhoun will continue to reside in New York City. It is reported that Mr. Charles H. Holbrook will be selected as managing director of the company. General Manager George F. Chapman will be made a vice-president of the company with enlarged powers.

MR. C. H. QUEREAU, formerly superintendent of shops of the New York Central & Hudson River Railroad Company, has been appointed superintendent of electrical equipment of that company and will have charge of the electric rolling stock. He will report to Mr. E. B. Katté, electrical engineer of the company. Mr. Quereau has been connected with the Vanderbilt lines for the past six or seven years, having been superintendent of shops, and before that superintendent of tests. Previous to his connection with the New York Central, Mr. Quereau was associated with the Denver & Rio Grande Railroad and also with the Chicago, Burlington & Quincy Railroad.

MR. ARTHUR HOLLAND, the retiring president of the United Railroads of San Francisco, was the guest of honor at a dinner given in San Francisco on Dec. 30, at which the directors, officers and heads of departments took occasion to show their regret at his leaving. After speeches by Chief Counsel Terry L. Ford and others, Mr. Holland was presented with a beautifully engraved silver platter. General Manager George F. Chapman, Secretary George B. Willcut, Master Mechanic F. F. Bodler, Chief Clerk J. H. Hanlon, Attorney A. A. Moore and J. M. Duane, member of the banking house of Brown Bros. & Company, of New York, were among those present. Mr. Holland will remain on the Coast for some time.

MR. J. S. HAMLIN, Chicago representative of the St. Louis Car Company, has resigned his position, and will on Feb. 1 become identified with the Ohio Brass Company, of Mansfield, Ohio. Mr. Hamlin will assume the management of a new department, having charge of the sales of the Aikman pressure annunciator, Nicholl-Intern air sander, hose track bridge and car signal system. Previous to his connection with the St. Louis Car Company, Mr. Hamlin was for the greater part of the eight years preceding identified with the National Electric Company. For more than a year, however, he was master mechanic of the Union Traction Company of Indiana, at Anderson, Ind. In his new work Mr. Hamlin will be located at Mansfield, Ohio.

MR. LEE MASSENGALE, formerly master mechanic of the East St. Louis & Suburban Railway Company, at East St. Louis, Ill., assumed the position of general manager of the Iola Electric Railway Company, of Iola, Kan., Jan. 1. For fifteen years Mr. Massengale was master mechanic of the Lindell Railway Company, of St. Louis. Later, in 1900, he was appointed master mechanic of the St. Louis Transit Company, retaining this position two years. Afterwards he was superintendent of the Rossiter & McGovern Electric Company, being located at St. Louis. He remained with that company until May, 1904, when he became master mechanic of the East St. Louis & Suburban Railway, from which position he has just resigned.

MR. CHARLES C. GLOVER has resigned as vice-president and member of the board of directors of the Capital Traction Company, of Washington, D. C. Mr. Glover, it is said, intended to resign from the company a year ago, but the interests of the company with respect to pending legislation, induced him to defer it, although at a personal sacrifice. For thirty years Mr. Glover has been an influential factor in the affairs of the company and its constituents. He became interested in the company in 1875. By the close of the following ten years the cable system was installed. When electricity became commercially useful a change was made to the underground system, which is the present installation. In both of these changes the systems adopted were not only of the most modern and approved types, but the installations were of the most substantial character. In these particulars it is recognized that the judgment and foresight of Mr. Glover exercised a potent influence. During this interval the affairs of the company have been refinanced on a broad and comprehensive scale, so as to enable it to meet the new conditions that have arisen and to provide the facilities which an expanding business as well as new methods of transportation required.