

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVII.

NEW YORK, SATURDAY, JUNE 24, 1911

No. 25

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President
CURTIS E. WHITTLESEY, Secretary and Treasurer.

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor.

Associate Editors:

RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.

News Editors:

G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, \$3.00 per year; Canada, \$4.50 per year; all other countries, \$6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

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

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 copies are printed.

NEW YORK, SATURDAY, JUNE 24, 1911.

CONTENTS.

The Near-Side Car.....	1095
The Need for a Modern Car Cleaner.....	1095
The Test of Materials.....	1096
Illinois Traction Automatic Block Signals.....	1096
Concrete in Railway Service.....	1096
Car Maintenance by the Hudson Companies.....	1097
Operating Practices of the Hudson Companies.....	1098
A New Automatic Train Stop.....	1104
Automatic Block Signals on the Illinois Traction System.....	1105
Overhead Construction.....	1110
Wood Preservation.....	1110
Meeting of the Committee of Shop Accounting.....	1111
Master Mechanics' and Master Car Builders' Convention.....	1111
The Buffalo Near-Side Single Platform Car.....	1112
Improvements Planned in Albany.....	1114
Meeting of the Joint Committee on Block Signals.....	1114
Exhibits at the Railway Convention.....	1115
Robinson Plan for Chicago Subway.....	1117
Meeting of Committee on Engineering Apprentices.....	1117
Manufacturers' Exhibit Space at 1911 Convention.....	1118
New System of Signs Adopted by Boston Elevated Railway.....	1119
Meeting of the Executive Committee of Manufacturers' Association.....	1119
Hearing on West Newbury Fare Petition.....	1120
Metal Car Parts.....	1120
Commutating Pole Rotary Converters.....	1122
Flexible Asbestos Insulating Tape.....	1122
News of Electric Railways.....	1123
Financial and Corporate.....	1126
Traffic and Transportation.....	1129
Personal Mention.....	1131
Construction News.....	1132
Manufactures and Supplies.....	1135

The Near-Side Car

Radical innovations are uncommon in an industry so standardized as the electric railway business, but no milder term than radical can properly be applied to the near-side car recently developed for city service in Buffalo. From the very earliest days, when the street car was nothing but a modified bus body, mounted upon flanged wheels, it has been the universal rule to place the employee who collected the fares at one point in the car and the employee in charge of operation at another. Sometimes the main entrance and exit have been at the rear of the car and sometimes they have been at the side, but never before, we believe, except in the case of one-man prepayment cars, have all passengers been required to board and leave at the front end of the car. Nevertheless, an instant's thought will disclose a number of advantages in such an arrangement. Of these, most important in our opinion is the concentration on the motorman of the responsibility for seeing that the car is not started until all those who wish to ride are safely on board and those who are leaving the car are off the steps. There are other advantages of the car, however, and also possibly some disadvantages which time will disclose. There may be, for instance, a question whether standing passengers will pass to the rear of the car, as they are expected to do, and will not remain near the entrance where exit is easy. No final conclusions can be reached in any changes of this kind until an experiment has been tried on a considerable scale for some time and under both summer and winter conditions. But this is now assured at Buffalo, and the results attained there will be watched elsewhere with interest.

The Need for a Modern Car Cleaner

It is somewhat remarkable that while vacuum and compressed-air machinery is revolutionizing the cleaning of assembly rooms, offices and residences many electric railways cling to the car-cleaning methods which were in force during the era of the horse car. This condition seems all the more odd in view of the fact that some supply of energy for power-driven machinery is almost always available at a carhouse. It is true that a few companies have adapted certain old railway air compressors either for compressed-air cleaning alone or for a combination of pressure and vacuum cleaning. But such outfits cannot be expected to give the best possible results, partly because they are too small for the work and partly because they were designed for intermittent operation. What is wanted is a continuous-service machine which is capable of exerting such powerful suction that objects as heavy as peanut shells will be drawn out quickly from every nook and cranny of the car, even at a distance of several inches. The cost of cleaning constitutes so large a proportion of the car maintenance expenses that the application of specialized machinery to it is worthy of careful consideration.

The Test of Materials

We believe that on many roads greater use could be made than is now the case of the experience of the engineering department in the experimental testing of materials. The subject is a pertinent one at the present time, because a great many companies have not had much construction work recently to occupy the time of the engineering departments and on other lines the needs for the summer season in the way of new construction will soon be completed. The idea that the purchasing department should maintain the closest relations with the engineering department and should obtain the benefit of its assistance in the selection of supplies is not new, but is worth repeating. In nearly every engineering department there are a number of young men, recent graduates of technical schools, who are well fitted to carry out these tests of equipment and supplies. Almost all of the supplies used by an electric railway company are susceptible to this kind of engineering analysis, and these young men have had just the kind of training to conduct these tests satisfactorily, especially when they do so under the general supervision of the head of the engineering department. The number of articles which could be so tested for durability or efficiency is legion, but we might mention in particular insulation of all kinds, overhead appliances, lamps, bell cords, fare registers, trolley wheels, brakeshoes and wheels. Work of this character should pay for itself in a short time because it would determine quickly the relation between first cost and real cost of the articles tested, and where a company has no other or better facilities for determining the value of articles purchased it would usually prove more economical than laying these same men off in slack seasons.

Automatic Block Signals

Several notable installations of automatic block signals have been made on interurban electric railways during the past year, but the new signal equipment of the Illinois Traction System, which is described elsewhere in this issue, is the largest installation of its kind which has yet been made. Except for the use of alternating current in the track circuits the signal apparatus is very similar to the standard apparatus used on steam railroads. The density of traffic on the sections of the Illinois Traction System where the signals have been installed is greater than on most of the single-track steam railroads which have been equipped with block signals, and the average speed of trains is higher. The same considerations of safety, convenience and reliability which require the use of the track circuit system on steam roads influenced the management of the Illinois Traction System in its selection of signal equipment in spite of the comparatively high cost. Only part of the Illinois Traction System is being equipped with continuous signaling at the present time, but where continuous signaling has not been put in the most dangerous curves have been protected by warning signals which, while they are not block signals in the true sense of the word, afford ample protection against head-on or rear-end collisions at the points where the view of the track ahead is obscured. It is worthy of note that the block signals on the Illinois Traction System are not supplemented with any form of automatic stop. The block signals are not intended to displace the control of the train dispatcher over the movements of trains on the road, but they do assist materially in preventing cumulative delays when one or more trains are running late.

CONCRETE IN RAILWAY SERVICE

One sometimes thinks of our own as the age of steel and concrete, since these are the structural materials which occupy public attention. A vast amount of use has been found for both, and concrete is at present a very popular form of construction for buildings of ordinary type as well as for bridges, culverts and other such structures. Of late, railway companies have gone considerably into the use of concrete not only for these more commonplace purposes but for platforms in freight and passenger service, for ties and foundations for ties, and even for poles on their transmission and distribution systems. A recent discussion before the New York Railway Club brought out a large amount of interesting facts and comment regarding the applicability of reinforced and other concrete for the wide variety of structures which are used by railway companies.

Now, in the present stage of experience it quite goes without saying that for structural use, as in bridges and the abutments of bridges, arches, culverts, piers, viaducts and a great number of minor structures, reinforced concrete is a cheap and reliable substitute for masonry. When well mixed and reinforced there is every reason to believe that it is as permanent a building material as one could desire. It gets harder and harder with time, and after the passage of years the structure becomes practically a monolith in which the reinforcement is so sealed up that there is little reason to fear the effect of corrosion. Now and then one hears of a concrete structure giving way, which naturally causes some alarm among those who desire to use the material, but such accidents are, it is only fair to say, almost always the result of bad mixing with insufficient or poor cement.

This very fact, however, is of serious import. Building stone is a material about which there can be very little deception, and there are certain well-defined and standard ways of laying it. If the structure is properly designed these inevitably lead to sound results. But in using reinforced concrete one is dealing neither with a well-defined material of thoroughly ascertained qualities nor with methods which have been standardized through generations of practice. If a suitable mixture is carefully and honestly made and is set around suitable reinforcement, the result is of the highest excellence, but there is no material which can be more successfully scamped than concrete, as many a user of it has learned to his sorrow. So to speak, it varies in quality from adamant to mud. An adobe house in Arizona is granite compared with some of the concrete we have seen slapped together in buildings in the metropolis of our country. A closely drawn specification, an honest contractor and a minute inspection are the three things necessary to be in combination in order to get thoroughly first-class results out of concrete. When this trio is on duty concrete as a building material leaves very little to be desired; but good things come high in this world, and buildings of the grade of excellence we have described, while less expensive than if of masonry, can by no means be classified as cheap. When we pass to ordinary cases of building, like stations, freight houses, platforms, office buildings, carhouses and power stations, one meets a somewhat different set of conditions. All these things have been at times successfully built of reinforced concrete, which here is in competition, however, not with masonry, but with brick, terra cotta and steel, concrete blocks and even with wood

and galvanized iron. For instance, in building a freight house or a passenger station all these materials come into active competition, and when it comes to figuring the cost concrete has to take its chances with the rest.

Prices of material vary greatly from place to place, but true monolithic reinforced concrete will probably head the list in cost in a very large number of instances. It is solid, enduring and fireproof as regards the structure itself, but on the other hand it is somewhat expensive, runs such risk of interior fires that the underwriters make little difference between it and ordinary brick construction, and it is open to the objection that if alterations have to be made one is almost driven to diamond drills and dynamite. Concrete blocks have given great promise of usefulness, but at present many constructors look on them somewhat askant owing to the great care and close inspection required to secure a uniform and sound product. In the discussion to which we have referred there seems to be a rather well-settled opinion among practical railway men that cost of construction with concrete of really good quality runs much higher than is commonly stated, an experience which is not uncommon among those who have figured on such structures. There was, too, some complaint of dampness, so that even the reinforced concrete had to have a special waterproof coating, and of lack of durability in concrete used for floors and platforms, owing to gradual chipping which could not be easily repaired. Of course, the better the concrete the more waterproof it is and the less likelihood there is of chipping, all, however, at increased cost. The sum and substance of the experience in this matter seems to be that reinforced concrete, properly put up, is a fine and reliable substitute for masonry, but of somewhat uncertain economy when put into keen competition with other materials for structures which ordinarily would not be made of masonry.

The use of concrete for ties and poles has not yet progressed far enough to enable one to form a final opinion on it. Abroad concrete ties are coming into use, particularly in Italy. It must be borne in mind, however, that steel ties have been largely and successfully used abroad, while in American construction, in which the roadbed is differently designed, both concrete and steel are still looked upon with some disfavor. The objection to concrete seems to be chiefly one of cost, on the ground that if the tie is of section heavy enough and the concrete is rich enough to stand up well against disintegration it is too expensive, and if smaller, so much steel is required for reinforcement as again to bring up the cost. The reinforced-concrete tie, however, seems promising enough to warrant further experiments even though some of the results reached have been unsatisfactory.

The same is true of concrete poles. There is a fine stability to a well-built reinforced-concrete pole that appeals at once to the contractor. The endurance of such a pole is still a matter of some doubt since few have been in use for any considerable length of time. The concrete poles look well for supporting trolley wires and if on firm foundations should give a good account of themselves in such service. For transmission work they are perhaps less well adapted. The rigidity of the material is perhaps somewhat of a disadvantage for this service, inasmuch as it compels the use of rather massive poles, while equal security can be secured at lower cost by the intelligent use of steel alone.

To sum up the situation it appears that at present concrete offers a splendid substitute for masonry, serves admirably and under some circumstances economically for general structures in which it has to compete with other building materials, and that it is promising, though comparatively untried, for ties and certain classes of pole lines. With respect to these latter uses it would take much time and experience to find out the facts in the case. The general opinion seems to be that first-class concrete construction, while leaving little to be desired in its properties, is far from being as inexpensive as its warm advocates are disposed to assert.

CAR MAINTENANCE BY THE HUDSON COMPANIES

The car maintenance experiences of the Hudson Companies, whose practices are described elsewhere in this issue, prove that delays due to the failure of car equipment can be made practically negligible when modern electrical apparatus is operated within reasonable loading limits and maintained as closely as possible to the original standard of efficiency. To operate on such a basis as one minute car equipment detention for every 167,161 miles operated, as was actually accomplished last April by the Hudson Companies, is to set a mark of excellence which is high indeed. Such a record means that the action of the electrical apparatus must have been well-nigh perfect. In fact, this has been the case. At one time the armature shop was free from traction motor repair work for more than six months, although fifty of the 190 two-motor equipments had then been in service for longer than two and a half years. This railway's experience with steel cars is of particular interest. It has found that with oil burners it is possible to repair steel panels almost as easily as wooden panels are repaired by the usual methods, and that sand-blasting provides a quick and comparatively cheap means for preparing the steel for repainting. The behavior of the composition cement flooring in the Hudson cars is worth noting. These floors, it will be remembered, have a special hard rough surface so as to provide a good foothold for the passenger. In this respect they have proved very satisfactory, but as they have required redressing within two years some increase in longevity would appear to be desirable.

A very important feature of the Hudson Companies' operating practice has been the standardization of every car. This policy has given to the patrons the benefit of all the improvements which have been devised as the result of operating the first cars. At the same time the adoption of uniform car equipment to the smallest detail has simplified the maintenance work and made a complex record system unnecessary. The monthly comparisons of detentions and the analysis of equipment defects do not require much clerical work, but they do furnish plenty of data to keep the several departments and the manufacturers of the principal apparatus alert for possible betterments.

In conclusion, something should be said about the success this company has had in practically enlarging its facilities through the adoption of a piece-work system. When a car cleaner's average output can be raised from 8 2/7 to 12 1/3 cars a day, it becomes apparent that an equitable piece-work rate can do more for the company than merely to decrease the actual cost per car. The maximum use of the space available for inspection and cleaning is as important in a carhouse as is the intensive use of machine tools in a factory.

OPERATING PRACTICES OF THE HUDSON COMPANIES

The Hudson & Manhattan Railroad, commonly known as the Hudson Companies, operates 17.525 miles of single track, which consist of a belt line connecting all of the New Jersey steam railroad terminals in Jersey City and Hoboken, except that of the Central Railroad of New Jersey, a line under Sixth Avenue, New York, from Christopher Street to Thirty-third Street

boken on Feb. 26, 1908, and on the downtown system from Hoboken to the Hudson Terminal Buildings at Cortlandt Street on July 19, 1909.

The growth of the system is well indicated by the increase in rolling stock. The original equipment consisted of fifty cars. The second lot consisted of ninety cars and was placed in service in July, 1909, and the third lot, consisting of fifty cars, was placed in service late in 1910, making a total of 190 cars. Orders have also been placed for thirty-six cars more for use in the service to Newark, which will be over the tracks of the Pennsylvania Railroad. All of the present rolling stock is of the steel center-door type, seating forty-four passengers, as described by Hugh Hazelton, electrical engineer of the Hudson & Manhattan Railroad, in the *STREET RAILWAY JOURNAL* for June 8, 1907. Many minor improvements were embodied in the later cars, and it was therefore decided early in 1911 to incorporate these changes in the first cars, thereby standardizing the rolling stock and bringing it up to the same

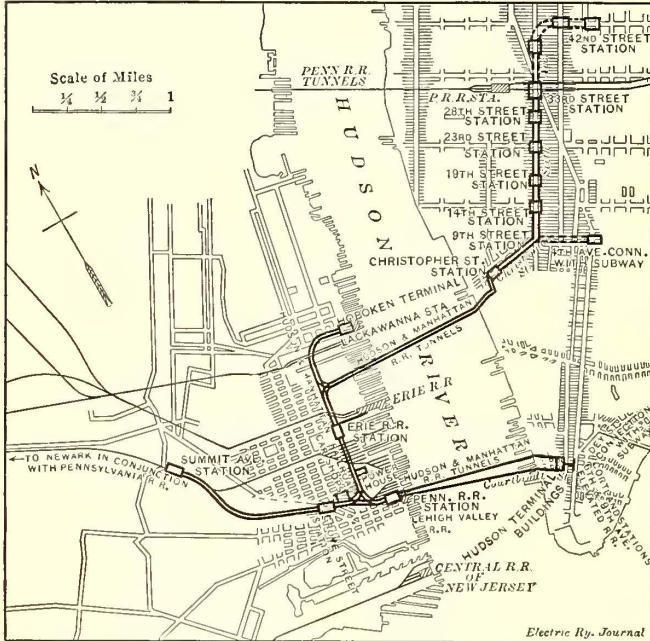


TABLE I.—HUDSON COMPANIES' LABOR COSTS OF INSPECTION AND REPAIRS FOR MARCH, 1911.

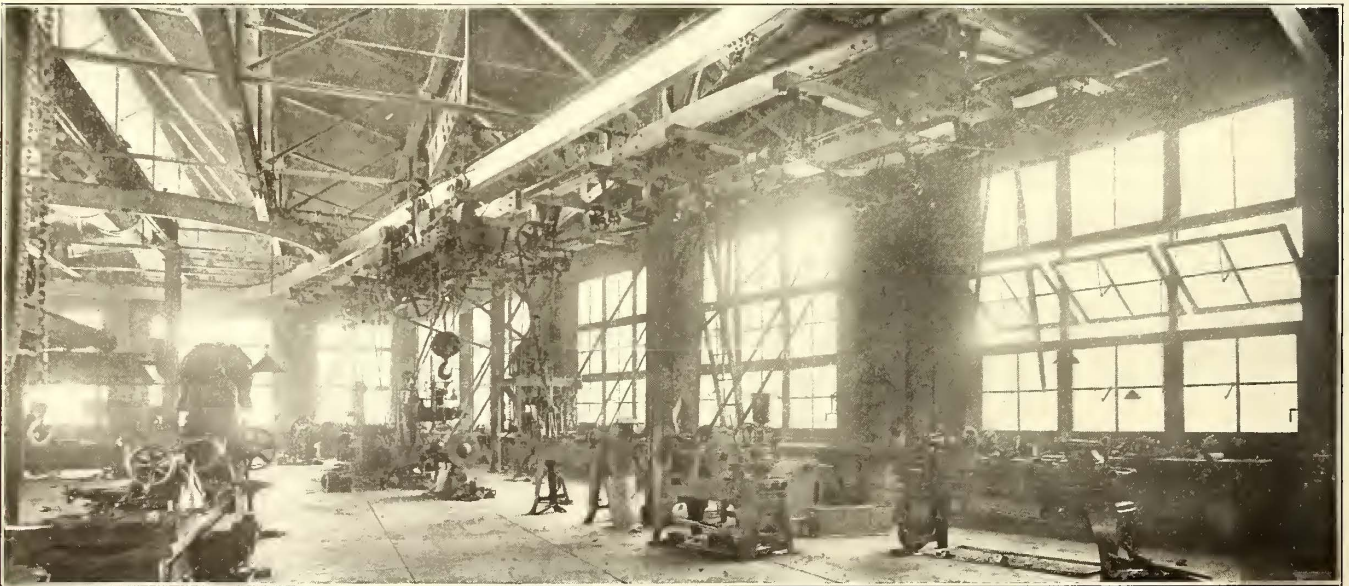
Description.	Cost.	Cost Per Car Mile.
Painting and varnishing of cars.....	\$579.91	\$0.0009279
Repairs and renewals to car bodies.....	1130.18	0.0018083
Repairs and renewals to air brakes.....	603.95	0.0009663
Repairs and renewals to trucks.....	966.39	0.0015462
Repairs and renewals to wheels and axles.....	472.67	0.0007563
Renewals of brakeshoes.....	93.73	0.0001499
Repairs and renewals to motor bearings.....	14.36	0.0000229
Repairs and renewals to gears and pinions.....	.....	.....
Other motor repairs.....	72.60	0.0001162
Repairs and renewals of control equipment.....	475.75	0.0007612
Repairs and renewals of pumps and governor.....	217.74	0.0003484
Train supplies and expenses.....	222.00	0.0003552
Total	\$4849.28	\$0.0077588
Car cleaning.....	\$847.04	.....
Cleaning cost per car for one month.....	\$4.46	.....
Cars in service.....	.....	190
Total mileage.....	.....	625,006.30

Hudson Shops—Map Showing Routes of and Territory Served by the Hudson Companies

and Broadway, and two pairs of single-track tunnels which enter New York at Cortlandt Street and Christopher Street respectively. Franchises have also been granted for extensions from Sixth Avenue to Fourth Avenue along Ninth Street, and from Thirty-third Street and Sixth Avenue to the Grand Cen-

tral Terminal at Forty-second Street and Madison Avenue. The system now in operation comprises 7.25 route miles. The territory served in New York and Jersey City is shown in the accompanying map.

The first regular trains were operated on the uptown system from Nineteenth Street and Sixth Avenue, New York, to Ho-



Hudson Shops—Machine Shop, Illustrating the Layout of Tools, the Telfer System, Natural Lighting Facilities, Etc.

Manhattan Railroad is in charge of E. T. Munger, general superintendent, with P. V. See as superintendent of car equipment.

DETENTION RECORDS AND MAINTENANCE COSTS

No consideration of the car maintenance practice of any railway would be complete without showing its relation to the

actual service reliability of the equipment. On this system a keen rivalry exists among all departments to keep the delays down to the irreducible minimum. This is reflected by the monthly comparative reports which are issued by the general superintendent with comments on the conditions which have produced the records of each department. From these records it appears that during the calendar year 1910 the cars ran 17,000 miles, per minute of detention, due to causes for which the car equipment department could be held responsible. A most extraordinary record was achieved by this department in April of this year, when 585,065 passenger car miles were operated with a detention of only 3½ minutes, giving practically 167,161 miles per minute of detention. It is a curious fact that the detention record for the year 1910 was about three times better than for the preceding year, when the rolling stock was almost new. The first car was sent to the overhauling shop on Feb. 27, 1911, at which time it had run 175,000 miles without any other attention than regular inspection. The examination of this car proved that it could have run for a much longer period without trouble.

In spite of the remarkable freedom from mechanical and

ing up of car maintenance work is especially important. The classes of labor to which the piecework system has been applied are window cleaning, painting, wheelwork and for special jobs, such as the installation of electric heaters and coasting registers, replacement of broken motor studs, etc. The sand-blasting of cars is also to be worked out on this basis. The accompanying tables present the differences between day and piecework rates for certain classes of work.

Table II, for example, shows the estimates of savings which were made when the piecework system was decided upon for window cleaning. These estimates have proved correct in practice, as the application of piecework has reduced the cost of window cleaning from 19½ cents to 15 cents per car. The

TABLE II.—HUDSON COMPANIES' WINDOW CLEANING, 15 CENTS PER CAR.

	Day Work. (Present.)	Piece Work. (Proposed.)	Saving. (Expected.)
Number of men.....	7	6	1
Cars per man.....	8½	Max. 9½	13
Wages per diem.....	\$1.75	\$1.95	\$0.20
Cost per car.....	0.19½	0.15	0.04½
Cars cleaned per diem.....	58	74	16 (increase)
Minutes per car.....	70	46	24
Cost of cleaning per diem....	\$11.73	\$11.12	\$0.61
Cost per car per month.....	2.27	2.06	0.21
Total monthly saving.....			\$15.86
Extra cars cleaned per month.....			416

TABLE III.—HUDSON COMPANIES' PIECEWORK PRICES FOR PAINTING.

Scraping and painting roof.....	\$1.00
Scraping one side and one end.....	1.50
Painting one side and one end.....	1.50
Scrubbing seats.....	0.75
Varnishing.....	0.75
Rubbing outline, cleaning ventilators, painting poles and green parts.....	2.40
Coat white.....	1.75
Coat enamel.....	1.75
Painting under seats.....	0.25
Cleaning, retouching and varnishing.....	3.30

PAINTING CARS.

Last cars painted on day work.....	\$25.29
Cars painted on piece work.....	19.70

COMPARISON OF EARNING OF MEN.

	Day Work.	Piece Work.
Head painter.....	\$2.75	\$3.28
Inside painter.....	2.25	3.28
Painter's helper.....	1.75	2.49
Painter's helper.....	1.75	2.40

TABLE IV.—HUDSON COMPANIES' PIECEWORK RATES, WHEEL TURNING.

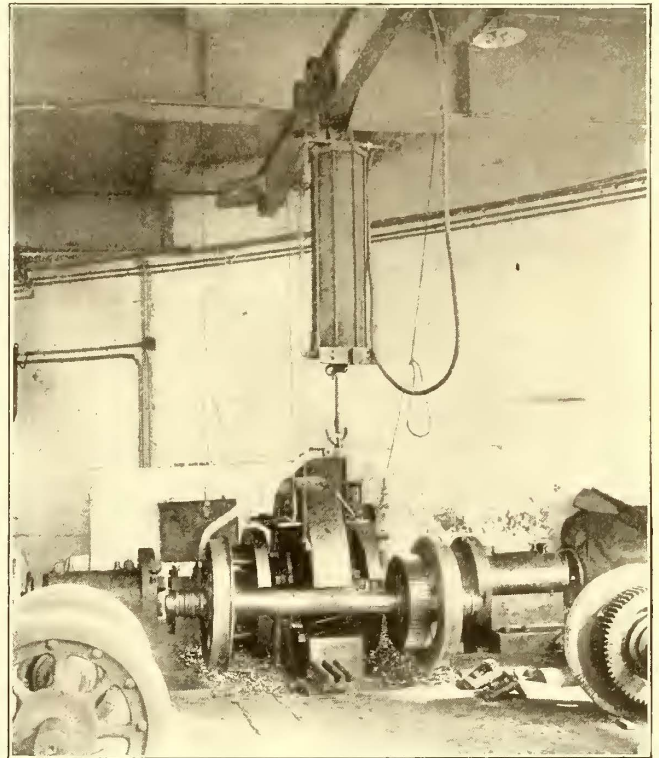
MOTOR WHEELS.		
Minimum diameter 30¼ in.....		\$0.16½
Maximum diameter 34¼ in.....		0.48½
TRAILER WHEELS.		
Minimum diameter 26¼ in.....		0.12½
Maximum diameter 30¼ in.....		0.44½
½ cent will be allowed for each 1/16 in. diameter over minimum size.		

electrical troubles the car equipment department's expenditures for the calendar year 1910 did not exceed \$75,000, or only \$13.34 per 1000 car miles. The cost of labor alone was about \$50,000. The total cost previously given included \$1,876.17, which was spent for such extra equipment as rubber door cushions, and \$1,750, which was applied to the tire and wheel reserve fund.

Table I, on page 1098, shows the labor costs for car inspection and repairs for March, 1911. In this table there are listed the costs per car mile of all items relating to inspection and repairs, except that of car cleaning, which is given separately. This table also shows that the total distance run by 190 cars in March was 625,006 miles, or 3289 miles per car.

PIECEWORK SYSTEM

The piecework system has been applied in these shops on an extended scale. This practice has resulted in far larger pay for the men than under the day rate system. So far as the company is concerned, the change in labor payment has had at least two excellent results, namely, a great increase in the number of cars which can be passed through the shops in a given time and an improvement in the grade of work turned out by the men. The space facilities at Jersey City are so limited that the speed-



Hudson Shops—Air Hoist for Bringing Wheel Sets Direct to the Lathe

piecework system disposes of the cars much faster than the day system. It was correctly estimated that seventy-four cars could be cleaned by six men in the time formerly required by seven men to clean fifty-eight cars. Table III shows a similar comparison for painting. The saving in one case has amounted to \$5.59 per car and in another case to \$3 per car.

The piecework rates on wheel turning are not based on the usual cent per inch principle. As shown in the accompanying Table IV, the method is to pay the men 16½ cents for a wheel of the minimum diameter of 30¼ in., allowing ½ cent more for each 1/16 in. diameter over the minimum size, consequently 48½ cents is paid for a wheel of the maximum diameter of 34¼ in. On the inch basis the respective prices for minimum and maximum diameters would be 30¼ cents and 34¼ cents. It will be seen that the Hudson Companies' method is to give a high premium to the man who saves the most metal. In the long run this does not cost as much as the cent-per-inch practice. The company feels that it can well afford to pay for extra skill because a saving of 1/16 in. metal means that the wheel may give \$1 to \$2 value in extra life. The introduction of the piecework system for wheels also has doubled the capacity of the lathe.

STANDARDIZATION AND IMPROVEMENTS IN CAR EQUIPMENT

As previously mentioned, it has been found desirable to standardize the rolling stock purchased at different times so that all cars would be brought up to the same degree of safety and efficiency. All work of this character is summarized in a monthly

progress report by the superintendent of car equipment, entitled "Special Work Done." The changes noted in the following paragraphs are of more or less general interest.

The leather hand straps in the first fifty cars have been replaced by horizontal enameled stanchions which form a convenient grab rail as in the later cars.

All cars have been equipped with door signal devices whereby a lamp in the motorman's cab is illuminated when all the doors of the train are closed. Soft rubber buffers have been added to the edges of all car doors to prevent passengers' clothing from being caught when the doors are closed. The original fifty cars are being furnished with electric door control valves to displace manual control valves. Feed valves have been installed to regulate the door pressure, which varies from 40 lb. to 50 lb., whereas the supply is delivered at 90 lb.

All electric switches have been lined with fiber on account of the short-circuits which were caused by the rough treatment they received from the trainmen.

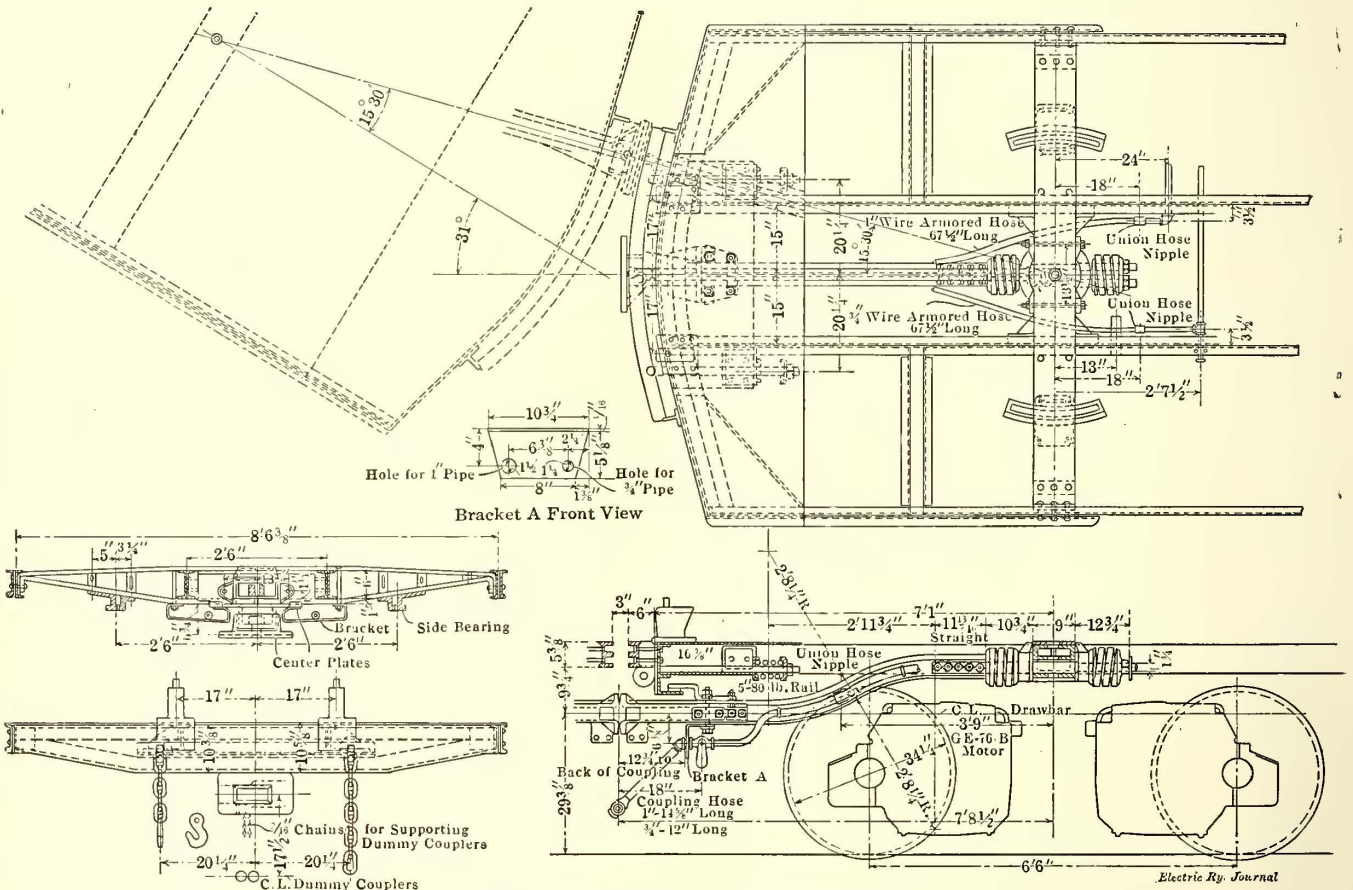
The aluminum corner plates of the cars are being replaced by brass, owing to the strong corroding influence of the salty atmosphere of the tunnels.

The removal of the kingpins from the trucks made it possible to use for lubricating passages the holes which existed in the car floors. The oil falls on a wooden block and then spreads out over the center plate.

To prevent breaks at bends, a change has been made in the undercar pipe fittings from the truck to the tripper. The new fittings are of the bored-out, high-pressure type.

Westinghouse automatic resetting devices have been installed for emergency trippers. This device resets when the train line pressure drops to zero.

Consolidated electric heaters have been placed under the seats in all the cars despite the fact that the tunnel temperature ranges from 60 deg. to 70 deg. Fahr. even in the coldest weather. The heaters were installed because air-brake apparatus was found frozen in cars which had been standing in the yards.



Hudson Shops—Details of Draft Rigging

All cars have been furnished with Hedley anti-climbers.

It has been found necessary to renew the top surface of the composition cement car flooring, which had worn out at the doors and opposite the seat risers after two years' service. In placing the new flooring two important changes are applied as follows: The flooring is laid perfectly flat instead of being crowned, so that there is no thinning out at the very place at which the wear is greatest, namely, opposite the risers, where there is a great deal of shuffling by passengers; the top dressing is 1/2 in. instead of 3/8 in. thick. The underlying layer of these floors, which has not been touched, is about 7/8 in. thick at the deepest point of the keystone section floor. The cement-covered area of the floor section and vestibules of a car is 265 sq. ft. The net cost of removing the top dressing is \$2 and the cost of laying the new dressing \$4 per car. The cement, after requiring some five hours' preparation, will set sufficiently well over night to permit the car to go into service. At this time the company is experimenting with five different types of fire-proof flooring.

The air hose on all cars formerly was fastened to a sector bar. This bar proved troublesome because the hose would uncouple on short curves. The hose is now fastened to the drawbar, as shown in the accompanying drawing, so that it remains rigid and parallel to the drawbars at all times.

All cars have been equipped with train line receptacle cover springs. The train line jumper used to work loose, so that it would fail to make contact and would drop to the rail. This trouble is now prevented by the cover springs, which will last indefinitely because they are not subjected to tension under normal conditions.

The original motor studs broke frequently, owing to the very short and sharp curves and the steep grades on this system. They have been replaced by heat-treated steel studs.

Round ribbon contactor shunts have replaced the old-style laminated flat ribbon shunts, the breakage of which caused trouble with the contactors.

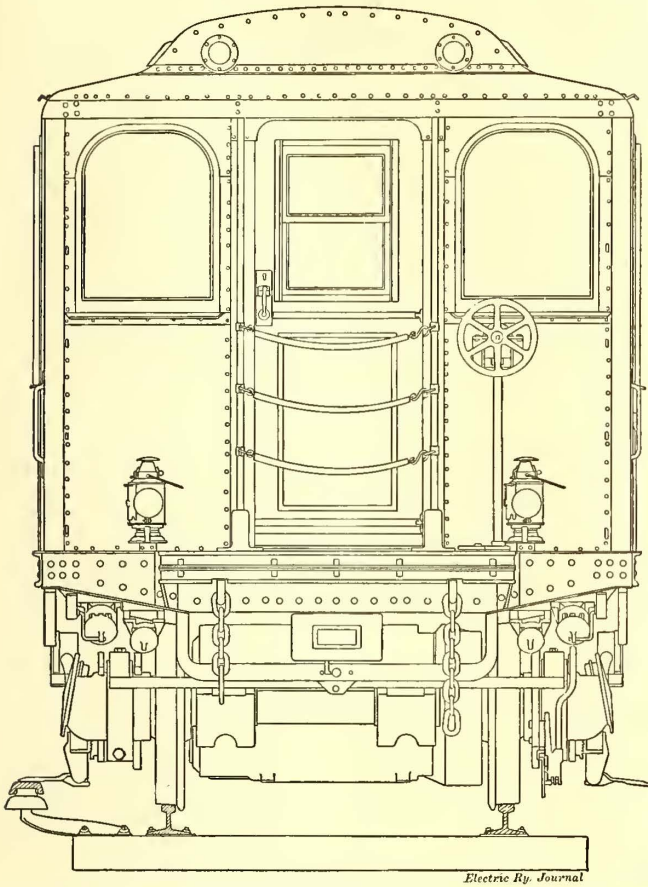
INSPECTION FACILITIES AND RECORDS

The inspection quarters at the Jersey City shops were de-

scribed in detail in Mr. Hazelton's article in the issue of May 6, but it will be of interest to refer to some features which have been installed in connection with this work. As stated by Mr.

An electric tell-tale alongside one of the inspection tracks is installed to catch any third-rail shoes of improper height. This tell-tale is in circuit with a warning bell in the office of the superintendent of equipment. As shown in one of the accompanying illustrations, it consists of a pair of conductors, mounted on six insulators, and a small scaffold from which is suspended a set of copper strips similar to a gold-leaf electroscope. If a shoe is too high, the warning circuit will be closed when contact is made with the copper strips; if the shoe is too low, the warning circuit is closed by the depression of the springs under one of the conductors. The roofs of all cars are furnished with mechanical tell-tales which indicate by the amount of their bending how much a car tips from the vertical when passing through the tunnels.

Contrary to the practice of most large companies, this railway does not keep individual mileage records of equipment parts. The principal cause for this is that the equipments are practically uniform throughout, so that no good reason exists for keeping track of many thousands of items.



Hudson Shops—End Elevation of Hudson Companies' Standard Car

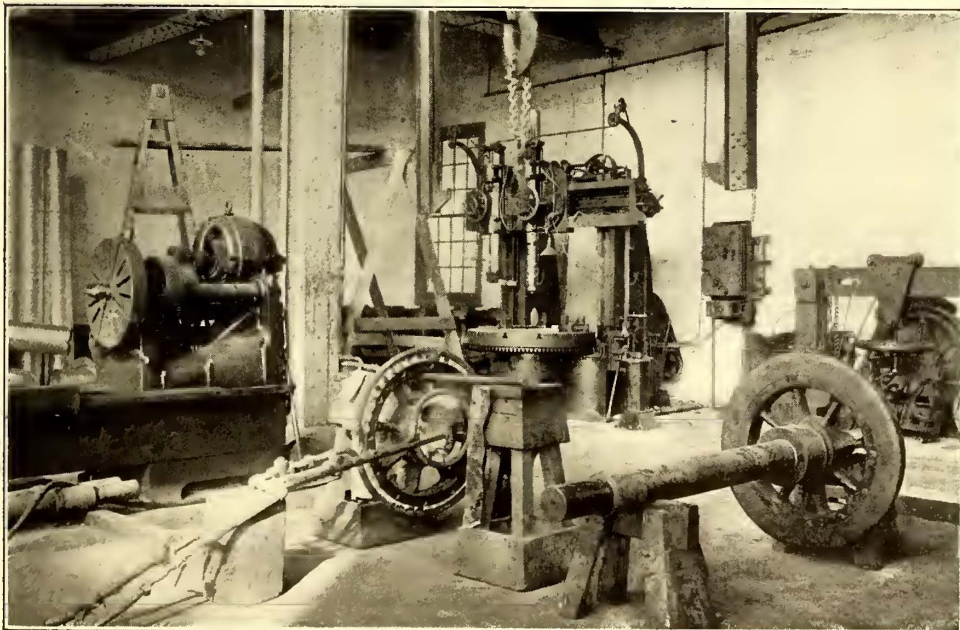
Hazelton, the inspection tracks are carried on concrete piers of such height that all work under the cars can be done while the men are standing up. The inspection shop has room for six-



Hudson Shops—Third-Rail Shoe Tell-tale Outside of the Inspection Shop

One of the principal records of the company is based on the daily reports on all cars in the shop. These reports are made out by the shop foremen and assembled by the superintendent of car equipment for a monthly report to the general superintendent. A noteworthy feature of these reports is that various manufacturers are furnished with reports of the troubles relating to their equipment. In this way they have an opportunity of determining what their apparatus is doing in service even when the railway company does not ask directly for assistance in solving maintenance problems. Thus all door trouble reports are sent regularly to the Burdette-Rowntree Company; the motor and control report, which goes to the General Electric Company, shows the number of cars in service, the mileage made and the delay in minutes caused by this apparatus; the brake trouble report, Table V, which goes to the Westinghouse Traction Brake Company, also gives the amounts of oil used in the compressors in addition to statistics like the electrical report.

One of the improvements made as the result of sending these reports to the manufacturers was in the motors. The original armatures were subject to open circuits at the back end. These



Hudson Shops—Gas-Heating Outfit for Applying Steel-Tired Wheels

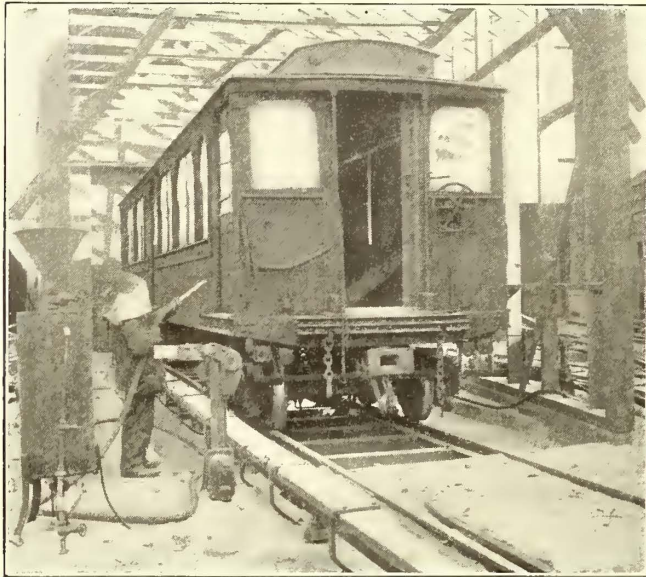
teen cars, but on an average fifty cars can be disposed of in a ten-hour day.

Clearance plates are bolted to the inspection tracks to prevent cars from going back to service with the automatic trip too low.

troubles have been overcome by inserting wooden pegs to prevent the vibration of coils where connected at the back end.

WHEEL PRACTICE

The standard motor wheels of this company are 3 1/4 in. diameter and the standard trailer wheels are 3 3/4 in. diameter. All motor wheels are of the extended hub, steel tire type. The original design of riveted section tires has been replaced by



Hudson Shops—Sand-Blasting Outfit in Service

bolted sections. The bolt passes through the tire and rim, whereas in the old wheels the rivets passed through the rim only and so did not always prevent the slipping of hot tires. The wheels are shrunk on hot by means of the gas-heating outfit shown in one of the accompanying illustrations. Special valves are installed in the gas pipes to permit variable amounts of heat to be applied to the rim and tire in accordance with their difference in thickness. At present this work is done in the open, but an inclosed type of heater is now being devised in order to economize in gas. Wheels which are to be shrunk on axles are set on horses by means of a crane.

The wheels are bored according to the standard M. C. B. shrinkage allowance of 0.001 in. per inch of diameter. They are installed on the axle in about twenty minutes. Wheels are put in the hydraulic press only for removal, and must be heated before they can be taken off, despite the fact that the press has a capacity of 300 tons.

As shown on page 1099, wheel sets are brought directly to the lathe by means of an air hoist instead of by the slower method of rolling them over a track into the lathe.

ELECTRICAL PRACTICES

It is impossible to describe the motor maintenance practice of this company for the simple reason that there has been no necessity to date for any appreciable amount of maintenance work. The armature room is empty almost all the time, as appears from the fact that not more than eight railway armatures have required any attention since the opening of the system. During the last six months there have been no electric repairs whatsoever. The repairs to compressor armatures have also been very light.

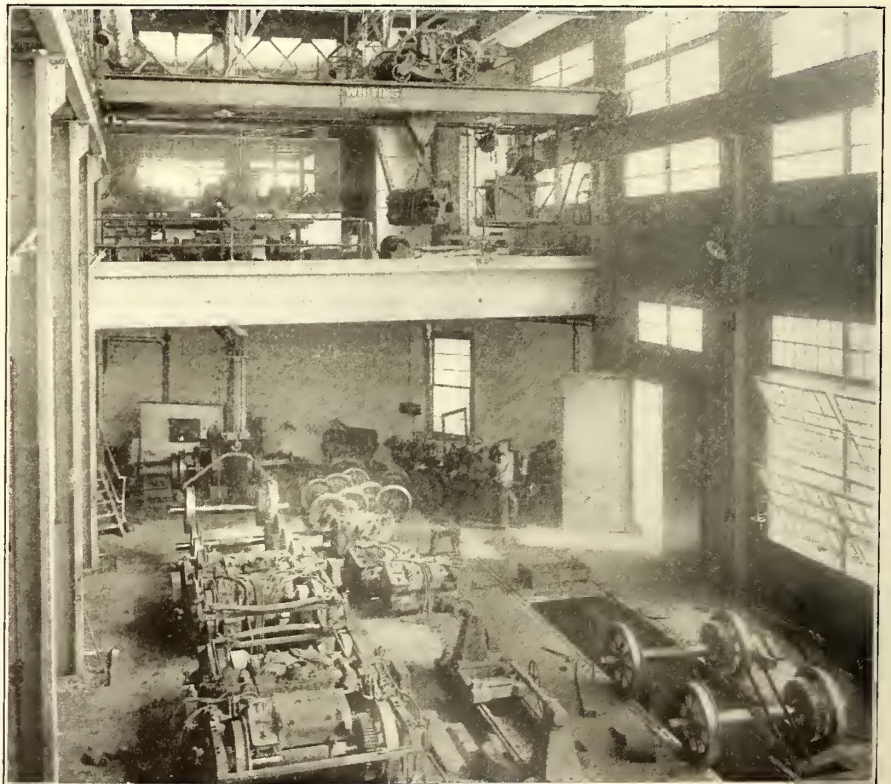
All of the cars are equipped with two GE-76 160-hp motors. This motor has slotted commutators but no commutating poles.

TABLE V.—HUDSON COMPANIES' BRAKE TROUBLES DURING THE MONTH OF FEBRUARY, 1911.

Fuse blown (electric brake).....	6
Pump slow.....	1
Stuck pump governor.....	2
Open circuited pump armature.....	1
Bad order valve (electric brake).....	1
Stiff brake valve.....	5
Bad order pump governor.....	5
Frozen magnet (electric brake).....	1
Feed valve frozen.....	2
Pump governor out of adjustment.....	1
Pump fuse missing.....	1
Short brushes in pump.....	3
Pilot valve cut out.....	2
Dirty slide valve (feed valve).....	1
Bad order finger (electric brake).....	1
Bad order bleed cock.....	1
Electric brake cut out.....	3
Dirty valve (electric brake).....	4
Nipple broken on pipe leading to governor.....	1
Pump fuse blown.....	2
Grounded pump armature.....	1
Total.....	46
Delay in minutes.....	0
No. cars in service.....	190
Mileage.....	565,815.89
Compressor oil used (gal.).....	104

The excellent results which it has given may be ascribed to four causes: First, the satisfactory design of the motor; second, the motors are not overloaded; third, the trains are operated through comparatively cool sub-aqueous tunnels for a large portion of the route; fourth, a thorough system of inspection. The gears and pinions, which are the General Electric Company's manufacture, type F, have shown no perceptible wear to date.

Lubrication is supplied on a Galena mileage contract. The lubricating cost for March, 1911, was \$0.1098 per 1000 car miles. All oil which is removed from the journal and motor bearings is re-used for lubricating levers, rods, etc. No oil-reclaiming



Hudson Shops—Truck Overhauling Section with Wheel Shop in the Background and the Compressor Shop in the Gallery

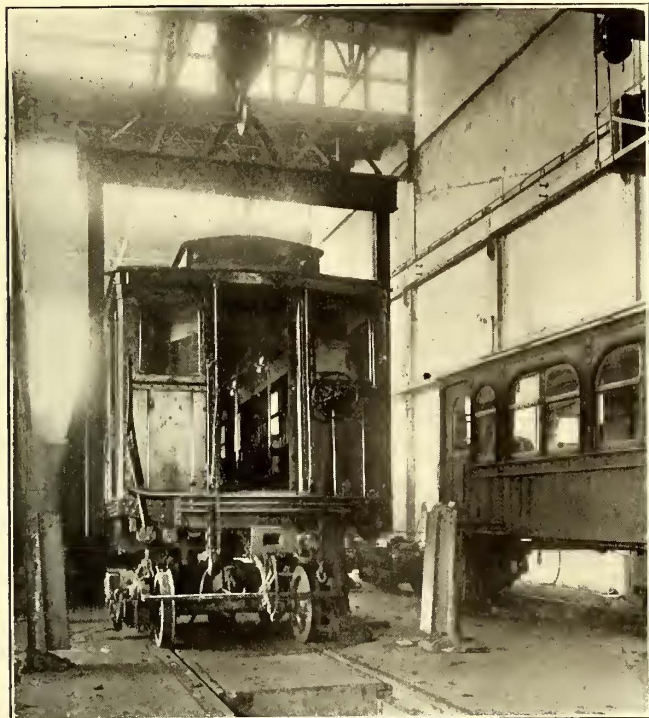
devices have therefore been required at this installation.

MAINTENANCE SHOPS

The general layout of the different shops has already been described in Mr. Hazelton's article, but the accompanying illus-

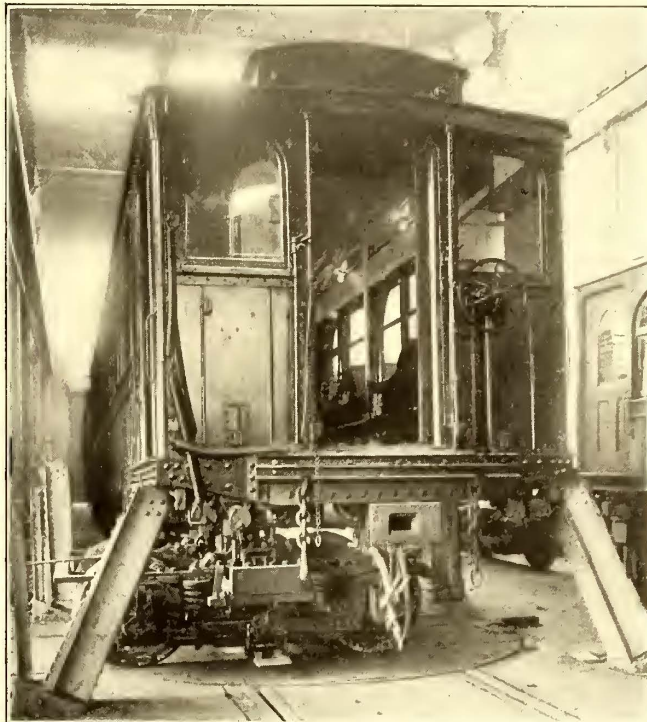
trations are added to show various operating features. One of these illustrations shows the machine shop with its comprehensive telfer system. This shop is practically a gallery overlooking the heavy repair shop; the latter is spanned by a crane

cial repair department is that devoted to taking care of storage batteries which are used for emergency car lighting. The batteries are tested about every fifty days, or when cars are in for general inspection. These batteries are filled to the proper



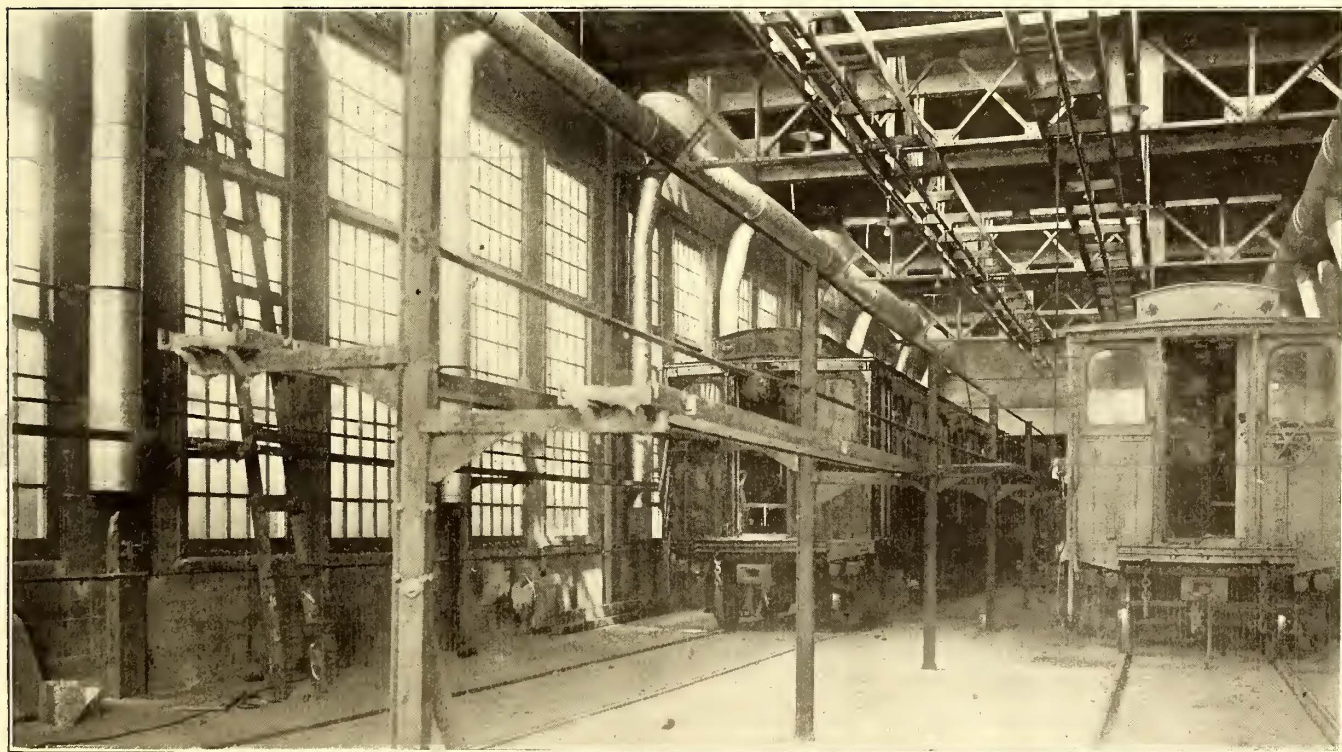
Hudson Shops—Preparing to Remove a Truck

which connects with the telfer system whereby articles brought to the rear of the machine shop can be transferred to the telfer for conveyance to individual machines.



Hudson Shops—Shifting the Truck with a Turntable

level and then charged until their specific gravity is constant. Two views on this page show the method of removing trucks from cars to the adjacent truck shop by means of a turntable.



Hudson Shops—Interior of Painting Section, Showing Trolley System for Shifting, Heating Pipes and Outlets, Aisle Scaffolds, Etc.

One view shows the rear of the truck shop and the gallery for compressor and general air-brake work. This gallery contains a home-made air-brake testing bench which is furnished with a special pump to give various operating pressures. Another spe-

The car is suspended in a steel yoke while the truck is taken out, and is afterward carried on steel supports, as shown, until the truck has been replaced.

The paint shop is large enough for six cars and handles an

average of one car a day. One of its features is the use of steel posts with brackets to permit the workmen's planks to be adjusted at any height desired. The view of this construction also shows the indirect heating system outlets and the Coburn trolley track for moving cars.

The interesting outfit shown on page 1102 was devised for the rapid sand-blasting of cars. In fact, this work is done at the rate of 1 sq. ft. per minute. The equipment includes an old car reservoir, which is filled with sand and supplied with air at 85 lb. pressure. Two inlets are used, one to force the sand down and the other to force it out of the tank at the bottom. The average life of a continuously used steel nozzle is about one day. With this equipment two men can sand-blast a 48-ft. car in eight to nine hours. The men who do this work under the present system receive respectively \$2 and \$1.75 a day each. The blasting is carried on outside the shop on the car-washing track, which is set in cement to permit easy cleaning.

The blacksmith shop has not been kept very busy to date owing to the fact that the steel cars require very little attention except on rare occasions. At present the shop contains two forges and a steam-type hammer, which, however, is operated pneumatically. When the first damaged car was repaired it was thought necessary to dismantle all of the bent plates and work them over in the blacksmith shop, but experience has shown that with McCloud oil burners repairs can be made on a steel car almost as easily as on a wooden car.

The carpenter shop, naturally, has even less car repairing than the blacksmith shop. The two carpenters employed spend much of their time in making patterns, benches, boxes, and other odds and ends required by the other departments of this railroad. In addition to the storeroom at the entrance to the shop, two auxiliary stockrooms are provided in order to save time in getting supplies. The main stockroom contains two Bowser pumps, one of which controls a 250-gal. compressor oil tank and the other a 500-gal. car oil tank. Both tanks are buried.

A NEW AUTOMATIC TRAIN STOP

At a meeting of the Railway Signal Association held in New York, June 14, 1911, J. M. Waldron, signal engineer Interborough Rapid Transit Company, described a new type of automatic train stop employing no mechanical trips or electrical contact-making devices, which has been in experimental use in the New York subway for several months.

The apparatus uses a closed magnetic circuit between the right of way and the moving vehicle. The closed circuit on the track is maintained by locating between the ties and below the rails and insulated therefrom at the beginning of each block an electromagnet and a permanent magnet which are superimposed, the electromagnet receiving its energy from a local battery through a contact on the relay of the track circuit in the block which it protects. This energy amounts to about 2½ watts. When the block ahead is occupied or the track is obstructed the track circuit is interrupted and no energy will pass through the electromagnet between the rails. The stationary apparatus would then be in position for stopping a train. If a train at that time should attempt to pass by the de-energized magnet the brake would be applied automatically. The part of the apparatus placed on the locomotive or motor car consists of one small loop of wire passing around each of the front pair of wheels of the train. These coils are parallel to the rails and can be 4 in. or more above the rails, but they must be below the car axle. The coils are fastened to the car truck and clear the wheels a sufficient distance to permit free movement of the wheels as well as the easy change of brake shoes. In the cab of the locomotive or motor car are a small transformer, an impedance coil, a solenoid coil which is attached to the valve in the train line pipe and a small battery with an emf not exceeding 10 volts. The battery, transformer, impedance coils, solenoid coil and wheel coils are connected in series on a closed circuit. There are no moving contacts in any portion of this apparatus.

In normal operation current from the battery flows through the transformer, impedance coils, solenoid coil and the wheel coils in series, and then back to the battery. As long as the solenoid coil is energized its armature is attracted and the valve in the train line pipe remains closed. When a locomotive or motor-car passes over one of the magnets between the rails and the block ahead is clear the electric energy passing through the track coil, which is immediately under the permanent magnet between rails, counteracts the effective force which the permanent magnet would exert on the apparatus on the vehicle passing over it to such an extent that the energy in the solenoid coil on the moving vehicle is not opposed but rather is assisted. The armature of the solenoid coil is therefore held in the attracted position and the brakes are not applied.

When the track ahead is occupied and the track circuit is shunted the danger position is then indicated and no energy passes through the magnetic coil on the track; therefore there is nothing to oppose the force exerted by the permanent magnet on the track. If an engine or motor car should then attempt to pass over the permanent magnet on the track and enter the next block which that magnet protects, the permanent magnet would induce in the wheel coil circuit a flux, which would tend to change the potential in that circuit. This energy induced by the permanent magnet upon the apparatus on the vehicle which is moving over it is in opposition to the current flow in the apparatus on the vehicle. This opposition is strong enough to counteract the holding effect which the battery on the moving vehicle exerts on the armature of the solenoid coil, with the result that the coil is de-energized, its armature falls and the brakes are applied automatically.

This counter emf is alternating, and its frequency is determined by the speed at which the train or car is moving. After the apparatus is once regulated to permit all movements being made over the track magnets when the speed of such movements does not exceed, say, 5 m.p.h., the apparatus remains permanently at that adjustment. There is an efficient margin of 50 per cent provided on both sides of that which is considered the best working condition of the apparatus. At any speed exceeding 5 m.p.h. the operation is positive. The higher the speed at which the train is moving the more pronounced is the effect on the solenoid coil which controls the air brake valve. The current consumption of the apparatus on the locomotive does not exceed 1 watt.

The batteries for supplying current on the train or car are small. In fact, a few cells of dry batteries would be sufficient to make a round trip from New York to Chicago and have considerable energy left. The parts of the apparatus on the train also are quite small. That which has been constructed and used in making experiments is placed in a box 12 in. long by 12 in. wide by 5 in. deep. These dimensions can be materially reduced by careful designing. As the apparatus is designed, steel bridges, steel viaducts or grade crossings will have no effect whatever upon its correct working. Tests covering a period of several months have been made with a motor car equipped with this device, with the desire to locate any defects, but so far the results have been entirely satisfactory.

REPORT OF COMMITTEE ON INTERURBAN RULES

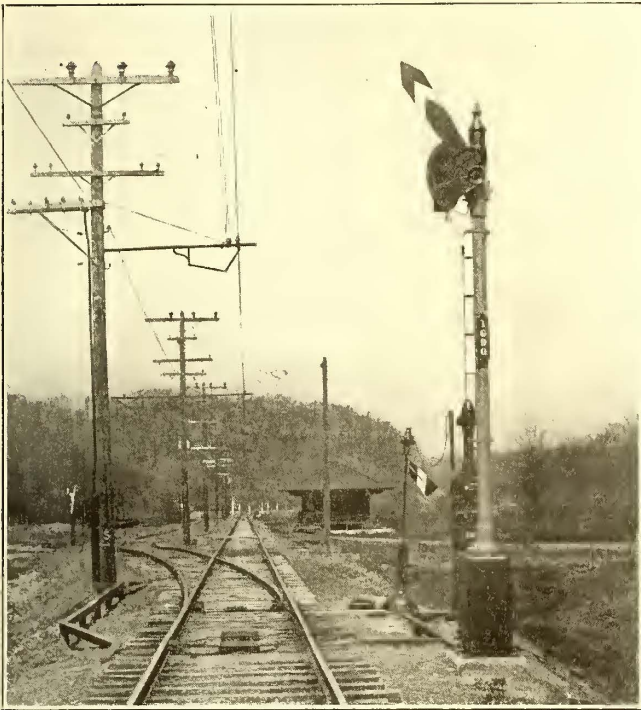
Secretary H. C. Donecker, of the American Electric Railway Transportation & Traffic Association, has sent to member companies part of the report of the committee on interurban rules, showing the changes made from the code adopted at the Denver convention in 1909. The report shows the old rule and the proposed substitute rule in parallel columns and also gives the reasons for the changes recommended in each instance.

It is urgently requested by the committee that operating officials give the subject and the report careful attention and submit written criticisms promptly. A digest of such criticisms will be prepared in advance of the meeting and, the committee believes, will be an aid toward decisive action at the October convention.

AUTOMATIC BLOCK SIGNALS ON THE ILLINOIS TRACTION SYSTEM

BY JOHN LEISENRING, SIGNAL ENGINEER ILLINOIS TRACTION SYSTEM

On Jan. 18, 1911, the signal department of the Illinois Traction System began the installation of 131 automatic block signals which will protect trains and facilitate their movement.



Illinois Traction Signals—Home Signal, Showing Location with Respect to Siding

Operation under signal protection was first begun on April 20 between Peoria and Mackinaw Junction and on the approaches to Mackinaw Junction, a total of 20.5 miles of track having been signaled. One-half of this signal equipment has been in service since April 1. Under the supervision of the writer the work of installing the signal apparatus is being carried on actively and about 65 miles of track will be operated under signal control by July 1.

These signals will protect practically all of the track outside of towns which is not on tangents. The first announcement of plans for this installation was made in the *ELECTRIC RAILWAY JOURNAL* for Nov. 26, 1910, page 1070, and subsequent articles have reported the progress of the erection work. Train operation on the Illinois Traction System is typical of interurban roads with heavy traffic. On each division the daily service includes hourly passenger trains of one and two cars in each direction running alternately as locals and limiteds, two scheduled freight trains and an average of four express or merchandise trains in each direction.

Since the signals were put in use on the Peoria-Mackinaw division train operation has proceeded smoothly and the public has so well recognized the purpose of the signal installation that Vice-president Executive H. E. Chubbuck has placed an order for thirty-seven additional signals of similar design. A portion of the equipment represented by the latest signal order will be installed between Princeton and Ottawa on the Chicago, Ottawa & Peoria Railway in the north central part of Illinois, which is under the same management as the Illinois Traction System.

GENERAL PLAN OF PROTECTION

On the Illinois Traction System proper, which has 460 miles of single track on private right-of-way, six sections of the road are being protected with continuous signaling as follows:

Peoria through Mackinaw to Porter and Summit, 20.5 miles, thirty-nine signals; Selbytown to Ridgeley Junction, 7 miles, seventeen signals; Carlinville to Staunton, 20.0 miles, thirty-six signals; Edwardsville to Granite City, 14.0 miles, thirty signals; Danville City limits to Gray's Siding, 5.7 miles, thirteen signals. This is a total of 67 miles of track provided with continuous block-signal protection, and in addition automatic signals are being installed to protect eleven separate sections of curved track, ranging from 1 mile to 1.7 miles in length each.

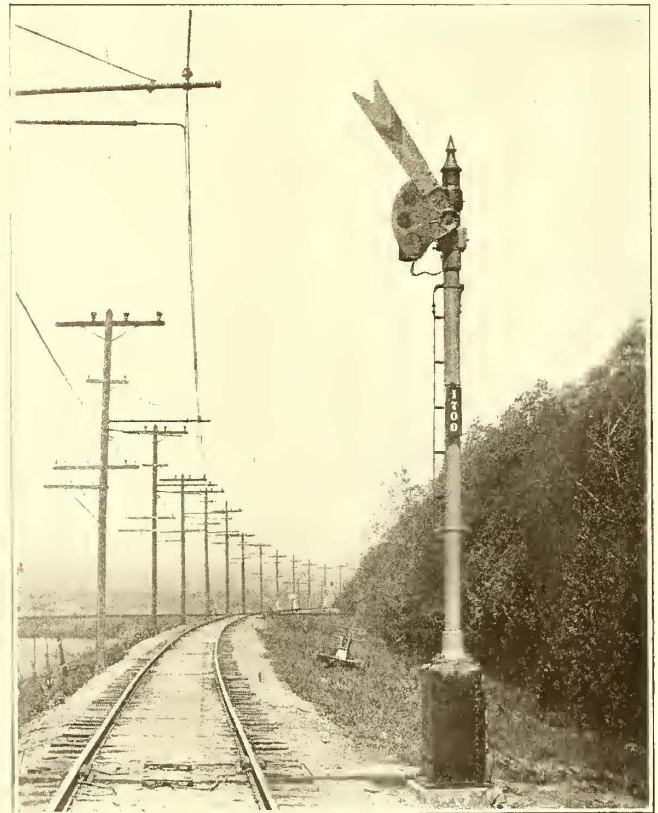
SIGNALING SCHEME

The scheme of signaling which has been followed in this installation was adopted only after a most careful study had been made of its effect on train operation. On continuously protected track one train following another is spaced one siding in the rear, and opposing trains at meeting points are given notification of the presence of other opposing trains when within not less than 1500 ft. of the siding at which they are to meet. The average distance between sidings on the Illinois Traction System is about 3 miles. Just previous to the installation of the automatic signal equipment, the sidings falling within the protected territory were double-ended and made about 1000 ft. long. These are not used as "through" sidings, but trains are required to head in and back out. The first train arriving takes the siding. The extra long side track with the double-end main-line connections is utilized for setting out freight cars and frequently is necessary for passing fifteen-car freight trains which are operated daily.

The following description of the standard location arrangement of signals for curve protection and for siding protection appears in the recently issued signal supplement to the standard book of rules of the Illinois Traction System.

CURVE PROTECTION

"Fig. 1 shows a typical arrangement of curve protection



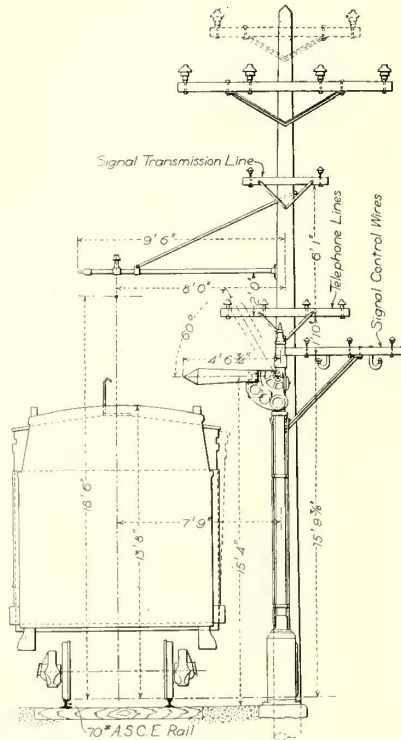
Illinois Traction Signals—Standard Distant Signal

signals, the dangerous curve being between signals Nos. 1 and 2. Whenever it is possible these signals are placed about 2000 ft. from the beginning of the curve. The dotted lines show the limits of control of the signals, or the point to which the signal is controlled. Point 3 is called the preliminary and is usually about 1500 ft. from signal No. 1. The operation of the signals is as follows:

"A train approaching from the right passes point 3; as soon as the first truck is past this point signal No. 2 goes to the 'stop' position, and any train approaching from the left will be stopped by signal No. 2. The first train continues past signal No. 1, which is in the clear position, and runs on around the curve, knowing that if signal No. 1 is clear there is no train between the two signals. The fact that signal No. 1 is clear, however, does not mean that the track is clear to the next siding, and in going around a protected curve a motor-man must always expect to find another train standing at the opposing signal, and be under such control that he can stop before reaching it.

"When a train is running from left to right and passes signal No. 2 while it is clear, which shows that the other train has not passed point 3, because signal No. 2 is controlled to point 3, signal No. 1 will go to danger and stop any train running from right to left.

"Should two following trains approach a dangerous curve close together, the second train would be stopped by the signal until the first section had passed beyond the limits of control of that signal."



Illinois Traction Signals—Clearance Diagram

SIDING PROTECTION

"Referring to Fig. 2, A, B and C are three sidings with the usual arrangement of signals at each. North is on the right-hand side of the page as distinguished by the signal numbers.

"Signals Nos. 2, 6, 10 and 3, 7 and 11 are distant signals, as shown by the slotted blade, and signals Nos. 4, 8 and 12 and 1, 5, and 9 are home signals. The limits of control of the different signals are shown in the same manner as in Fig. 5.

"One pair of siding-protection signals is almost exactly similar to a set of curve signals. Take, for instance, the two signals Nos. 4 and 5. These are two opposing home signals placed just like the curve signals in Fig. 1, the preliminary being on the south end at point 2. Other home and distant signals on the plan tend to confuse, but if the theory of the curve protection is mastered the siding protection will be readily understood.

"A train approaching siding C from the north passes signal 11; this has no effect on signals Nos. 6 and 8, as they are controlled only to signal No. 9. A train passing signal No. 9, however, will block the opposing train at signal No. 8 because this signal goes to the 'stop' position as soon as signal No. 9 is passed.

"In the other direction, a train passing signal No. 6, which is the preliminary for signal No. 9, will cause signal No. 9 to go to the 'stop' position as in the curve protection described above.

"Now, considering that siding B is a meeting point and the southbound train is late, should the northbound train pass signal No. 6 while it is clear, which shows that there is no train between that signal and signal No. 9, it might stop the southbound train at signal No. 9 until the northbound train reaches the siding. In this case the train in the siding would have to wait for the southbound train to run from signal No. 9 to siding B before it could proceed north. If the northbound

train waited at signal No. 6 until it went to 'caution,' which indicates that the southbound train had passed signal No. 9 the northbound train could then proceed to the siding and get into clear without blocking the southbound train and neither train would be greatly delayed.

"In the case of a southbound train approaching the meeting point at B before signal No. 7 goes to 'caution' it can pro-

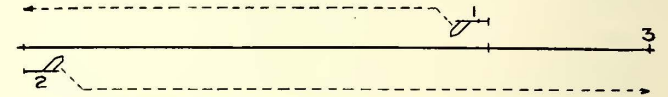


Fig. 1—Illinois Traction Signals—Diagram of Curve Protection

ceed at once to the siding and get into clear, for the reason that signal No. 4 is controlled only to signal No. 5, and not beyond it to signal No. 7.

"For ordinary meets when both trains are on time and arrive at the meeting point together, the first train, when pos-

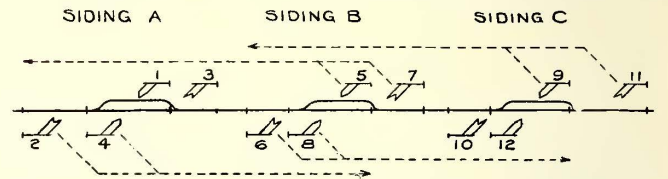
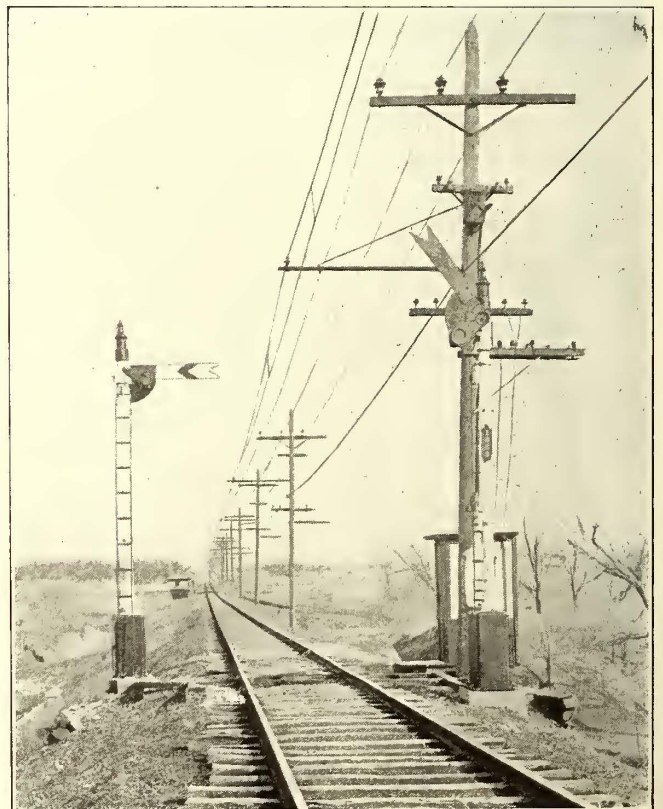


Fig. 2—Illinois Traction Signals—Diagram of Signals at Sidings

sible, takes the siding, the other train stopping at the home signal at the far end of the siding until this signal clears."

TYPE OF APPARATUS

The Union Switch & Signal Company's style B signals, alternating-current relays, track reactance bonds and specialties



Illinois Traction Signals—Home and Distant Signals Midway Between Two Sidings 4500 ft. Apart

have been used. The signals have bottom post mechanisms and give a 60-deg. clear indication in the upper left-hand quadrant. They are mounted on steel masts set vertically with centers 7 ft. 9 in. from the center line of the track. The signal spectacle shafts are 15 ft. 4 in. above the top of the track rails. An accompanying engraving shows the location of a signal

mast in relation to equipment clearance lines and to a trolley bracket and a transmission pole.

All signal poles, blades and mechanisms are uniform in design, except that the blades of the home signals are pointed and those of the distant signals are notched. Standard American Railway Association colors were followed in painting the blades, using red for home signals on the governing side and

line relays having been used. Standard vane and galvanometer type relays were employed, each having four front contacts. The galvanometer relay has two windings, the track and the line, the track side being fed from the transformer at one end of the track section through the rails to the armature of the relay. The line side is fed from the same transformer as the track but directly over the line and through a small relay transformer located in the relay case. An inside view of a relay case is shown on page 1109. It is necessary to have the proper phase relation between the currents in the two windings of the relay before it will pick up.

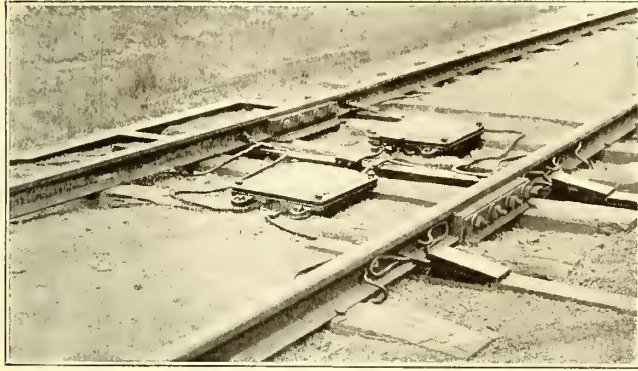
A view on this page shows a complete impedance bond in place at an insulated track section. This bond consists of two reactance coils of heavy copper, the terminals of each of which connect with the two running rails. The intermediate points of each of the two coils are connected by an equalizer for continuing the propulsion return circuit. Each coil is contained in a cast-iron case filled with oil. These cases are designed to be installed between the ties as shown. All exterior connections are made with flexible copper cable.

The impedance, which is used to protect the track transformer at the bond location when a car stands on the track directly at the bonds, is mounted in a wooden box hung on a pole near the reactance bond. These boxes also contain the low-tension lightning arresters which protect the signal apparatus. The switch lamps in the signaled territory have all been lighted by current from the signal transformers.

No switch indicators are used because distant signals 1500 ft. away from the switchstands give the best possible indication of whether or not the block is occupied. Each switch is provided with a switch circuit controller, as shown in a view on page 1108. This small drum controller, inclosed in a cast-iron case, is so connected with the switchpoint by a rod that the movement of the switchpoint from the closed to the open position will make or break circuits which cause the signals to assume the "stop" position. With the closing of the switch for main-line travel the reverse procedure follows, provided, of course, that the signal is not held in the "stop" position because of a train on the track section.

CONTROL CIRCUITS

All connections at the track level are made with rubber-covered signal wire of American Steel & Wire Company manufacture inclosed in treated wooden trunking. The connections between the line transformers on the transmission poles and the apparatus at the ground level are made with similar wire inclosed in iron conduit. The line transformers are pro-

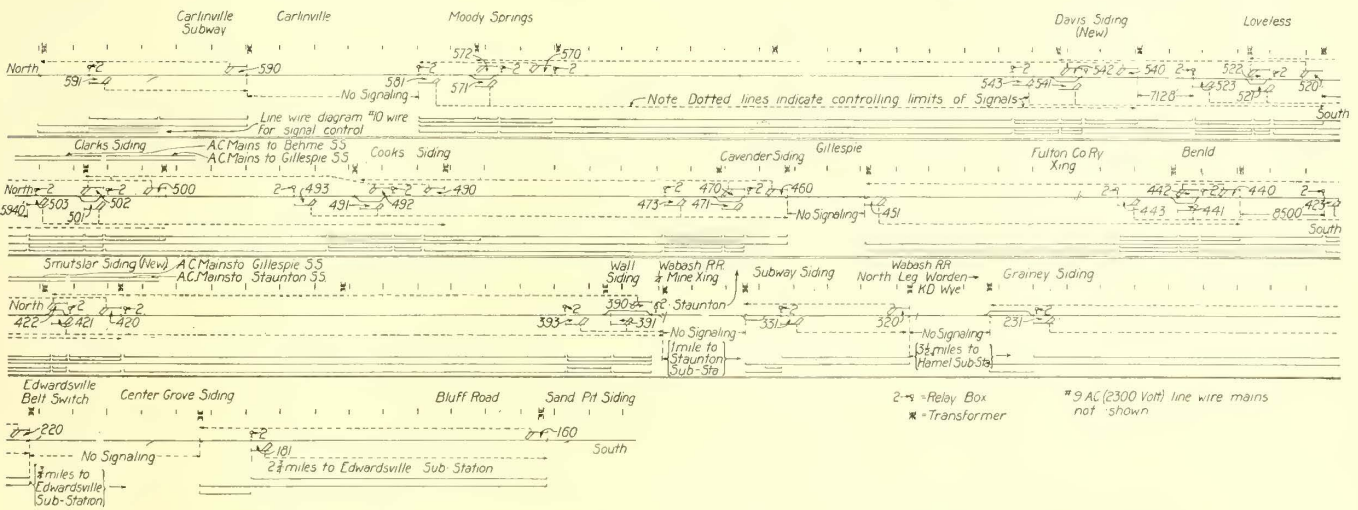


Illinois Traction Signals—Reactance Bonds and Insulated Joints

white on the rear side; the distant signals similarly are painted yellow and white. The signal masts have been painted the standard colors—olive green and buff—which are used on all roadway structures along the Illinois Traction System.

Each signal mast has a number plate showing the number of the signal in raised cast-iron letters painted white with a black background. The scheme of numbering is as follows: The signals are given numbers according to their distance from St. Louis. That is to say, all the signal numbers in mile 170 have the prefix "170," with which is coupled a unit number indicating the location of the signal in relation to the milepost. Odd-numbered signals govern trains which have odd train numbers, and similarly the even-numbered signals govern trains with even train numbers. Thus signal 1704 would indicate that it was the fourth signal north of milepost 170 north of St. Louis and that it governed a northbound movement.

The signal equipment, all of which was supplied by the Union Switch & Signal Company, included: Track relays and transformers, impedance bonds, switch circuit controllers and miscellaneous smaller fittings, including reactance coils, lightning arresters, etc. The insulated joints were supplied by



Illinois Traction Signals—Diagram of Signaling Between Carlinville and Edwardsville

the Rail Joint Company and are of the Weber type. The relays are mounted in cast-iron cases erected on short steel masts bolted to concrete foundations. The cases are provided with rubber gaskets to exclude moisture, and the relays have glass sides to allow inspection of contents, etc.

All circuits are broken directly over the track relays, no

tected by means of Westinghouse 2300-volt fuse plug cut-outs.

As indicated on the accompanying signaling plan, line control wires varying from three to five in number are required through all territory having continuous protection. These signal control wires have been installed on three-pin side-arms supported by pressed-steel braces. The first, second and third

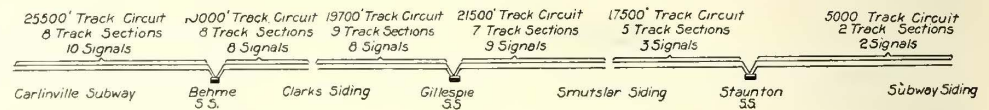
wires are carried above the cross-arms and wherever the fourth and fifth wires are installed they are supported from insulators on J-hooks. This arrangement of wires permitted standardizing on one size of cross-arm for all locations. The signal control wires are No. 10 hard-drawn bare copper of American Steel & Wire Company manufacture, drawn to a special specification as to elastic limit and ultimate strength.

CURRENT SUPPLY

Energy for operating the system of automatic block signals is received from the power transmission system at the rotary-converter substations, which are approximately 10 to 12 miles apart. A 10-kw oil-cooled transformer in each substation is fed from one phase of the low-tension side of a large substation transformer. Thus it receives current at 370

volts, which is stepped up to 2300 volts, 25 cycles, for feeding a single-phase transmission line extending through the signal territory. Substation signal transformers were not necessary at all substations because at some the company already had 2300-volt, single-phase current available from 33,000-2300-volt step-down transformers feeding local lighting or power circuits.

The 2300-volt signal transmission power line has two No. 9 hard-drawn bare copper wires carried on a two-pin cross-arm located 4 ft. 4 in. below the 33,000-volt circuit and about 8 ft. above the signal control wires, as shown in one of the engravings. The step-up transformer at each substation feeds the signal line for about 5 miles in each direction. The line is opened at a line oil switch located at an intermediate point. Should there be any derangement of the feeding apparatus at one substation it can be cut off the transmission line and the line switches 5 miles away in each direction may be closed, thus



Illinois Traction Signals—Diagram of Signal Transmission Circuits

ported inoperative. The ammeters show that the energy consumption is about 475 watts per mile of track, or roughly, one-half horsepower. The substation equipment for the signal system is protected by an installation of Type C multigap lightning arresters.

The circuit breakers of the substation equipments have been fitted with contact points so that when the breakers open an alarm bell is rung to attract the attention of the substation operator. Inclosed fuses are inserted between the substation and the signal transformers. The 2300-volt mains are led out

of the substation building through lead-covered cables. All of the substation equipment is of Westinghouse manufacture.

SIGNAL INSTRUCTIONS

Previous to the time when the different sections of the signal work are made effective for train operation, schools are held for the purpose of instructing trainmen regarding the operation of the signals. Signal diagrams having movable dummy blades are arranged so that the actual movements of the signals as trains assume different positions can be shown.

In connection with its new automatic block signal equipment the operating department of the Illinois Traction System has issued a signal supplement to its standard book of rules for the government of operating officers and trainmen. This book contains the following sections: Automatic block signals; definitions; block signal rules; principles of location; rules, and maintainers. A portion of the contents of this rule book follows:

AUTOMATIC BLOCK SIGNALS

"122. Automatic block signals, controlled by a track circuit in the rails, will be installed on different sections of the system, and as the various sections are ready for operation, bulletins to that effect will be issued and posted for the information of the employees concerned.

"There will be two kinds of protection afforded by these automatic signals: First, the continuous protection or blocking between sidings; second, the local or curve protection for dangerous curves and other points where the view is obstructed.

"It shall be the duty of all trainmen to familiarize themselves with the following rules as well as the location of the different signals, the meaning of the different indications shown, and the extent of the protection afforded.

DEFINITIONS

"123. Block: A length of track of defined limits, the use of which by trains is controlled by block signals.

"124. Block Signal: A fixed signal controlling the use of a block.

"125. Home Block Signal: A fixed signal at the entrance of a block to control trains in entering and using the block.

"126. Distant Block Signal: A fixed signal used in connection with the home block signal to regulate the approach to said home block signal.

"127. Block System: A series of consecutive blocks.

"128. Automatic Block System: A block system in which the signals are operated by electric current actuated by a train or by certain other conditions affecting the use of a block.

"129. The apparatus is so constructed that the failure of any part controlling the home block signal will cause it to indicate 'Stop' and the distant block signal to indicate 'Caution.'

"130. The normal indication of the home and distant signals is clear.

"131. The distant signal being so controlled that if the home signal indicates 'Stop' the distant signal will indicate 'Caution.'

BLOCK SIGNAL RULES

"132. All automatic block signals are distinguished by numbers, the even-numbered signals controlling north and



Illinois Traction Signals—Switch Circuit Controller and Lighting Connection for Switch Lamp

permitting the 2300-volt signal transmission system to be fed continuously, even though one substation is inoperative.

SUBSTATION EQUIPMENT

Each substation signal transformer has a gray marble control panel. On this panel are a 2300-volt circuit breaker and oil switch, an ammeter reading up to 10 amp, and a recording voltmeter. These voltmeters furnish the signal engineering department with valuable evidence in case signals may be re-

east-bound trains and the odd-numbered signals the south and west-bound trains.

"133. Block signals control the use of the blocks, but unless otherwise provided, do not affect the movement of trains under the time card or train rules, nor dispense with the use or observance of other signals whenever and wherever they may be required. This system does not affect flagging rules



Illinois Traction Signals—Bottom Post Signal Mechanism

and none of the usual precautions are to be omitted, and rules must be carried out at all times and places in the same manner as if the block signals did not exist.

"134. Block signals apply only to trains running in the established direction, and are displayed on the right-hand side of the track movement over which they govern.

"135. Automatic signals are of the semaphore type and, unless otherwise designated, are positive signals.

"136. Indications are given by not more than two positions of the arm operating in the upper left-hand quadrant, and in addition, by lights of prescribed color.

"137. On automatic block signals the arms that govern are displayed to the left of the post as seen from an approaching train.

"138. The arm of the home automatic block signal has a pointed end and is painted red with a white band near the end.

"139. On automatic block signals the arm of the home signal in the horizontal position by day and a red light by night indicate 'Stop.'

"140. The arm of the home automatic block signal at an angle of 60 deg. above the horizontal by day and a green light by night indicate 'Proceed.'

"141. The arm of the distant automatic block signal in the horizontal position by day and a yellow light by night indicate 'Caution—be prepared to stop at the home signal.'

"142. The arm of the distant automatic block signal at an angle of 60 deg. above the horizontal by day and a green light by night indicate 'Proceed,' except as noted in Rule 151.

"143. A signal improperly displayed, a white light by night displayed on a signal, or the absence of a signal at a place where a signal is usually shown, must be regarded as a 'stop' signal and the fact reported to the dispatcher.

"144. When a train is stopped by a block signal that is evidently out of order, after waiting two minutes the motorman must call up the dispatcher and proceed only after the dispatcher has given the authority for so doing on the form used for a regular order.

"145. Reports of detentions to trains by signals must be made by the motorman to the dispatcher by telephone, at once, and a written report sent to the dispatcher and signal engineer on the form provided, upon reaching the end of the run.

"146. In reporting a signal the number of the signal as indicated on the signal itself must be used.

"147. Motormen before reporting the cause of the stop 'Unknown' must, if possible, ascertain if such stop was caused by a train in the block, an open switch, a broken rail, or some other obstruction.

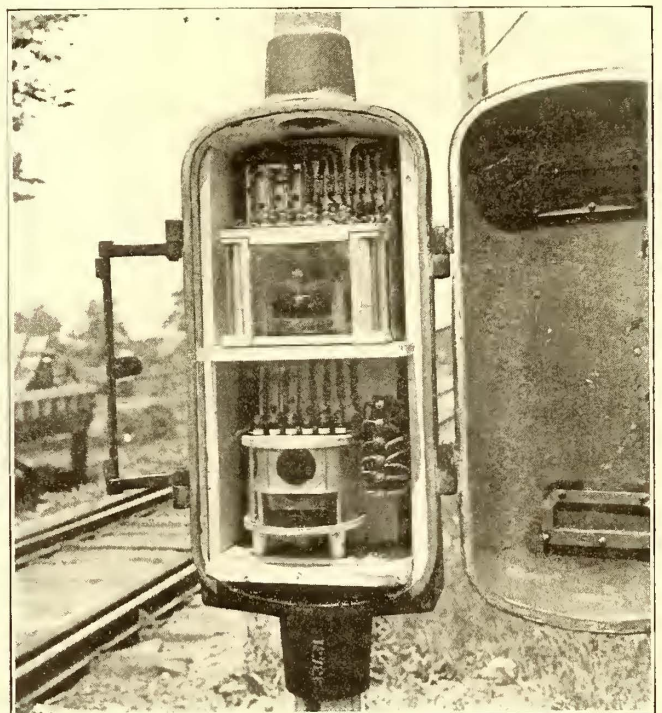
"148. Switches in or leading to the main track are provided with switch boxes so connected to the switch points that opening the switch in any block will cause the home signals governing that block to indicate 'Stop' and the distant signals to indicate 'Caution,' until the switch is again closed.

"149. Cars taking the siding must be stopped clear of the fouling point and insulated track joints, as otherwise the signal for the block in which the siding is located will indicate 'Stop.'

"150. Block signals are absolute except as per Rule No. 144, and that northbound trains may run past a 'Stop' signal at a meeting point in order to take the siding.

"151. Northbound trains approaching a meeting point and finding the distant signal at the meeting point clear must stop, and, after waiting one minute, call the dispatcher. In case the orders are not changed the train must wait until the distant signal goes to 'Caution' before proceeding to the siding. This rule applies only to northbound trains at the time-card or train-order meeting points.

"152. A train having entered the siding and cleared the main line at a meeting point, the conductor must leave the switch set for the siding and remain at the switch until he sees the other train approaching, and knows that it has passed the distant signal. He may then close the switch and give the other train the signal to proceed.



Illinois Traction Signals—Case with Two Relays

"153. Trains taking a siding must in every case back out of said siding.

"154. Any train entering the main line from a siding, except in the case of a regular time-card or train-order meet, must protect his rear end by flag, the flagman going back a sufficient distance to insure full protection.

"155. Trackmen and other employees will report promptly to the dispatcher and signal engineer by telephone all defects noticed in the block signal system."

OVERHEAD CONSTRUCTION*

BY EDWARD HEYDON, SUPERINTENDENT OVERHEAD CONSTRUCTION
TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

At present too little attention appears to be given to the construction and maintenance of the overhead line and material used. In the early days of electric lines the greater part of this construction was experimental. Every builder used what looked best and cheapest to him. The results are that now we have practically no part of the lines that we can class as standard. I believe that the elimination of these conditions would be of great benefit in many ways to all properties and would also establish a standard grade of material for overhead construction.

POLES

In purchasing wooden poles the first thing the seller will offer is the Northwestern Cedarmen's Association specifications, and he expects you to be governed by them. If you make this concession, you will get about 25 per cent poles suitable for trolley construction. Greater care should be used in the selection of poles. In the past, when Michigan cedar was plentiful, we did not have as much trouble getting good stock. Therefore, some of the older lines have much better poles than those more recently constructed. The time is now at hand when we have to look to the Southern States for poles, with the result that the chestnut pole will come into more general use. There have been some objections heretofore to the chestnut pole, mainly on account of its rough appearance. However, plenty of reasonably straight poles can be procured, and if they are shaved and properly set they are practically as neat as cedar in appearance and far more substantial. There are many defects in chestnut poles that do not appear in cedar. Poles should therefore be carefully inspected in the yards before shipment. Nothing but winter-cut timber should be accepted, and consideration should be given to the general appearance of the pole.

FEED WIRE

In purchasing insulated feed wire thought should be given to the question of insulation. There is more profit for the manufacturers in insulation than in copper, and hence the insulation is often heavier than required. The writer has in mind a comparison of two insulated feeders, in which the one with double braid only was of larger external diameter than one of the same capacity with triple braid. Rigid specifications will make it possible to obtain efficient insulation at minimum cost per mile.

TROLLEY WIRE

In the last report of the committee on standards of the American Electric Railway Engineering Association it was recommended that No. 0000 grooved trolley wire be adopted as a standard. While a No. 0000 trolley offers greater capacity than the smaller sizes, it is not without its drawbacks, such as excessive weight, which makes it very difficult and expensive to maintain. At present there is not a satisfactory No. 0000 splice that will properly withstand the strain of having a trolley wheel pass over it without causing a hammering which will cause the crystallization of the wire in a very short time. Furthermore, the No. 0000 wire is not practicable for use especially in city streets and special work, whereas No. 00 and No. 000 size have many advantages. The No. 00 round wire is particularly suitable in city streets, as it is lighter and, consequently, easier to support. It causes less strain on poles and is more flexible in special work and easier to splice.

SPAN WIRE

In the past few years it has been rather difficult to obtain the proper grade of span wire. The manufacturers now tell us that the span wire of five years ago will not fully meet the requirements of to-day, and that the strands we are now getting are not what they should be. The galvanizing is not perfect, and it appears that a lower grade of steel is used.

*Abstract of paper read at quarterly meeting of Central Electric Railway Association, St. Joseph, Mich., June 22, 1911.

HANGERS

The question of insulation within the hanger is of utmost importance. There are numerous hangers on the market, all of which have some merit. The round top and three-piece hanger are generally used, each having but little advantage over the other. Three new-type hangers are now being developed by manufacturers, who expect to have them on the market within the next year.

EARS

The type of ear and the material therein govern to some extent the maintenance and cost of overhead lines. Ears should be designed to give flexibility and long life. The boss should be heavy enough to stand the strain on curves and high enough to prevent the trolley wheels from hitting the hangers on pull-overs. All ears should be clinched on the wire and solder used only on curves to prevent the ears from slipping, and then only for about 2 in. on each end.

SPLICES

There are a great number of mechanical and soldered splices on the market. The disadvantage of the soldered splice is that in order to obtain the proper amalgamation of the metals it is necessary to create an intense heat, which anneals the copper and greatly weakens it where it enters the splice. The drawback of a few of the mechanical type splices is that they are too long and rigid. This absence of flexibility causes crystallization of the wire at the end of the splice; consequently, the shorter the splice the longer the life and the better the results.

INSULATORS

Wood strain insulators have recently come into more general use for all classes of work. The question arises, Are we overdoing it? That is, are we forgetting the fact that we are placing a great deal of confidence in sticks of wood when we depend on them to withstand all kinds of weather conditions and mechanical strains? Although the composition insulator may break down electrically, yet it will very seldom let a wire fall. It is a problem whether it is not better to have a leaky insulator than to have a wire fall on the street.

TROLLEY WHEELS AND STANDS

Much line trouble is caused by the use of a bad trolley wheel or because the trolley base is not receiving the proper care. It is very natural for this part of the equipment to be neglected by the car equipment department, as it is necessary for the inspector to climb to the top of the car. If this equipment received as much attention as the rest of the apparatus, little if any trouble would be due to defective wheels and stands.

WOOD PRESERVATION

At the June meeting of the Central Electric Railway Association, held at St. Joseph, Mo., on June 22, 1911, C. P. Winslow, engineer in wood preservation, United States Department of Agriculture, Forest Service, Madison, Wis., presented a paper entitled "Advantages to Electric Traction Companies of the Use of Treated Timber." Mr. Winslow first referred to the constantly increasing price of lumber. The average price of ties at the point of purchase had risen from 47 cents in 1906 to 49 cents in 1909. The increase in lumber values had been closely followed by an increase in the use of treated material, namely, from over 68,000,000 cu. ft. in 1907 to 99,000,000 cu. ft. in 1910. With a total consumption of slightly over 22,000,000 treated ties in 1909, only 835,000 were used by electric railways. During the same year only 24 per cent of the poles bought by electric railway light and power companies were treated.

Mr. Winslow described an experiment undertaken in the spring of 1902 by the Forest Service on a section of track in Texas. The results up to February, 1911, showed that whereas the untreated ties had a life varying from one and one-half years to slightly over four years, many treated ties were still in service at the end of nine years. The early and rapid removal of some of the treated ties was due to an im-

proper selection of material, to an improper application of the preservative, or to a combination of both causes. This only tended to prove the necessity of care in successful wood preservation. In 1907 the Forest Service co-operated in placing about 3000 hemlock and tamarack ties for a Wisconsin railway. The treated ties, all of which were protected with tie plates, showed no decay after three and one-half years' service. On the other hand, of the untreated ties, over 14 per cent of the hemlock and 12 per cent of the tamarack were so badly decayed that they had to be removed; over 8 per cent and 29 per cent, respectively, were partly decayed, and 43 per cent and 60 per cent, respectively, were rail-cut from 1/4 in. to 1/2 in.

The life of poles could be similarly increased. In one case, in a period of eight years, untreated chestnut poles had decreased in circumference at the ground line from 1.86 in. to 2.27 in., while creosoted pine poles had shown no loss at all.

In discussing the utilization of the so-called inferior species, Mr. Winslow said that some of them were not so resistant to rail wear as white oak, long-leaf pine, etc., but in such cases recourse may be had to tie plates.

The following conditions were assumed by the speaker in showing the ultimate financial saving from wood preservation:

Initial cost of an untreated 6-in. x 8-in. x 8-ft. red oak tie.....	\$0.50
Cost of placement in new track.....	.10
Cost of replacement in old track.....	.15
Cost of zinc chloride treatment (Burnett).....	.11
Cost of creosote treatment.....	.32
Life of untreated tie.....	5 years
Life of Burnettized tie.....	11 years
Life of creosoted tie.....	16 years

The cost per tie in place in the track would then be as follows:

	New Work.	Replacement in Old Track.
Untreated	\$0.60	\$0.65
Burnettized .....	.71	.76
Creosoted .....	.92	.97

Applying these figures to a mile of new track to contain 2800 ties, the actual expenditure at the end of the first year would amount to \$1,680, plus 5 per cent interest on this investment. Theoretically, with the exception of the yearly interest charge, there would then be no further expenditure until the end of the fifth year. During the sixth year a replacement charge amounting to $\$2,800 \times .65 = \$1,820$ would be undergone, together with 5 per cent interest on both the placement charge during the first year and the replacement charge during the sixth year. Thus, there would always be a slight annual expenditure due to the interest charges, and, at intervals of five years, a comparatively heavy charge for replacements. Assuming that creosoted ties were used, the expenditure at the end of the first year would amount to $\$2,800 \times .92 = \$2,576$, plus 5 per cent interest on this amount. With the exception of this yearly interest charge, there would be no further expenditures until the end of the sixteenth year, when it would be necessary to renew the ties.

The diagram presented by Mr. Winslow in this connection showed the saving resulting from the use of creosoted ties. At the end of twenty years, the actual expenditure per mile of track, using untreated ties, would be over \$12,000, while with creosoted ties it would be only slightly over \$8,000. In other words, a saving of approximately \$4,000, or 25 per cent of the total cost using untreated ties, would result.

The actual expenditure for the first year would be considerably greater with creosoted than with untreated ties, and the total actual expenditure would continue to exceed that for the untreated until the middle of the sixth year. In other words, actual financial saving would not accrue for a period slightly greater than the life of the untreated material. It was mainly due to this fact that treated material was not more widely used. Other figures presented by Mr. Winslow compared the fixed charges for treated and untreated ties.

Continuing, Mr. Winslow said that there were now numerous commercial plants from which treated material may be purchased, but frequently a traction company would find advantageous the installation of a treating plant adapted to

its needs. Plants, with an annual capacity of from 40,000 to 50,000, 6-in. x 8-in. x 8-ft. ties could be completely installed for from \$4,000 to \$5,000; larger plants, with an annual capacity of about 140,000 ties, would cost about \$15,000.

He said that some of the work now under way at the Forest Products Laboratory, at Madison, Wis., included investigations regarding the relative efficiency of various wood preservatives, the relative cost of impregnation of various woods, the relative durability of various woods and the relative efficiency of various processes. As secured, the results of such work would be published and disseminated, the ultimate aim being to assist both the producer and consumer to a more economic utilization of forest products.

MEETING OF THE COMMITTEE ON SHOP ACCOUNTING

A meeting of the joint committee on shop accounting of the American Electric Railway Engineering and Accountants' Associations was held at the Engineering Societies Building, New York, on June 20. The following were present: P. S. Young, Public Service Railway, Newark, N. J., chairman; H. H. Adams, Metropolitan Street Railway, New York; E. O. Ackerman, Columbus (Ohio) Railway & Light Company; Charles Hewitt, Philadelphia Rapid Transit Company; C. E. Thompson, Chicago & Milwaukee Electric Railroad.

Mr. Adams, as chairman of a sub-committee appointed at the last meeting to review the 1910 report of the joint committee on shop accounting, submitted a report containing recommendations for changes in some of the accounts and also further subdivisions of certain accounts. The sub-committee was composed of Mr. Adams, N. E. Stubbs, United Railway & Electric Company of Baltimore, and John W. Corning, Boston Elevated Railway. The report was accepted and will be incorporated in the report of the committee.

Mr. Hewitt, together with Mr. Ackerman and F. B. Lasher, New York State Railways, constituted a sub-committee appointed to consider what constitutes maintenance. Mr. Hewitt read a preliminary report on this subject, which will be given further consideration by the sub-committee.

The subject of inter-department charges was discussed in papers sent by A. D. McWhorter, Memphis Street Railway, and A. F. Elkins, Columbus, Delaware & Marion Railway. Mr. Thompson, who was present, also discussed the subject. After discussion by several members of the committee, it was decided to ask the sub-committee to hold a meeting and to prepare a report for inclusion in the report of the committee.

There was also a general discussion on the subject of efficiency. Part of the report of the committee will be devoted to discussion on this topic.

THE MASTER MECHANICS' AND MASTER CAR BUILDERS' CONVENTIONS

The annual conventions of the American Railway Master Mechanics' Association and the Master Car Builders' Association, which were held in Atlantic City June 14-16 and 19-21, were largely attended by railway officers and supplimen. The exhibits of railway appliances on Young's Million-Dollar Pier exceeded those of any previous year in numbers and space occupied and the decorations of growing flowers and plants were especially attractive.

Neither of the two associations had any committee reports or individual papers relating to electric railway practice, but a large number of devices used on electric railway cars were included among the exhibits, so that the conventions were interesting in that respect to electric railway officials, a number of whom were present. The social side of the conventions included two large balls on the Pier, a baseball game between teams representing the East and the West, which was won by the Western team, and an all-star vaudeville performance on Saturday evening.

THE BUFFALO NEAR-SIDE SINGLE-PLATFORM CAR

Some time during next September the International Railway, Buffalo, N. Y., is to place in service thirty-five single-platform prepayment cars, to be known as "near-side" cars. This type of car has been developed to meet the requirements of the New York State Public Service Commission, Second District. Following a careful inspection of the sample car, hereinafter described, the commission authorized the purchase of additional cars as noted. The near-side car was developed under the personal direction of T. E. Mitten, president Chicago City Railway, and R. T. Senter, master mechanic International Railway. Valuable assistance in the development of the combined heating and ventilating system was given by Dr. W. A. Evans, health commissioner of Chicago. The builders of the car also received many helpful suggestions from Charles R. Barnes, electrical inspector of the Public Service Commission, Second District. The car was built by The J. G. Brill Company.

To prepare the public for this radical change in car design and operation the International Railway has issued an elaborately illustrated bulletin from which the following information and accompanying illustrations are taken. The first part of the bulletin sets forth the conditions which should be met by a car to give the maximum convenience and comfort to passengers and employees and to insure the minimum liability to accidents. It is pointed out that the usual form of prepayment car, having no entrance at the front, is at a disadvantage during bad weather in such cities as Chicago, Philadelphia and Buffalo, where ordinances require the cars to be stopped at the near crossing. Furthermore, the conductor cannot see all approaching passengers from his position on the rear platform, while alighting passengers who get off at the rear and turn toward the far side of the street are in danger of being run down. Although the rear-entrance prepayment car has greatly reduced platform accidents, it still leaves the

GENERAL DESCRIPTION OF NEAR-SIDE CAR

As shown in the accompanying illustrations, the entrance and normal exit are by way of the front platform, thus enabling the passengers to enter and leave the car directly at the cross-walk on the near side of the street. The plan shows a step entrance of 29¼ in. and a step exit of 26¼ in. The corresponding divisions at the front end of the car body proper are 28 in. and 28¾ in. The motorman is provided with a seat and in the operation of his apparatus is protected from interference by a dividing rail. His vision is guarded against



Near-Side Car—View Showing Closed Doors and Folded Steps on Front Platform, Front and Side Destination Signs, "Car Full" Sign, Etc.

reflected light by installing an adjustable curtain. By means of a lever the motorman controls the entrance and exit folding



Near-Side Car—Interior View Showing Longitudinal Seats in Front, Circular Seating at Rear and Cross Seats



Near-Side Car—Entrance and Exit in Simultaneous Use at the Front Platform

conductor's control imperfect, because he must divide his attention between collecting fares at the entrance and watching the step. The near-side prepayment car is intended not only to remove these disabilities, but also to incorporate certain other advantages, such as effective automatic ventilation and improved destination signs.

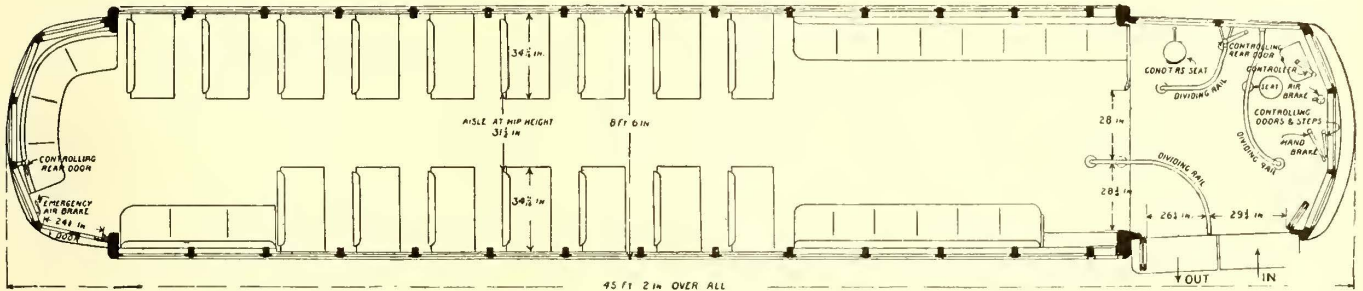
doors and steps either separately or together. While the car is at a standstill the motorman can plainly see the passenger enter and leave, and is thus able to act promptly in operating the doors and steps and in getting the car under way without waiting for the bell signal. Passengers are not permitted to remain upon the platform when the car is in motion. This rule

prevents the motorman's attention from being diverted and consequently enables him to give all of his attention toward watching for passengers and avoiding collisions.

The conductor is provided with a seat within the rail space directly opposite the entrance to the front platform. In this position he is able to control the entrance passage in the body of the car. As the conductor is amply protected from the weather, he can be clothed always in the way most convenient

Should they desire to pass behind the car from which they alight, they must necessarily await its forward movement. These conditions serve to forestall the accidents which occur when passengers alight from the rear end of the car and pass directly behind it.

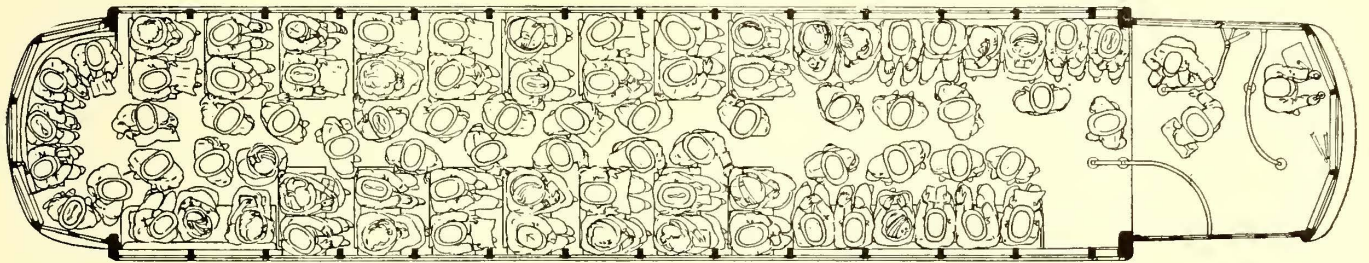
It will be noted from the plan that, strictly speaking, there is no rear platform. However, a door and step are installed for emergency exit or for use at points where the car is



Near-Side Car—General Plan Showing Seating and Clearances

for his work. When the car is taking on passengers the conductor collects fares and issues transfers. He is able to do this work more rapidly and accurately than heretofore because the motorman relieves him of the necessity of watching the step and of giving the starting signal. The entrance

entirely unloaded, as at parks, baseball grounds, etc. This rear exit may be operated either from the rear end of the car or by the conductor from his position on the front platform. The space heretofore required for a rear platform is utilized for a circular seat, thereby giving a largely increased seating capacity.



Near-Side Car—View Downward, Showing Distribution of Passengers, Position of Motorman and Conductor, Etc.

portion of the front platform will accommodate ten to fifteen oncoming passengers. When the car is in motion the conductor, whether seated or standing, directly faces the passengers, thus placing him where he can most readily observe the signals of those passengers who cannot conveniently reach the signal push-buttons. Having no other duty to perform while

ity. In fact, the total seating capacity of the car is 53, as compared with 40 for a prepayment car of the same length. Of these 53 passengers 35 face forward; there is also room for 30 standing passengers, on the basis of each standing passenger occupying an oval 12 in. by 18 in.

This car, as described, operates ordinarily from one end



Near-Side Car—Side View, Showing Regular Front Entrance and Exit Doors and the Emergency Rear Exit Door

the car is moving, the conductor is able to call the streets, as required, and as he faces the passengers the street names are much more easily heard and understood.

Passengers alighting from the car by way of the front platform and passing across in front of it have a direct view of cars or automobiles approaching from the opposite direction.

only, necessitating loops or wyes at the ends of the line. It can, however, be run in the reverse direction in case of emergency. This single-end design permits the use of a non-reversible cross seat, which with the semi-convertible window construction gives a considerable increase in the width of the aisle and the width of the cross seats without increasing the

over-all width of the car. The adoption of maximum traction center bearing trucks allows the use of two-motor instead of four-motor equipments, greatly reducing the weight per passenger and also reducing the height of the car floor to such a degree that the lower step is carried 2 in. nearer the ground.

Another interesting feature of the construction of this car is the use of a flat-arch roof in connection with the automatic ventilating system. Fresh air is brought in over the electric heaters, which are controlled by a thermostat, and the foul air is discharged through nine registers placed in the ceiling directly over the seats. These registers are connected with ventilators placed at intervals on the roof of the car. The vacuum created by the motion of the car draws out the foul air so rapidly that the air in the car is renewed every three and one-half minutes, which is slightly in excess of the Buffalo health commission's requirements.

To provide against the inadequacy of the usual destination signs, there is used to designate the route a large illuminated white letter on a black background located in the upper half of the right-hand front vestibule window. This letter is large enough to be visible by day or night for a distance of several blocks. Supplementary thereto, a side destination sign occupies the full length of the opening immediately over the entrance and exit doors. An application of European practice is found in the "Car Full" sign, which is dropped into place below the initial destination sign whenever a maximum car-load of passengers has been taken on.

The inherent accident prevention features of this car are supplemented by the use of the H.-B. life guard and by a safety grab-handle around the front vestibule. The handle is so designed and placed that it can be easily seized by a person about to be struck by the car and who might otherwise be thrown under the platform.

The seating capacity, dimensions, weights, etc., of the near-side car as compared with the standard pay-as-you-enter cars used in Buffalo and Chicago are as follows:

	Near-side Car.	Pay-as-you-enter Car.
Seating capacity	53	40
Length of cross-seat cushion.....	34 11/16 in.	34 in.
Width of aisle, at hip height.....	31 1/2 in.	27 in.
Width of car	8 ft. 6 in.	8 ft. 6 in.
Length of car, over all.....	45 ft. 2 in.	45 ft.
Height of car	12 ft.	12 ft. 5 in.
Height of lower step from ground....	14 in.	16 in.
Weight of car fully equipped.....	39,000 lb.	52,000 lb.
Weight per seated passenger.....	736 lb.	1,300 lb.

IMPROVEMENTS PLANNED IN ALBANY

Improvements in street railway service on the Pine Hills and West Albany lines of the United Traction Company, Albany, are called for in the order made by the New York Public Service Commission, Second District, after investigation for the past two years. Objections of the company to the installation of double-truck cars on these lines have been eliminated one by one by the commission, excepting that of expense. The commission says that the United Traction Company is in excellent condition financially. It pays 4 per cent on \$12,500,000 capital annually.

The commission points out that, in its opinion, the company is well able financially to furnish reasonable service.

During the evening rush hours' season when all closed cars are used the company has been providing a seating capacity running from 900 to about 1000 on the Pine Hills line and from 900 to 975 on the West Albany line. The commission has ordered the company on or before Nov. 1, 1911, to provide for not less than 1300 seats on the Pine Hills line and not less than 1400 on the West Albany line on both east and westbound trips.

The running of any closed cars less than 21 ft. in length on these two lines of the United Traction Company is prohibited after Nov. 1, 1911.

The company is required to provide for and permit the discharge of passengers from both the front and rear ends of its closed cars on these lines unless the type of car adopted shall be a double-truck car arranged for exit by front door only.

The commission recommends that in making necessary additions to service on the Pine Hills and West Albany lines modern double-truck cars be provided. In this connection it was announced on June 21, 1911, that the United Traction Company had placed an order with the Pressed Steel Car Company for twelve double-truck cars.

MEETING OF THE JOINT COMMITTEE ON BLOCK SIGNALS

The joint committee of the Engineering and the Transportation & Traffic Associations held a meeting in Pittsburgh, Pa., June 19 and 20. The members of the committee present were J. M. Waldron, Interborough Rapid Transit Company, chairman; J. N. Shannahan, Washington, Baltimore & Annapolis Electric Railway, and G. H. Kelsay, Indiana Union Traction Company. John Leisenring, Illinois Traction System, and L. E. Gould, ELECTRIC RAILWAY JOURNAL, representing the block signal committee of the Illinois Electric Railways Association, were also present, as were M. H. Hovey, consulting engineer of the Indiana Railroad Commission, and A. B. Cloud, managing editor *Signal Engineer*.

The meeting was called to discuss the general arrangement and details of the forthcoming report of the committee and to go over the information obtained from manufacturers and other sources regarding existing installations of block signals and other data. It was decided to include in the committee report the roll call of each committee meeting and an abstract of the minutes of the several meetings which the committee has held.

Mr. Waldron presented for discussion a draft of the first part of the committee's report, which will cover the following subjects:

1. Instructions from associations.
2. Personnel of committee.
3. Minutes of committee meetings.
4. Introductory paragraphs on signal systems.
5. Historical data on signaling.

Mr. Waldron will also prepare a summary of answers to the data sheet which was sent out and to which replies were received from ninety-six companies.

A general discussion followed on existing signal installations. Mr. Shannahan presented a summary on state and interstate laws and regulations relating to signals for electric railways. He called particular attention to the report of the Interstate Commerce Commission for 1903 and also read the text of House Bill No. 1668, which was introduced in the House of Representatives in 1903 and has been introduced at each succeeding session of Congress, including the special session called in April, 1911, when the bill was presented by Representative Esch of Wisconsin. This bill has been killed in committee each year. It was thought desirable to include the text of this bill in the report of the block signal committee to show its drastic provisions. Mr. Shannahan also read Bill No. 479-S, which has been made a law in Wisconsin. This law gives the Railroad Commission authority to compel the installation of adequate signals where reasonably demanded for safe operation.

The data sheets were next discussed in detail, and the answers arranged for presentation in the report.

Mr. Leisenring described the use of Blake dispatchers' signals to supplement train orders on the Illinois Traction System.

The committee then entered into a general discussion regarding the method of arranging for publication the descriptions of signal systems and apparatus which had been supplied by manufacturers at the request of the committee.

The committee met on Tuesday morning for its second session and concluded its consideration of the technical data received from the manufacturers. After adjournment the committee visited the plant of the Union Switch & Signal Company at Swissvale, Pa., where the members were entertained at luncheon.

EXHIBITS AT THE RAILWAY CONVENTIONS

The exhibits at the convention of the Master Mechanics' and Master Car Builders' Associations this year occupied more than 75,000 sq. ft. of space on Young's Million-Dollar Pier. In spite of an increase of 5000 sq. ft. over last year it was found impossible to furnish space to nearly seventy companies which had applied, and several of those which were disappointed rented space on the Boardwalk near the Pier. Among the exhibitors who showed devices and products used in the electric railway field were the following:

Acme Supply Company, Chicago, Ill., had an exhibit of pressed steel shapes used in car construction, steel doors, deck sash and "Tucó" curtain fixtures.

Adams & Westlake Company, Chicago, Ill., showed samples of pressed-steel window frames, car-lighting fixtures, interior fittings for cars and a full line of marker and signal lamps and lanterns.

American Brake Company, St. Louis, Mo., exhibited the American automatic brake slack adjuster in the space of the Westinghouse Air Brake Company.

American Brake Shoe & Foundry Company, Mahwah, N. J., had a large reception booth in which were displayed numerous samples of flanged and unflanged steel-back brake shoes for use on solid-steel wheels, steel-tired wheels and cast-iron wheels.

American Car & Foundry Company, New York, N. Y., showed in its booth photographs of typical passenger and freight car equipment built at its works.

American Mason Safety Tread Company, Boston, Mass., showed samples of Karbolith flooring and safety step treads.

American Rolled Gold Leaf Company, Providence, R. I., had sample of gold leaf for car striping.

Automatic Ventilator Company, New York, N. Y., had a full-size sectional model of a car roof equipped with its ventilators and by means of an electric fan, which created a current of air past the ventilators, their positive action was demonstrated.

Baldwin Locomotive Works, Philadelphia, Pa., occupied a large reception booth in the main building with the Standard Steel Works Company, which had an elaborate exhibit of wheels, axles and forgings.

Berry Brothers, Limited, Detroit, Mich., displayed a number of panels illustrating different methods of painting and finishing cars. Specimens of the crude materials used in paint and varnish making were also shown.

Blake, John S., Charlotte, N. C., showed a folding car step suitable for steam or interurban cars. The step was operated by a lever from the platform, and when not in use folded up underneath the platform or lowest permanent step of the car.

Bowser & Company, Inc., S. F., Ft. Wayne, Ind., exhibited a line of typical oil-storage and pumping systems for use in shops, power stations, etc.

Buffalo Brake Beam Company, New York, N. Y., showed sample brake beams of all kinds for steam and electric railway cars and locomotives.

Carborundum Company, The, Niagara Falls, N. Y., demonstrated the cutting qualities of its carborundum wheels on grinding machines in operation. It also displayed samples of carborundum grinding wheels, aloxite wheels and cloth and other forms of abrasives.

Carnegie Steel Company, Pittsburgh, Pa., had a large space in which it showed Schoen steel wheels for all classes of service, also samples of structural shapes and plates, gear blanks, steel sheet piling, concrete reinforcing bars, rail sections and steel ties and track accessories.

Chicago Varnish Company, Chicago, Ill., exhibited sections of car sides finished with the "Ce Ve" process of quick painting for cars.

Chisholm & Moore Manufacturing Company, Cleveland, Ohio, displayed a line of chain hoists and trolleys of different sizes and had a working model of a section of the gearing used in these hoists.

Cleveland Twist Drill Company, The, Cleveland, Ohio, had in operation a drill press on which were given demonstrations of the cutting qualities of Cleveland high-speed drills and reamers. It also showed a complete line of small tools.

Coe Brass Manufacturing Company, Ansonia, Conn., placed in its booth several boards, on which were mounted sections of intricate designs of extruded metal, such as are used in car trimmings and art-metal work.

Coe Manufacturing Company, W. H., Providence, R. I., exhibited samples of gold leaf, aluminum leaf, and gilding wheels and brushes.

Commonwealth Steel Company, St. Louis, Mo., displayed photographs of some of its latest types of cast-steel car and truck specialties, including body and truck bolsters, truck frames and its weed burner.

Consolidated Car Heating Company, Albany, N. Y., showed a full line of steam-heating apparatus and electric heaters.

Crane Company, Chicago, Ill., exhibited a large assortment of steam specialties, valves, fittings and traps.

Curtain Supply Company, Chicago, Ill., had several models showing the application of its ring curtain fixtures and various designs of car curtain materials.

Dahlstrom Metallic Door Company, Jamestown, N. Y., had a full-sized section of a sleeping car, in which all of the parts were made of steel finished in imitation of Circassian walnut. It also displayed metal doors and samples of pressed-steel interior trimming for cars.

Davis-Bournonville Company, New York, N. Y., had a working exhibit on the end of the Pier, where is shown the process of welding and cutting with oxy-acetylene forge.

Dearborn Drug & Chemical Works, Chicago, Ill., had an attractive reception booth in the main building.

Dixon Crucible Company, Joseph, Jersey City, N. J., exhibited samples of a large number of graphite lubricants and paints for different purposes.

Dressel Railway Lamp Works, The, New York, N. Y., had an exhibit of headlights, marker lamps, tail lamps and railway lanterns.

Duff Manufacturing Company, Pittsburgh, Pa., showed several types of Barrett ratchet track jacks, Duff ball-bearing screw jacks, and Bethlehem forged-steel hydraulic jacks.

Edison Storage Battery Company, Orange, N. J., displayed sample batteries for car lighting, signaling, etc., and specimen plates, showing the details of manufacture of Edison storage batteries.

Edwards Company, The O. M., Syracuse, N. Y., had a large exhibit of full-sized models of its window fixtures, shade rollers, steel platform trap doors and pressed-steel office furniture.

Electric Storage Battery Company, Philadelphia, Pa., exhibited car lighting batteries, Exide vehicle batteries and chloride accumulators.

Emery Pneumatic Lubricator Company, St. Louis, Mo., showed its automatic lubricator for air brake, triple valves and cylinders.

Fairbanks, Morse & Company, Chicago, Ill., exhibited a full line of ratchet and hydraulic jacks and also two types of gasoline motor section cars.

Federal Storage Battery Company, New York, N. Y., had on exhibition its double-truck closed car built for the Erie Railroad. This car has been making regular runs on the Greenwood Lake division of the Erie Railroad, but with its permission was taken to Atlantic City. The car made the run of 135 miles, from Elizabethport, N. J., to Atlantic City, N. J., on one charge and reached Atlantic City over the tracks of the Central Railroad and the Reading Railroad. It was on exhibition at the yards of the Pennsylvania Railroad, and exhibition runs were made over the tracks of the local system on Atlantic Avenue.

Ford & Johnson Company, The, Michigan City, Ind., exhibited a line of Perfection car seats, parlor car furniture and seating material.

Forsyth Brothers Company, Chicago, Ill., had a large exhibit, which included the Forsyth high-capacity buffing device, deck sash ratchets, metal sash and weather strips, Forsyth one-piece metal doors and pressed-steel unit car side construction.

Galena Signal Oil Company, Franklin, Pa., as has been its custom at past conventions, had an attractively decorated reception booth, where tea was served to guests.

General Electric Company, Schenectady, N. Y., exhibited on the Pier a steam turbine set for train lighting and 5-kw gasoline-electric generating set, portable air compressors, shop motors, incandescent lamps, electric heating and cooking devices, a large railway motor and a number of other electric specialties. It also had at the convention one of its latest types of gasoline-electric motors, which is to be put in trial service on the Philadelphia & Reading Railroad immediately and later is to be put in service on the Central Railroad of New Jersey.

General Railway Supply Company, Chicago, Ill., exhibited samples of metallic steel sheathing, National steel vestibule trap doors, Flexolith composition flooring, car window screens and sash fixtures.

Gold Car Heating & Lighting Company, New York, N. Y., had samples of its ventilator porcelain core heater of different types, 2-deg., 3-deg., truss plank, longitudinal seat, etc., as well as heaters for steam railroad cars.

Goldschmidt Thermit Company, New York, N. Y., gave frequent demonstrations of welding by the Thermit process, and its booth was decorated with a large number of photographs showing repairs made by this process. A feature of this exhibit was a moving-picture machine, which showed the complete process of making Thermit welds.

Grip Nut Company, Chicago, Ill., exhibited a full line of large and small grip nuts.

Hale & Kilburn Manufacturing Company, Philadelphia, Pa., had as a feature of its exhibit a room such as would be installed on a steamship or steamboat, fitted throughout with steel furniture. There was a stationary bed, folding bed, couch, washstand, chiffonier, stool and other articles of furniture constructed entirely of steel, but the finish was so perfect that it looked exactly like enameled wood. The exhibit also contained many other specimens of steel work finished to represent various kinds of wood. One of the single-piece-door vestibules for the motorman of interurban cars was also shown. These vestibules are used on the electric motor-cars of the New Haven Railroad.

Johns-Manville Company, H. W., New York, N. Y., displayed sample sheets of asbestos roofing, asbestos packings, pipe covering, waterproof materials, electrical materials, asbestos wood, underground electrical conduits and other specialties.

Kerite Insulated Wire & Cable Company, New York, N. Y., showed samples of wires and cables insulated with Kerite.

Knight Pneumatic Sander Company, Huntington, Ind., had an exhibit of pneumatic sanders for steam and electric locomotives and motor cars.

Linde Air Products Company, The, Buffalo, N. Y., exhibited its oxy-acetylene welding and cutting apparatus and its acetylene generators, also numerous samples of work done by the oxy-acetylene process in building and repairing steel cars and locomotives.

Lupton's Sons Company, David, Philadelphia, Pa., displayed specimens of Lupton's steel sash for side walls and Pond's continuous sash for monitor roofs.

McConway & Torley Company, The, Pittsburgh, Pa., exhibited McConway steel-tired wheels, the Pittsburgh car coupler and samples of steel castings.

McCord & Company, Chicago, Ill., showed samples of metal dust guards, journal boxes made of malleable iron and cast steel, and a full line of metal sash and sash fixtures.

McGraw Publishing Company, New York, N. Y., had a booth at the entrance to the Pier, where it showed photographs of its offices and printing plant, sample copies of the *ELECTRIC RAILWAY JOURNAL*, *Electrical World* and *Engineering Record*, and copies of the *Electric Railway Dictionary*.

Midvale Steel Company, The, Philadelphia, Pa., exhibited rolled-steel and steel-tired wheels for passenger and freight service, and small test pieces showing the fine quality of the metal in its heat-treated axles and steel forgings.

Milburn Company, Alexander, Baltimore, Md., displayed several types of Milburn acetylene lights for construction work and wrecking trains.

Mudge & Company, Burton W., Chicago, Ill., had full-sized sectional model of cars showing the application of Garland ventilators to monitor decks and arch roofs.

National Lock Washer Company, The, Newark, N. J., displayed several models showing various types of car window and curtain fixtures, also National lock washers.

National Tube Company, Pittsburgh, Pa., displayed a full line of Kewanee unions, valves and fittings for air, steam and hydraulic pressure.

Niles-Bement-Pond Company, New York, N. Y., exhibited a new type of car-wheel lathe, which was too large to place on the Pier. It was shown in a special booth on the Boardwalk opposite the entrance to the Pier.

Pantasote Company, The, New York, N. Y., had on display a full line of Pantasote curtains and upholstery materials and samples of Agosote of different thicknesses for different uses of interior finish of cars.

Pneumatic Jack Company, Louisville, Ky., showed samples of pneumatic journal jacks of different sizes and capacities. These jacks can be used wherever compressed air is available.

Pressed Steel Car Company, Pittsburgh, Pa., decorated its booth with photographs of steel passenger and freight cars of all types which it has recently built.

Pyrene Manufacturing Company, New York, N. Y., exhibited a line of its chemical fire extinguishers.

Railway Materials Company, The, Chicago, Ill., showed samples of steel-back brake shoes for steam and electric railway service, also drawings and photographs of the Ferguson shop furnaces.

Scarritt-Comstock Furniture Company, St. Louis, Mo., had on exhibition car seats and reclining chairs.

Sherwin-Williams Company, Cleveland, Ohio, had a reception booth in the main building.

Sprague Electric Works of General Electric Company, New York, N. Y., exhibited a full line of flexible steel armored hose, flexible steel conduit, outlet boxes and other electrical fittings.

Standard Steel Car Company, New York, N. Y., had a reception booth.

Standard Steel Works Company, Philadelphia, Pa., had a large space in the main building, where it showed specimens of steel-tired wheels, rolled-steel wheels, axles, forgings, springs and wheel centers.

Strong, Carlisle, Hammond Company, The, Cleveland, Ohio exhibited Randall graphite sheet lubricator bearings.

Symington Company, The T. H., Baltimore, Md., had an exhibit of Symington journal boxes, flexible dust guards and Farlow draft gear.

Underwood & Company, H. B., Philadelphia, Pa., exhibited a number of types of special portable machine tools.

Union Spring & Manufacturing Company, Pittsburgh, Pa., had an exhibit of coil and elliptical springs, Kensington all-steel journal boxes, pressed-steel journal box lids and steel castings.

United States Lighting & Heating Company, New York, N. Y., had complete equipments of its axle lighting system and samples of storage batteries for car lighting, signals, telephones and central stations.

U. S. Metal & Manufacturing Company, New York, N. Y., showed pressed-steel journal boxes, Diamond tapered steel poles, "Galco" artificial lumber, Anglo-American varnish and car cleaner.

Universal Safety Tread Company, Boston, Mass., exhibited samples of safety treads for car steps and station platforms.

Westinghouse Companies, Pittsburgh, Pa., had a combined exhibit, which included an air-brake demonstration rack with complete equipment, and air-brake test truck, alternating-cur-

rent and direct-current motors for shop machinery, tungsten and carbon lamps for all voltages and a 25-kw turbo-generator outfit.

Wheel Truing Brake Shoe Company, Detroit, Mich., exhibited abrasive brake shoes for truing locomotive driver and car wheels.

Yale & Towne Manufacturing Company, The, New York, N. Y., had an exhibit of chain blocks, trolleys, electric hoists and car hardware.

PLAN BY A. S. ROBINSON FOR CHICAGO SUBWAYS

Before the local transportation committee of the Chicago City Council, June 14, A. S. Robinson, now chief engineer of the Mountain, Valley & Plains Railroad Company, Dalhart, Tex., presented suggestions for a plan of Chicago subways involving a number of through routes between the North, South and West sides of the city, besides several loops entering the downtown district from the West Side. Intersecting all of these subways, along the lines of Monroe Street and Jackson Boulevard, Mr. Robinson has provided a low-level transfer-belt subway, by changing to which passengers may cross over to any other main line and continue their journeys, with universal transfers if desired. The system suggested is an amplification of that first proposed by the author in a paper read before the Western Society of Engineers at Chicago in February, 1911. Mr. Robinson's routes, which provide for both the surface and elevated lines in the downtown district, were prepared to employ the minimum number of curves, making possible future high-speed operation in connection with outlying subways or elevated roadways. By employing four-track construction, it was also sought to work each downtown street to its fullest sub-surface capacity, thus securing the greatest proportion of high-level subway, and in this way cheapening excavation and locating all stations near the surface.

The plans indicate four-track construction of the several routes under the downtown streets, providing in each bore two outside "local" tracks and two inside "express" tracks. Island platforms would be installed between each adjoining local and express track, while a partition wall between the center express tracks would divide the subway into two sections, in each of which the piston-like action of similarly moving trains is expected to accomplish adequate ventilation. The subway tracks for the surface cars would be carried at a level of 16 ft. below the street surface and the elevated cars 14 ft. below the surface, requiring excavation averaging 20 ft. deep, or about 6 ft. below the Lake Michigan datum line. Electric pumps would provide for removing any seepage occurring through the waterproofed concrete walls. At the side of the tracks Mr. Robinson allowed space for gas, water, electric service and telephone wires, while in the 5-ft. earthen back-fill above the roof of the tunnel would be space for various small service laterals. This earth back-fill is designed to deaden the noise of traffic overhead, as well as to silence the roar of the trains beneath the surface. Mr. Robinson suggested that street cars entering the tunnel portals be collected into trains of several cars each, and thus handled as multiple units through the underground section. Outside the downtown congested district, the speaker proposed extension subways or high-speed elevated structures of concrete, providing rapid transportation to outlying sections of the city. The minimum of curves and the absence of all grade crossings in the tunnels will permit this traffic to be handled with the maximum of dispatch. While the transfer belt, Mr. Robinson said, is a valuable feature of his plan, it need not be installed until most of the subway system has been completed, since arcades or foot passages could be temporarily provided for the short transverse distances in going from line to line.

The cost of this four-track construction is estimated at \$3,141,000 a mile, and the entire 18-mile installation as planned by Mr. Robinson would involve an expenditure of about \$57,000,000. The smallest loop and its adjoining through-route

should be built first, as this construction would provide most relief at a low cost and give valuable engineering experience. The preliminary subways indicated, those of the La Salle Street through route and a loop on Washington, Van Buren and Clark Streets, totaling 2.75 miles, would cost \$8,638,000, not including the existing river tunnels. Following this construction, Mr. Robinson suggested the building of the State Street through route and a West Side loop on Randolph, Dearborn and Harrison Streets. Coincident with the building of the subway system, he urged the construction of an adequate sewerage system for Chicago. As each element of the proposed subway system was constructed, it would begin to contribute its share of relief to the traffic problem, without depending on the completion of the entire installation.

For the elevated lines entering the downtown district over his proposed system of through-route subways, Mr. Robinson exhibited a diagram of a reversing-yard arrangement which can be employed to send cars back through the city to the express or local tracks of their own lines if desired. These reversing yards permit a "local" train to come in and unload on the "local" tracks in the downtown section, running on to the reversing yard and there being shunted to come back through the business district as an "express" train over the express tracks, carrying the evening rush homeward. In the morning the conditions would be reversed, of course, the center track of each line being employed for "express" service in the predominating direction of traffic.

MEETING OF COMMITTEE ON ENGINEERING APPRENTICES

A meeting of the committee on engineering apprentices, American Electric Railway Engineering Association, was held at the New York office of the association on Saturday, June 17, 1911. The committee members present were Chairman W. H. Evans, superintendent of motive power Indiana Union Traction Company, and H. A. Benedict, mechanical engineer Public Service Railway Company. There were also present H. H. Adams, superintendent rolling stock and shops Metropolitan Street Railway Company, and J. L. Ingoldsby, mechanical department Brooklyn Rapid Transit Company. Mr. Evans suggested the formulation of specific courses for shop apprentices to consist of separate specialties, as pit work, electrical equipment, car body repairs, machine shop, armature room, painting, etc. In addition, such an apprentice should have enough general knowledge to be able to take care of general inspection and minor repairs at outside carhouses. He submitted for discussion copies of the steam railroad apprenticeship course laid out by the Master Mechanics' Association in 1898. He suggested a four-year course, beginning with boys, say, seventeen years old. It is the plan of the committee to draft a number of courses. The courses applicable for a large company will be specialized, while those for small companies will be fewer in number but correspondingly broader in scope. Thus a large company would train separate men for controllers and for motors, whereas a small company would train one man for both classes and possibly for all classes of electrical work on cars. It was also suggested that such students be given some information about records and storekeeping. The head of the mechanical department should furnish a certificate of completion of apprenticeship course, properly signed by different instructing foremen.

A report presented in London, England, on May 2, to the directors of the La Plata (South America) Electric Tramways Company stated that the total receipts of the La Plata system, most of which is now under construction, had amounted to £34,483, of which amount £21,691 had been derived from electric traction. The average earnings were one shilling per car mile and the operating expenses averaged about 67.5 per cent of the receipts, thus making the cost of operation about eightpence per car mile.

MANUFACTURERS' EXHIBIT SPACE AT 1911 CONVENTION

George Keegan, secretary-treasurer of the American Electric Railway Manufacturers' Association, 165 Broadway, New York, has just issued a circular concerning the exhibit arrangements of the convention of the American Electric Railway Association and allied associations, which is to be held on Young's Pier, Atlantic City, N. J., from Oct. 9 to Oct. 13, inclusive, 1911. The circular is accompanied by an application blank for space. All applications received on or before June 30 will be considered as of that date and will have equal preference as to location; applications received after June 30 will be considered chronologically. The diagram, as reproduced on this page, shows the layout of exhibit spaces, for which applicants may state their preference, giving first, second and third choice. The charge for space on the Pier will be 30 cents per square foot, it being understood that this payment includes erection of booth ready for occupancy, electricity, steam, air and gas for power with terminal in booth, Crex floor matting, burlap erected on sides and back, enameled 3-in. name sign erected, telephone, checking, removing and returning all boxes and crates, and swinging-board sign without lettering. The booths in Buildings Nos. 1, 2 and 3, Aquarium Court and Machinery Hall, will be ready for exhibits Oct. 1.

All freight charges should be prepaid and the receipt for the prepaid charges sent to the Eldredge Express Company, Atlantic City, N. J. The boxes addressed to the exhibitor, care of the Eldredge Express Company, should give the space number on the Million-Dollar Pier. Heavy shipments should be routed via the Pennsylvania Railroad. Express packages should be sent care of the association, charges prepaid and marked with the exhibitor's space number. The exhibitors will install their own exhibits and must have same completed and in order by 8 a. m. Monday, Oct. 9. Arrangements for the unpacking and installations may be made with any responsible contractor. Workmen's badges must be procured. Reservations for machinists' labor may be made through the exhibits committee. Badges for the workmen will be issued at the office of the exhibits committee in the tower on the pier. The weights allowed by the pier management are as follows: Building No. 1 and Machinery Hall, 200-250 lb. per square foot; Aquarium Court, 200 lb. per square foot; Building No. 2, 150 lb. per square foot; Building No. 3, 150-200 lb. per square foot, and Booths 960-969, 80 lb. per square foot. Concentrated loads of 10 tons or less are permissible if placed directly over piles.

The Pier Company will provide adequate general lighting until 10 o'clock each night. Special arrangements have been made with the Ingalls Electric Construction Company, 22 South Tennessee Avenue, Atlantic City, for all special lighting and electric signs to be erected at the exhibitor's expense. No electric signs, however, will be permitted in Building No. 1. The uniform display signboard which added greatly to the appearance of the exhibits last year will be continued this year. No cardboard, oilcloth or other sign will be permitted. A signboard will be supplied by the association and the printing thereon will be paid for by the exhibitors.

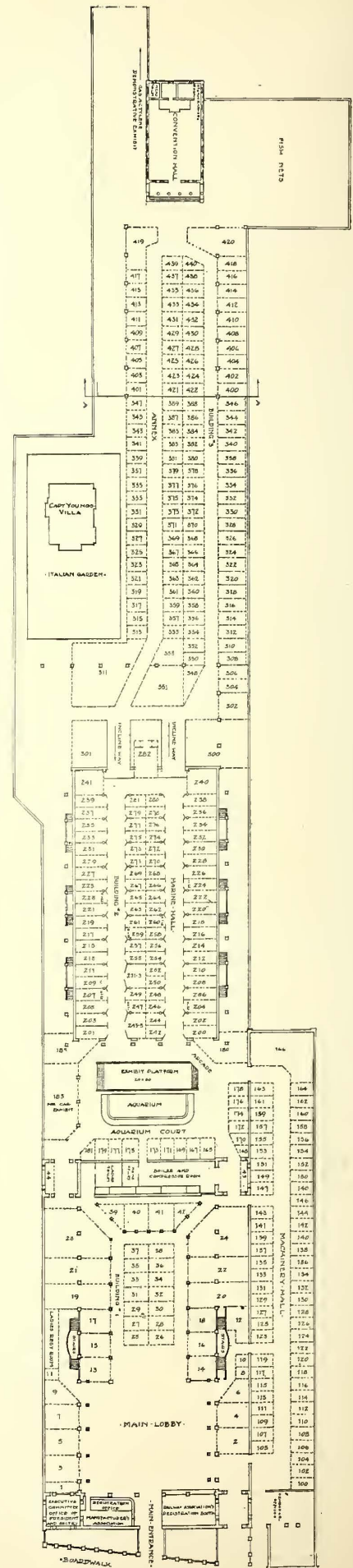
The operation of pneumatic hammers will not be allowed. No noisy or otherwise objectionable exhibits will be permitted. No watchman, workman or other attendant will be allowed on the pier between 12 o'clock midnight and 6 a. m., unless by permission countersigned by the director of exhibits and management of the Pier.

The Pier will be guarded at all hours of the day and night by special watchmen and the Atlantic City police department. It will also be under the protection at all times of the Atlantic City fire department, which will have firemen on the Pier constantly. To facilitate the service it is absolutely necessary to keep the aisles clear of all boxes, crates or other obstructions.

Arrangements have been made so that only the regular prevailing rates for skilled or unskilled labor will be charged the exhibitors. If an exhibitor requires any labor he should make early application to the association, stating what class is required, the number of men required, and on what days they will be required.

Arrangements have been made for the storage of packing boxes, crates, etc. Each exhibitor will make application for the space required for this material. These spaces are open, subject to weather conditions, unless special arrangements are made. The storage areas will be in care of watchmen and boxes will be issued only to persons holding the proper receipts.

Local telephone service will be furnished free of charge from Oct. 9 to Oct. 13, inclusive. Telegrams can be telephoned to the information office at the main entrance of the Pier. The Edwards Floral Hall Company, 1700 Pacific Avenue, Atlantic City, N. J., will rent palms, ferns, flowers, etc., for the convention period. Joseph L. Shoemaker & Company, 926 Arch Street, Philadelphia, will rent furniture and rugs. Leonard Young, 2517 Atlantic Avenue, and Bell, Gorman & Higby, Atlantic and Tennessee Avenues, Atlantic City, are recommended for handling decorations. Detailed information covering hotel rates, railway facilities, etc., will be sent out by Mr. Keegan later.

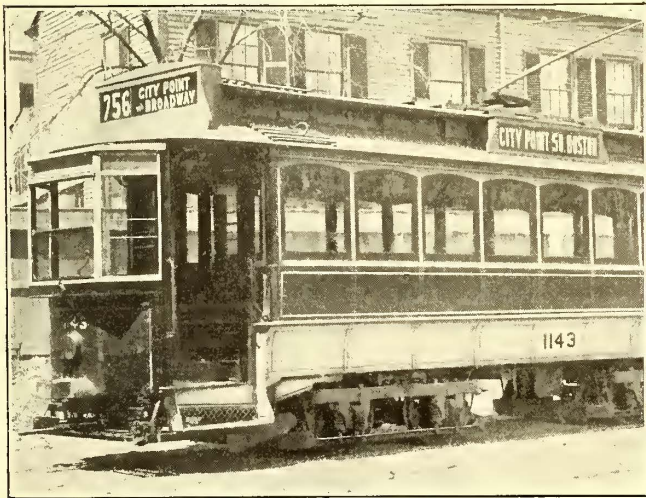


Plan of Exhibit Pier

NEW SYSTEM OF SIGNS ADOPTED BY BOSTON ELEVATED RAILWAY

As a result of a long study of the problem of car signs the Boston Elevated Railway Company has decided to equip all of its surface cars with a new type of Hunter sign arranged to indicate routes on the dual basis of numbering and lettering. The street layout in Boston and the interrelation of about forty suburban municipalities with the city proper have complicated the question of signs and the natural tendency has been to multiply the legends carried by the cars, but this plan had obvious limitations. For many years the company attempted to use cars of different colors on different lines, but the advantages of a single color standard were recognized and two years ago a standard color was adopted and the rolling stock is gradually being changed to a uniform dark green color.

Some months ago the company installed disks bearing the division number on the front and rear hoods of the surface cars. The disks were visible for considerable distances by day and were also legible at night for distances of two or more blocks through the use of incandescent lamps with reflectors arranged to throw the light upward upon the disk face, the



New Car Signs in Boston

lamps being practically concealed from persons on the street or car. The use of these division numbers proved helpful in enabling passengers quickly to identify cars destined for a given general direction, but the company felt that a still more accurate and flexible designation was desirable. Thorough discussion of the question and conferences with representatives of various civic organizations led to the adoption of the present sign, which is illustrated herewith.

The new signs, which the Boston Elevated Railway Company is to install upon about 3150 cars are 5 ft. long by 11 in. high and are lighted from the interior of the car without the use of extra sign lamps. The hood signs are to show the number of the division and route, the first figure indicating the division and the others the route designation. Thus, No. 756 indicates route 56 of division 7, and applies to a line running to City Point, South Boston, via Broadway. In addition to the number, which thus forms a route and destination symbol, the hood signs also show the name of the destination of the car and, where space permits, the name of the trunk line of the route over which the car runs. Wherever possible the company plans to use a single word on the hood signs, the lettering being about 9 in. high, white on a dark background. The side signs indicate the route or destination of the car in words only. In all cases the proper abbreviation is to be used, as "No." for "North," "Ave." for "Avenue," etc. These signs will be standard for all cars so equipped and no other signs of any kind will be used on the roof of the car.

As is well known, the Hunter sign consists of a roll of canvas on which a maximum of twenty destinations may be painted. The destination displayed can be changed readily by turning a handle within the car. The rolls are interchangeable. Wiring, power consumption and lamp maintenance are eliminated in connection with the signs of this type and a good illumination of both hood and side signs is insured, there being no illumination whatever on the present type of painted wooden side signs.

Previous to exhibiting a car equipped with the new signs the company sent the following letter to a large number of persons associated with various improvement associations in Greater Boston, including the Boston Chamber of Commerce, United Improvement Association and the Retail Merchants' Association:

"April 21, 1911.

"Dear Sir:

"In an endeavor to simplify and improve the present method of signing cars on the surface lines of the Boston Elevated Railway a systematic and thorough study has been made of the subject, together with investigations of the practices elsewhere in this country and abroad, as well as conferences with representatives of various local associations. There has now been designed a general scheme, which, in the judgment of the officers of the company, will be much more intelligible, satisfactory and clear to the public, embodying as it does the best features of methods developed by the most able railway minds and tested by years of experience.

"A car has been equipped with these signs in manner identical with that which it is anticipated will become common, to the exclusion of all other signs or indications of routes, divisions, etc., of any nature whatsoever on the surface lines of the company, and arrangements have been made to place this car on Providence Street at the junction of Church Street, near Park Square, on the evening of Tuesday, April 25, at 8:30 p. m.

"The company cordially invites you to be present at the time to inspect the signing. There have been invited to observe this example of signing representatives from organizations such as the Chamber of Commerce, Retail Trade Board, Improvement Associations, etc., as well as individuals who from time to time have made suggestions to the officers of the company in connection with the signing of cars.

"Representatives of the company will be present and will be glad to explain any details or give any information possible.

"Yours very truly,

(Signed)

"C. S. SERGEANT,
"Vice-president."

The car was exhibited on April 25 as planned and many favorable comments were received upon the design of the signing equipment.

MEETING OF THE EXECUTIVE COMMITTEE OF THE MANUFACTURERS' ASSOCIATION

The meeting of the executive committee of the American Electric Railway Manufacturers' Association was held at Atlantic City, June 16, during the progress of the American Railway Master Mechanics' convention. At that meeting Edwin H. Baker, of the Galena Signal Oil Company, was elected a successor as vice-president of exhibits to K. D. Hequembourg, whose resignation was announced last week.

At the same meeting W. L. Conwell, vice-president in charge of entertainments, showed sketches of different designs of badges for the convention. These were considered by the committee and Mr. Conwell was authorized to order the type finally selected.

The Swiss government has just granted a concession for the construction of a narrow gage electric railway, about 19 miles long, from Meiringen to Engelberg over the Joch Pass.

HEARING ON WEST NEWBURY FARE PETITION

A hearing was given by the Massachusetts Railroad Commission recently at Boston upon the petition of the Selectmen of West Newbury for a reduction of fares between West Newbury and Haverhill on the Boston & Northern Street Railway. Charles W. Ordway, chairman of the board, represented West Newbury and Bentley W. Warren, Boston, appeared for the company. Commissioner White conducted the hearing. The petitioners desire that a 5-cent fare should be established from any part of West Newbury to Haverhill or Newburyport. The present fare is 10 cents. They also asked for a reduction in the price of workmen's tickets from the present charge of \$1.40 for a twenty-ride book to \$1 between Indian River and Haverhill. The claim was advanced that as the People's Street Railway, a predecessor of the Boston & Northern Street Railway, had agreed to carry passengers between any two points in West Newbury for 5 cents, the existing fares should be scaled as requested. Mr. Ordway said that the Boston & Northern Street Railway occupies a total length of about 5 miles of track in West Newbury, making a charge of 5 cents for the upper half of the town above the town hall and 5 cents for the lower half, although warrants are given out which entitle passengers to ride upon a single fare to a fare limit post located within the town about 100 ft. from the line. Beyond this limit an additional fare is collected.

Mr. Warren brought out the point in cross-examination that the Boston & Northern Street Railway is carrying passengers from point to point in West Newbury for 5 cents as agreed upon in the franchise granted its predecessors, with the exception that merely as a matter of operating convenience the fare zones east and west bound had been set at posts marked just inside the town line. Mr. Ordway admitted that he did not know of any cases where passengers had been obliged to pay two fares to ride in the town. Continuing, Mr. Warren said the commission's order of 1906 had been fully complied with by the company. At that time the board had recommended that the fare of 7 cents between Haverhill Center and the town house in West Newbury should be made to apply as far as Indian River in West Newbury. The board had also recommended that the ticket between any part of West Newbury and Haverhill Center, with fare of 10.5 cents, be extended throughout the day.

Mr. Warren further said that he doubted if any one knew exactly how far, with a normal amount of business in a reasonably thickly populated section, passengers could be carried for 5 cents at a profit. It was impossible to tell how much it costs to carry a passenger one, two or three miles. The company does know, however, the average cost per passenger. Of each nickel taken in the stockholders of the Boston & Northern Street Railway receive only a fraction of a cent. On a ride of a few miles, for which the company gets 5 cents, passengers pay for more than they receive in transportation. The average, however, shows a small profit. This indicates that on all long rides the company furnishes service at a loss.

No discrimination is practised against the people of West Newbury, and there is no house or point of interest between the fare limit and the town line. The company does not feel that it can afford to give more to the people of West Newbury than it is now giving, either in the direction of Newburyport or Haverhill. There has been no increase of business on the line such as would warrant a fare reduction at this time. The existing rates are very reasonable and should not be lowered. The United States Supreme Court has said that it would be an unsound proposition to establish rates which would be unreasonable on the present business in anticipation of increased business which may never come. The company cannot afford to carry the few people who want to ride for less than the present rates when they are already paying less than was formerly charged. Regarding the contention of the petitioners that workmen should be permitted to ride for 5 cents where they are now paying 7 cents, Mr. Warren called attention to

the fact that the employees of the railway company have been obliged to face the increased cost of living, receiving two increases in wages in the past five years.

The company filed with the board subsequent to the hearing an exhibit showing in detail the rates of fare charged for given distances on the Newburyport, Lawrence and Lowell, Andover and Byfield lines. These data showed that the rate per mile on the disputed line was less than 1 cent per mile in the local service of the town of West Newbury, rising to 2.1 cents per mile on part of the through trip from Haverhill to Newburyport. The total distance from Haverhill to Newburyport is 13.77 miles, the fare being 20 cents, or about 1.4 cents per mile. In general the fare did not exceed 1½ cents per mile, which, it was contended by the company, was reasonable for the sparsely settled district served. It was also shown that the rates of fare existing on workmen's tickets were extremely reasonable per mile, viz:

Route.	Distance Miles.	Reduced Fare.	Rate per Mile.
Haverhill-Newburyport	13.77	14 cts.	1.02 cts.
W. Newburyport-Groveland line to Newburyport	8.95	10½ cts.	1.17 cts.
Town Hall, W. Newbury to Newburyport	6.25	7 cts.	1.12 cts.
Artichoke River-Haverhill	9.92	10½ cts.	1.06 cts.
Indian River-Haverhill	8.57	7 cts.	.82 cts.

The board took the case under advisement.

METAL CAR PARTS

The increased popularity of steel cars has resulted in the design and manufacture by Forsyth Brothers Company, Chicago, of numerous metal unit parts, all adaptable for assembly in the construction of a car. The Southern Pacific cars, for example, described in the *ELECTRIC RAILWAY JOURNAL* for June 17 are furnished throughout with Forsyth doors and windows. In general, the use of metal parts for car framing and fittings is said to result in first economy as well as in reduced upkeep expense. This manufacturer has just completed a large plant with machinery designed for pressing car members from sheet steel and for manufacturing all of the products described in this article. These include pressed-unit car side sections, Doyle car posts, carlines, pressed-steel roof sections, one-piece metal doors, motormen's cabs, self-adjusting dust-proof window sash, metal interior car finish, draft appliances, buffing devices and weather stripping.

PRESSED UNIT CAR SIDE SECTION

The pressed unit side section represents the most advanced development of the built-up steel truss side construction. The latter, while utilizing the full height of the side of the car for a lattice girder or truss (having the diagonals so disposed as to permit windows to be formed in the structure) has resulted in producing a car body of great strength and rigidity with minimum weight. As the life of a steel car is dependent entirely on the security of the joints of its members, it is obvious that the fewer the joints the better will be the car. This latter consideration led to the invention of the pressed unit section, wherein the side posts, diagonal braces and side brace of the car are formed of one piece of metal.

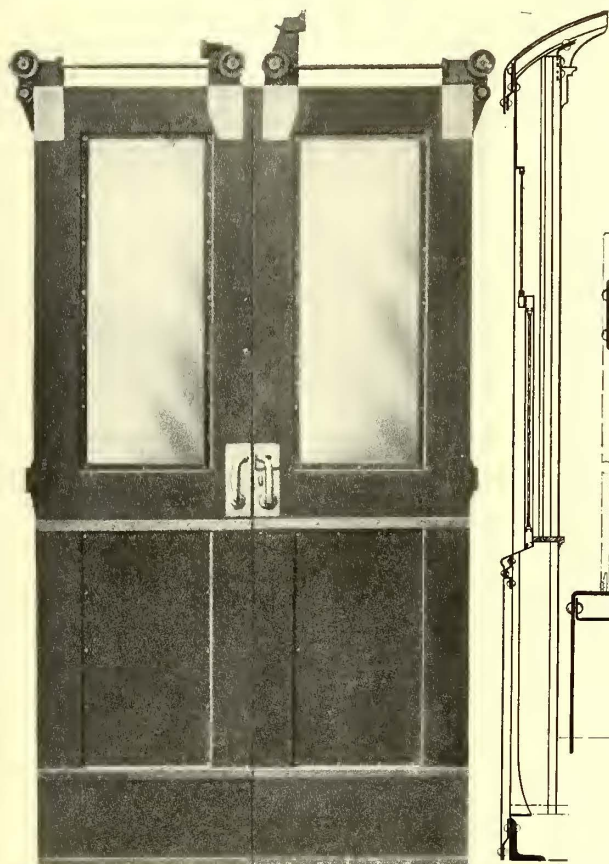
In a truss side-frame car the distribution of shock-resisting members in the truss frame results in practically surrounding the passenger space with a metal shield. The buffing shocks can be taken by a comparatively light center sill construction because this sill can be supported and secured from deflection at each side post by the rigid side frame. It is believed that weight for weight a car constructed with the pressed unit side truss will be more rigid and provide greater security to passengers than a car having all its shock-resisting members in the underframe or relying on a plate-girder side construction which has its top member below the sash rest. This construction may be adapted for any design of car or underframe.

ONE-PIECE METAL DOORS

In this company's one-piece metal door the framing and panels are formed out of one sheet of metal. Formerly metal doors were built up in sections, but under the constant rack-

ing action of the door when the cars were in motion the joints and seams would tend to open. In this way moisture entered the door and caused the formation of rust. Similar troubles occur where light metal sheets are overlapped and riveted together. The one-piece metal door is free from this defect since it contains no joints. It is composed of single sheets of metal in which the frame, panel and other finish are formed in the metal itself. These formations in the sheet of metal have in themselves the effect of stiffening the door and of imparting rigidity to it. There is no overlapping of sheets in making this door. Within the interior of the door and along its edge there is provided a one-piece reinforcing frame, which assists the door to withstand the most abusive treatment and prevents distortion of the door in service.

This door can be made in any pattern and dimensions desired with such glass or panel design as may be preferred. As it is formed from dies it is more readily interchanged than built-up doors.



One-Piece Metal Doors

The door is rendered thoroughly rust-proof by means of steel preservative which is baked on the interior as well as the outside of the door. The hardware is securely united to the interior reinforcements, which are in turn welded to the interior framework of the door itself. Consequently, any strains which may be imparted to the hardware are not transmitted to the shell of the doors, and, therefore, do not cause bulging or distortion of the finished door surface.

Large numbers of these one-piece metal doors are in service on both steam and electric lines, such as the Southern Pacific Company and the Interborough Rapid Transit Company of New York.

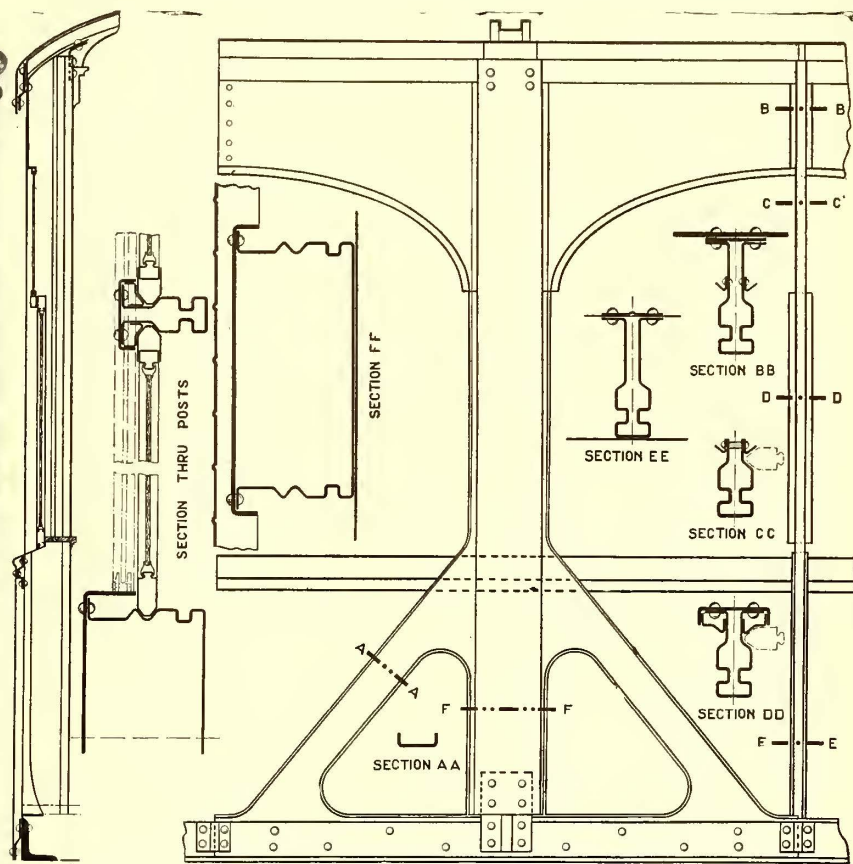
METAL SASH

Metal sash, adapted for various classes of service, is made both in steel and brass. This metal sash is readily adjustable for variations in the window openings, is absolutely dust-proof and can be made for any kind of glazing. Among other designs of metal sash there is one in which the rails are quite narrow, thus affording a maximum area of glass and increasing the light in the car.

Metal, and particularly brass, sash are coming into growing favor, not merely because of the finish which they impart to the car, but as a matter of economy in maintenance. There is imparted to the brass sash by the action of the atmosphere a permanent gun-metal finish which is not only pleasing to the eye, but eliminates the necessity of removing the sash at intervals for revarnishing. Along with other metal sash the company furnishes, if desired, various sash attachments, including weather stripping. Many thousands of these metal sash are in service.

DOYLE METAL POSTS

In the Doyle post the guides for the sash, as well as the curtain fixtures, are formed in the post itself. This avoids having extra strips and stops for this purpose. The formations and corrugations in the post also add to its rigidity. Between the sash and the post there is provided an outwardly springing thrust shoe, carried by the sash, and having a wedge or other suitable engagement with the corrugation or sash guide, formed



Pressed Steel Unit Car-Side Construction

in the post. These shoes automatically adjust the sash to any variations in the distance that the posts may be set from each other in the car and to any variation in their vertical alignment. They also permit the sash, along its lower edge, to adjust itself automatically to the camber of the car.

This shoe engagement also renders the sash dust-proof. The guides, or frames on the posts, upon which the sash shoes operate are preferably covered with a brass capping, which becomes oxidized from the action of the atmosphere and thus prevents the shoes from coming in contact with the paint or the finish of the rest of the post.

The sash shoes permit almost instantaneous withdrawal of the sash from the opening when desired without removing any of the customary sash guides. This is done by forcing the shoes inwardly to the sash, which thereupon permits the whole to be swung free of the opening.

The posts are formed out of one piece of metal and can be adapted to any construction of wooden or steel car. They are joined along the floor and at the top of the car construction in such a manner as to be readily removed at any time desired.

COMMUTATING POLE ROTARY CONVERTERS

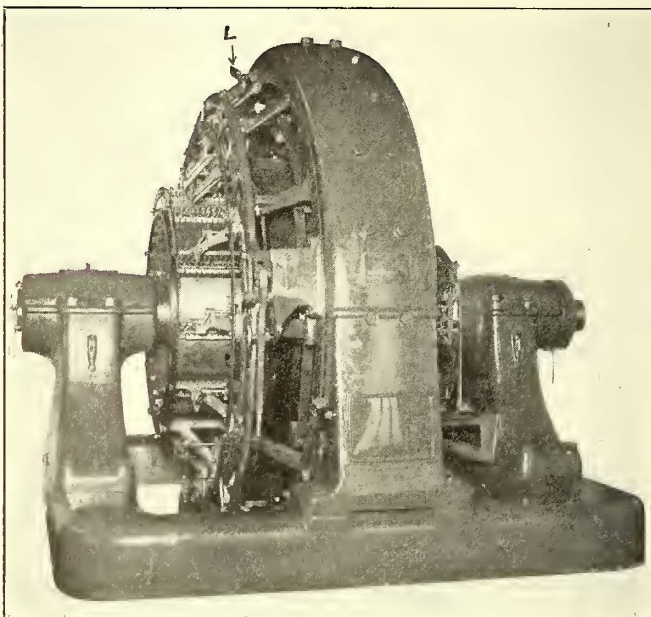
The General Electric Company has developed a line of commutating pole rotary converters for direct-current railways. As is well known, the limiting feature which governs the size of apparatus installed in most railway substations is the maximum momentary capacity and not the continuous capacity. Therefore, a considerable saving can be made in the initial cost of such a substation and a higher all-day efficiency can be obtained by using smaller machines having larger momentary overload capacities. This point is further emphasized when it is remembered that a fair average load factor for a substation of this nature is about 40 per cent, and it is in a great number of cases very much below this figure. These commutating pole rotary converters have the same normal heating and overload heating as the present standard railway apparatus, but have a momentary overload capacity of 200 per cent instead of 100 per cent. The commutating poles have such constants as give practically sparkless commutation from no load to 200 per cent overload, both when the machine is working at a nearly constant load or on a widely fluctuating load. The accompanying illustrations show the general appearance of such a machine, as well as some of the special features.

In general the construction of these machines is similar to standard rotary converters, with, of course, the addition of commutating poles. One novel detail is a device for raising the d.c. brushes when the machine is started from the a.c. end. This device will permit the use of both new and partially worn brushes on the same stud.

The details of the brush-raising device will be seen in one of the accompanying illustrations, where *A* is the operating lever. This is connected with the ring *B* in such a manner that when the handle is moved outward *B* shifts in the direction of the arrow, actuating the bell cranks *C* through the bars *D*. The bell

side by means of partial voltage taps on the secondary of the transformers, approximately full-load current is drawn from the line, but when the d.c. brushes are lifted from the commutator the amount of line current required to start the machine is very materially reduced. Consequently this brush-raising device has removed the objection that a.c. starting took too much current from the line.

The collector rings of the machine illustrated are provided with a new metal brush known by the trade name of "Metite." These brushes are said to be a marked improvement on the

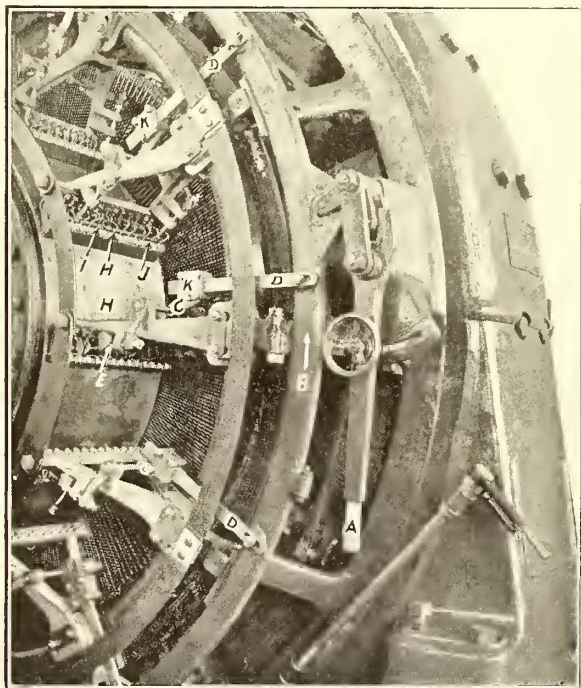


1200-Volt Commutating Pole Rotary Converter

old-type copper-leaf brush. They have heavy pigtails and are held in the brush holders in a similar manner to the brushes used on the d.c. end. Ample provision is made for brush adjustment and new brushes can be put in and old ones taken out and adjustments made while the machine is in operation. The method of operation is as follows: Before the machine is started the brushes are raised, leaving only two thin pilot brushes resting on the commutator to supply the field and for obtaining polarity. The machine is run up to speed and synchronized and then the brushes are lowered. The position of the brushes is always indicated by the semaphore *L*.

FLEXIBLE ASBESTOS INSULATING TAPE

The D & W Fuse Company, Providence, R. I., is making a new product called "Deltatape." This is a heat-resisting insulating material which has asbestos fiber as a base. Because of this fact and the special compound used for impregnation, the tape can be raised to a temperature of 500 deg. Fahr. before decomposition begins. It is said to be a good insulator electrically, although at the same time a good conductor of heat. Therefore, a coil wrapped with it, while thoroughly insulated, is not blanketed so as to make it retain heat, as is the case with most asbestos coverings. This material is made in any width and in thicknesses between 10 mils and 25 mils. The 10-mil tape requires 2500 volts to puncture it, and 5000 volts is required to break down the 20-mil tap. The flexibility of this tape makes it suitable for forming around the corners and the terminals of coils. These qualities make it particularly adapted for railway motor and controller work where high temperatures and severe conditions are to be met. The flexibility is practically permanent. "Delta" sheeting is also manufactured. This is a material 8½ in. wide, but identical with "Deltatape" in properties, texture and finish. It is made in rolls of any convenient length and is intended for use where large pieces of insulating material are required.



Brush Raising and Shifting Mechanism of Commutating Pole Rotary Converter

cranks actuate the vertical rods *E*, which are in turn connected to the horizontal rods *H*. The rods *H* pass under the brush holder springs *I* and the free end of these springs pass under the clips *J* attached to the brushes, so that when the rods *H* are raised the brushes are raised and when they are lowered the brushes are lowered. The operating handle, etc., is insulated by the joint *K*.

When an ordinary rotary converter is started from the a.c.

News of Electric Railways

Commission to Appeal from Finding in Regard to Third Avenue Reorganization

By a vote of 4 to 1 the Public Service Commission of the First District of New York on June 16, 1911, determined to appeal from the decision of the Appellate Division overruling the finding of the commission in the Third Avenue Railroad reorganization. The commission had unanimously refused to approve the plan for the reorganization of the Third Avenue Railroad on the ground that neither the earnings nor the property values of the system, as demonstrated by the long series of hearings on the plan itself, justified the issuance of the volume of securities which the reorganization committee proposed to issue, and that the commission was as clearly charged under the law with preventing the issuance of securities in excess of value in railway reorganizations as in original promotions. The reorganizers, on the other hand, cited a section of the Stock Corporation act and contended that the power of the commission was nominal in such cases and ran only to determining whether the reorganization committee legally held title to any property in question, whether the outstanding securities were legally issued, and whether the proposed new securities exceeded the volume previously outstanding.

The new member of the commission, J. Sergeant Cram, objected to the resolution of the majority directing counsel to appeal from the decision of the Appellate Division. Commissioner Cram said:

"I cannot, after having carefully read the opinions of Mr. Justice Clark and Mr. Justice Ingraham, vote to appeal, as I entertain no doubt of the result of the appeal. I think the Court of Appeals has already passed upon the difference between the original organization of a railroad and its reorganization. In the first instance there is no doubt of the jurisdiction of this board, but I think in the second the law relating to reorganizations of corporations controls.

"I am satisfied that it has not been superseded by the Public Service act, and consequently I think a great hardship would be inflicted upon the junior bondholders if they should be kept indefinitely out of what little is left to them of their property. I am therefore opposed to the appeal."

In reply to Mr. Cram, Chairman Willcox of the commission said:

"I think, in voting for the appeal, that the question at issue is so important that we should have the decision of the highest court. The evident intention of the Public Service Commissions law was to put the issuance of securities under the control of a State body, and it is anomalous to say that a new company would in its application for the issuance of securities be governed by the Public Service Commissions act while a company which has been reorganized would not be subject to such provisions. It is essentially desirable to have the opinion of the court of last resort in the questions at issue in this matter."

Commissioner McCarroll said:

"In voting for the appeal, I feel that the whole question of the limitation of the issuance of securities and supervision by the State is at stake. I feel that it is quite as important that the people of the State should have the protection that is given by the provisions of the statute in the case of a reorganization as in the case of a new company. I feel that in this particular case the issuance of the proposed securities would bring about practically a repetition of the history of the bankruptcy of this company, and I therefore feel that if the State's powers can be extended so as to bring such matters within the jurisdiction of the Public Service Commissions law that law should be sustained in that respect. I think it is exceedingly important that all resorts of the law should be exhausted to establish that position."

Commissioner Maltbie said:

"I think that it is essential and absolutely necessary that a decision be obtained from the highest court in the State of New York upon this subject. One of the opinions of the Appellate Division intimates that this point has never been decided by the Court of Appeals squarely upon the Public

Service Commissions law, as the point has not been raised in the court as to the Public Service Commission's power upon any such case before it. I think, therefore, that we should appeal this case and secure the decision of the highest court before definite action is taken in accordance with the opinion of the Appellate Division. If the decision of the Appellate Division should be affirmed, I think that the effects will be far-reaching, for they will go very much beyond the present case and their effect upon service, upon rates of fare and upon transfers will be tremendous, if the company is to start at the capitalization proposed in the plan of reorganization. Either the commission is entirely wrong upon its facts, as found in the evidence taken at the hearings, or the company cannot give adequate service at reasonable rates and still pay a fair return upon the securities that are to be issued."

In explaining his vote for the appeal, Commissioner Eustis said:

"In voting for the appeal, I do so because I feel that the State intended that the commission should have jurisdiction over the issue of stocks and securities by all companies, including reorganized companies. It appears from this decision that there is some question, at least, that reorganizations are exempt from the Public Service Commissions law. I think that the matter should be decided by the court of last resort, so that the Legislature will have final knowledge of what the law is, and then it will be up to it to revise these sections, so that in case there is any question about jurisdiction the law can be changed to meet the situation."

Ticket Counterfeiters Arrested

Through the efforts of J. J. Stanley, president of the Cleveland Railway, and C. E. Hauk, head of the secret service department of the company, the leaders of a gang of street railway ticket counterfeiters have been arrested. It has been known for some time that bogus tickets were in use on the Cleveland Railway, and while several conductors were punished for handling the tickets, the makers of the tickets could not be located. Not long ago, however, the fare box of a conductor who had been seen during the day to take tickets from an envelope was found to contain a large number of counterfeit tickets. He is said to have confessed that the tickets were purchased from a man in Akron and that other conductors were implicated. One of the Cleveland conductors was trailed to Akron, and Pinkerton detectives and Secret Service Agent Hauk finally located a house near Akron where they were satisfied the tickets were made.

On the evening of June 11, 1911, the detectives, accompanied by Attorney H. J. Crawford, acting for the company, and Charles Currie, general manager of the Northern Ohio Traction & Light Company, raided the house near Akron and arrested Leonard Reis, a printer, and his wife. A complete outfit for reproducing tickets and a large number of completed tickets ready for circulation were found. Reis gave information that resulted in the arrest of John F. Farris, William E. Farris and Joseph C. Hart, of Chicago. The Farris brothers are in the employ of the Illinois Central Railway. It is said that a complete plant for making tickets and also tickets aggregating \$150,000 in value were found at the Farris home. Of these tickets to the amount of \$70,000 are said to have been counterfeits of the tickets of the Cleveland Electric Railway and \$60,000 counterfeits of the tickets used by the Indianapolis Traction & Terminal Company. Others are said to have been counterfeits of tickets used by the Columbus Railway & Light Company, the Northern Ohio Traction & Light Company and the Toledo Railways & Light Company. The plates were made to the order of the Farris brothers. The Akron plant seems to have been a branch. Joseph C. Hart claims that he printed the tickets under contract with the Farris brothers, without suspecting that they were counterfeits.

The Farris brothers were bound over to the United

States grand jury on the charge of using the mails to defraud and were placed under bonds of \$10,000 each, while Hart was charged with conspiracy and placed under a bond of \$2,500. It is said that the Farris brothers confessed that plans had been made to counterfeit tickets of a number of the street railways in important cities. The principal difference between the real tickets and the counterfeits used in Cleveland was in the thickness of the paper. The counterfeits were thicker than the originals.

Ira F. Williamson, a conductor on the Superior Avenue line, was arrested on June 17, 1911, charged with being the Cleveland agent of the counterfeiters. He was committed in default of \$10,000 bail.

Rules to Govern Applications for Approval of Securities in New Jersey

The Board of Public Utility Commissioners of New Jersey has adopted a conference ruling for the guidance of public utilities applying for approval of proposed issues of stocks, bonds, notes or other evidences of indebtedness. The ruling gives in detail what will hereafter be the requirements of the board in such cases. It provides as follows:

"All applications for authority to issue any stocks, bonds, notes or other evidences of indebtedness must show by petition:

"One—The amount and terms of the proposed issue; the purpose for which the proceeds are to be used, and the nature of the security, if any.

"Two—Where the purpose is the acquisition of property, a general description of the property, from whom it is to be acquired, and the terms of the contract for such acquisition, if any has been made. Names of the owners of property to be acquired for rights-of-way need not be set out; a general description of the proposed route will be sufficient.

"Three—Where the purpose is the construction, completion, extension or improvement of facilities, existing facilities, as well as those proposed, must be described.

"Four—Where the purpose is the improvement or maintenance of service, the existing service, as well as the improvements or betterments proposed, must be described.

"Five—Where the purpose is the refunding of obligations, the obligations to be refunded must be described fully and the kind, amount, date of issue, date of maturity and all other material facts affecting the same must be set out.

"Six—The financial condition of the applicant must be set forth in appropriate schedules showing: (a), amount and classes of stock authorized; (b), amount and classes of stock issued and outstanding; (c), terms of preference of preferred stock; (d), brief description of each mortgage upon any property of the applicant, giving date of execution, name of trustee, amount of indebtedness actually secured and brief description of the mortgaged property; (e), number and amount of bonds authorized to be issued under each mortgage, describing each class separately, giving date of issue, par value, rate of interest, date of maturity and how secured; (f), other indebtedness of all kinds, giving same by classes and describing security, if any; (g), amount of interest paid during previous fiscal year upon each kind of indebtedness and rate thereof, and, if different rates were paid, amount paid at each rate; (h), amount of dividends paid upon each class of stock during previous fiscal year and rate thereof; (i), detailed statement of earnings and expenditures for previous fiscal year, and balance sheet, showing conditions at the close of the year.

"Seven—Where the application is for the issue of bonds to be secured by an existing mortgage, the amount of bonds, if any, already issued under such mortgage and the amount and application made of the proceeds of the same.

"Eight—Where the proceeds are to be used for construction, completion, extension or improvement purposes the affidavit of a competent person must be annexed, showing the estimated cost in reasonable detail.

"Nine—That no franchise or right is capitalized directly or indirectly except as authorized by the statute, but in case it is proposed to capitalize any franchise as authorized by the statute, a verified copy of such franchise shall be at-

tached to the application, together with an affidavit of the proper officer of the state, county or municipality, showing the amount that has actually been paid for such franchise.

"Ten—Where any contract, agreement or arrangement, verbal or written, has been made to sell the securities proposed to be issued, such contract, agreement or arrangement must be described fully, and, if in writing, a copy of the same must be annexed to the application.

"Eleven—If no contract, agreement or arrangement has been made for the sale or other disposition of the securities proposed to be issued, there must be attached to the application an affidavit of a competent person, showing the amount which can probably be realized from the sale and disposition thereof and the reasons for the opinion of the affiant.

"Twelve—All such applications should be verified by the affidavits of the chief administrative and chief financial officer of the applicant, and such verifications must include a statement that it is the intention of the applicant in good faith to use the proceeds of the securities proposed to be used for the purpose set forth in the application."

Further Consideration Given Amendments to Cleveland Grant

At a meeting of the committee of the whole of the Council of Cleveland on the afternoon of June 16, 1911, to consider amendments to the Tayler franchise proposed in the Dahl ordinance introduced some time ago, City Solicitor Baker opposed the amendment to extend the low fare to the suburbs as they are annexed. He said that the amendment endangers the whole plan of low fare. G. M. Dahl, Councilman Morgan and others argued that the referendum vote on the admission of the suburbs would also mean a referendum on the extension of the fare. Mr. Baker said that if Council should decide before a vote on annexation was taken that the suburb could not have low fare and the suburb should be annexed that portion of the city would be prevented forever from securing a reduction in fare. He said that it would be much better to adopt an amendment putting the entire matter in the hands of Council and allow that body to fix the fare at all times within the city limits.

Another amendment objected to by Mr. Baker was the provision for arbitration in case the city and company did not agree on the propriety or necessity of making betterments and extensions. Mr. Baker argued that this matter should be in the hands of the City Council. Mr. Dahl replied that the whole Tayler ordinance was saturated with arbitration provisions and that this amendment provided nothing new. Mr. Baker said that the Tayler ordinance was not perfect and that he did not believe in arbitration.

Councilmen are at odds in regard to the period during which the city should have the right to dictate in the matter of betterments and extensions. Some of them feel that the period should continue to within five years of the expiration of the franchise, while others desire a shorter period. It is argued that possibly it would be better to fix the grant so that the city could not dictate during the last fifteen years of the franchise period in order to insure a renewal, as refusal to renew might give the company what would amount to a perpetual grant. The company has stated that it cannot accept an amendment that would give the Council the right to dictate extensions and betterments during the last fifteen years of the life of the franchise.

At its regular meeting on June 12, 1911, the City Council voted to refer to Mr. Dahl the question of permitting passengers to smoke on the three rear seats of the cars through the summer.

New York Subway Report Adopted

The Board of Estimate and Apportionment of New York on June 21, 1911, unanimously adopted the report of the joint committee of the Board of Estimate and the Public Service Commission relating to the pending proposals submitted by the Interborough Rapid Transit Company and

the Brooklyn Rapid Transit Company for the construction, equipment and operation of rapid transit lines in New York. In adopting the report the board authorized the committee to notify the companies that they must signify by June 28, 1911, whether they will accept the division of territory proposed in the report.

Mayor Gaynor made known on June 19, 1911, that he would favor the adoption of the McAneny report dividing contracts for new subways between the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company. Mr. Gaynor said:

"Mr. Seth Low, formerly Mayor, called on me to discuss the subway report. He has been of the utmost service to the officers and to the city in this matter. The committee appointed by the Chamber of Commerce and the Merchants' Association some time ago, of which Mr. Low is chairman, is to meet on June 20, 1911, and I hope that with Mr. Low's advice it will ratify the subway report and help us in passing it and carrying it out. Of course, there are still a number of things unsettled. I do not mind saying I have asked Mr. Low to have a sub-committee of his committee appointed to give us its assistance hereafter in settling disputed things and framing the contracts. Much yet remains to be done."

Brief Filed in Detroit Rental Suit.—Corporation Counsel Hally has filed a supplemental brief in the case of the City of Detroit against the Detroit (Mich.) United Railway in an effort to collect a rental of \$200 a day for the use of the streets occupied by the Fort Street line. He denies that the company is in possession of the streets in the sense of possession of real estate, because it uses the streets for traffic, and only a portion of the space at that. He says that under present laws the company could be dispossessed even if operating under a contract with the city.

Important Tax Decision at Columbus, Ohio.—Judge Dillon in Common Pleas Court at Columbus, Ohio, has decided against the Ohio Electric Railway in its suit against the State Tax Commission to enjoin the commission from requiring that revenue derived from the company's terminal building in Cincinnati should be included in the report of its gross earnings. The commission entered a demurrer to the petition and this was sustained by the court, which held that the company is prevented from seeking a remedy in a court of equity. The case will be carried to the Supreme Court.

Oak Park Elevation Ordinance Passed.—The Oak Park village board on June 15, 1911, passed an ordinance to require the Chicago & Oak Park Elevated Railroad to elevate its tracks in Oak Park. No provision was made in the ordinance for a 5-cent fare to Chicago, and the measure passed, with a few minor amendments, is the one submitted to the board by Clarence A. Knight, president of the company. The company is given until July 1, 1913, to complete the work of elevation. The ordinance calls for an earth embankment, with concrete retaining walls, from Austin Avenue, the eastern boundary of the village, to Wisconsin Avenue, the terminus of the road.

Decision in Car Tax Case.—Judge R. C. Stewart, of the Court of Common Pleas of Northampton County, has rendered a decision in the case of the City of Easton, Pa., against the Phillipsburg (N. J.) Horse Car Railroad to recover a tax on cars doing an interstate commerce business. The company operates between Phillipsburg, N. J., and Easton, Pa., and Judge Stewart held that the ordinance imposing a tax of \$25 on each car of the company was a burden imposed on the company contrary to the provision of the Constitution of the United States with reference to interstate commerce and that the defendant was not liable for the payment of license fees under the ordinance.

Want Proposed Cincinnati Subway Operated at Three-Cent Fare.—At a meeting of the Federated Improvement Association of Cincinnati on June 8, 1911, a resolution was adopted requesting the city to build a subway under the Miami & Erie Canal within the city limits and lease it to an operating company on a three-cent fare basis. The plan suggested would provide branches along Queen City Ave-

nue for the development of Price Hill and Westwood and skirting Bond Hill on the south and Norwood on the north. One of the delegates asked to have the transportation committee instructed to investigate the franchise of the Cincinnati Traction Company. This franchise is subject to revision in 1916, at the end of the first twenty-year period.

Key Route Improvements at Oakland.—Plans for improvements that will double the capacity of the San Francisco, Oakland & San José Railroad through Oakland and Berkeley, Cal., are nearly completed. In addition to converting the pier of the company into a solid mole it is proposed to enlarge the ferry depot and slips at the end of the mole and to carry all trains through the depot on a series of loops instead of having them sent in and out on straight single tracks as at present. The loop is to be constructed on a solid foundation of earth and concrete, instead of upon piling, and the whole space within the loop and beneath the depot building will be filled in. The loop system, it is claimed, will greatly facilitate the handling of passengers and will shorten the running time of trains.

Electric Railway Development in Uruguay.—A long report has been received by the Bureau of Manufactures of the Department of Commerce and Labor at Washington, D. C., from Frederick W. Goding, United States Consul at Montevideo, on the development of Uruguay. Mr. Goding says that the net receipts of the electric tramways of Montevideo for the year ended Oct. 1, 1910, were \$513,701, an increase over the previous year of \$106,501. The number of passengers carried in 1910 was 60,124,305, against 48,017,142 in 1909, and on the horse tramways 2,632,354 in 1910 and 2,391,112 in 1910. The government, at present part owner of the lines, is studying a plan to nationalize and electrify the horse tramway system. Plans are being prepared for building an electric railway from Montevideo to Punta del Este, a favorite summer resort near Maldonado. Mr. Goding says that "the opportunities for the sale of American electrical goods and machinery in Uruguay are unlimited, but do not seem to arouse the interest of American manufacturers."

Improvements in St. Louis.—The United Railways, St. Louis, Mo., is reconstructing 25 miles of track at a cost of \$750,000. Of this mileage about 15 miles are practically completed. Twenty-five new semi-steel cars have been placed in operation and an equal number will be placed in service by Jan. 1, 1912. The roadway and car expenditure for 1911 will exceed \$1,000,000. When this year's improvements are completed, all the lines in the heart of St. Louis will have been rebuilt, except that on Locust Street, and this work will be done as soon as contracts are let by the city for the street paving. The McPherson line has been reconstructed from end to end, the Easton from end to end, and the Manchester from end to end. The Delmar line will be reconstructed from end to end when the city decides as to the kind of crossing which should be constructed at the Wabash station. The strip adjacent to the Wabash station is the only part of the line not rebuilt. The reconstruction on the Manchester line is in advance of street paving. The thoroughfare will be paved to the city limits.

Ladies' Day Outing of New England Street Railway Club.—The ladies' day outing of the New England Street Railway Club will be held at Uncanoonuc Mountain, Goffstown, N. H., on Thursday, June 29, 1911. The start from Boston will be made by special train at 9:15 a. m. Manchester, N. H., will be reached at 10:45 a. m., and at 11:45 a. m. the party is due to arrive the summit of the mountain. Returning, the special train will leave Lowell at 7:45 p. m. and arrive at the North Station, Boston, at 8:25 p. m. Dinner will be served at the Uncanoonuc Casino, on Uncanoonuc Mountain, N. H. Through the courtesy of the Manchester Street Railway, special cars will be furnished from Manchester to the base of the mountain and, returning, to Pine Island Park and Hudson Bridge; and also admission to all amusements at Pine Island Park. Through the courtesy of the Boston & Northern Street Railway, special cars will be furnished from Hudson Bridge to Lake View Park and Lowell, and also admission to Lake View Park. Tickets for the day's entertainment, including dinner, lunch and transportation are \$2.50 each.

LEGISLATION AFFECTING ELECTRIC RAILWAYS
CONNECTICUT.

The deciding vote taken in the Connecticut House on June 15, 1911, on the proposed public utilities bill resulted in a tie, 118 to 118, which was broken by Speaker Scott in favor of the amended majority report. A vote to reconsider was made and defeated, which will prevent the House from taking the matter up again this session. The Senate, after passing the minority report last week, also became deadlocked, so there is little likelihood of a utility measure being passed at this session. The majority bill differed from the minority measure in that it provided for two commissions instead of one, with lesser penalties attached to violations of their orders. The present Railroad Commission would have been continued, with the same jurisdiction, while another commission would have been created by it to control all other public service corporations.

MASSACHUSETTS

Several bills have been filed in the Senate in connection with the proposed extension of the lease of the West End Street Railway to the Boston Elevated Railway. As announced last week, the Boston Elevated Railway interests favor a bill which would provide for a fifty-year extension of the lease of the West End Street Railway, with the provision that leases of existing and prospective subways expire in 1936 with the probability of further extension for twenty-five years. Another section of the bill would provide for the construction of subways to Dorchester, the South Station, under Boylston Street, and an extension of the East Boston tunnel to the Charles River district of the West End Street Railway. The company takes the position that it cannot afford to bind its stockholders to meet the annual charges upon additional subways unless assured of a more permanent foothold in the community than is now the case. A protracted debate is anticipated when the measure comes up for consideration in the Senate. Senator Tinkham has filed substitute bills which would separate the question of West End Street Railway and Boston Elevated Railway relations from the subway acts and provide for the consolidation of the two companies with leases limited to twenty-five years.

The bill to give the Boston & Eastern Electric Railroad a certificate of exigency has been passed to a third reading in the Senate without dissent. Senator Schoonmaker has announced that the appearance of the bill at the engrossment stage will result in an attempt to amend it by a provision that the act shall become null unless within four months after its passage the company shall have subscribed in good faith to its capital stock not less than \$4,000,000, of which at least \$1,000,000 shall have been paid into the State treasury. From the latter amount, upon orders of the company certified by the railroad commission, the treasurer is to pay out such sums as may be demanded for the purchase of land and cost of construction, but not exceeding 50 per cent of such cost. At a recent committee session C. S. Mellen, president of the New York, New Haven & Hartford Railroad, announced that if the bill giving the company the right to purchase the Boston, Revere Beach & Lynn Railroad and to build a tunnel under Boston Harbor should pass the Boston, Revere Beach & Lynn Railroad would be electrified at the earliest possible date.

OHIO.

The Winters public utilities bill became a law on June 14 without the approval of Governor Harmon. Under the new law the Railroad Commission of Ohio will become the Public Service Commission of Ohio and electric railways and interurban railways will be subject to all the laws and rules governing steam railroads. The law becomes operative June 30, 1911. The bill places interurban railways in the same class as steam railroads. Upon the order of the commission a company may issue stocks, bonds, notes or other evidences of indebtedness, payable at periods of more than twelve months after date. The manner of hearing in cases of this kind is set out in full and the order issued by the commission must state clearly the kind of securities that may be issued, the term they are to run and the rate of interest.

Financial and Corporate

New York Stock and Money Markets

June 20, 1911.

On the New York Stock Exchange during the week the volume of sales decreased slightly, but price changes were few and unimportant. Heavy subscriptions to the \$30,000,000 Chinese government loan and the \$50,000,000 Panama Canal bond issue were important incidents of the week. The market to-day was dull, with a downward tendency. No marked change has occurred in the money market, and rates are still at the level of recent weeks. Quotations to-day were: Call 2@2½ per cent; ninety days, 2½@2¾ per cent.

Other Markets

In Philadelphia announcement of the first plans to rehabilitate the Philadelphia Rapid Transit properties caused interest in traction shares.

Prices declined slightly in Chicago to-day. Trading has been light throughout the week, accompanied by minor price changes.

The Boston market has been interested chiefly in the copper shares, with mild activity and varied prices the record of the week.

United Railways income bonds were in good demand on the Baltimore market to-day, with general trading quiet and prices but slightly changed.

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

	June 13.	June 20.
American Light & Traction Company (common).....	a295	a295
American Light & Traction Company (preferred).....	a107	a108
American Railways Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a43	a43
Aurora, Elgin & Chicago Railroad (preferred).....	a86	a88
Boston Elevated Railway.....	129½	129½
Boston Suburban Electric Companies (common).....	a15½	a16
Boston Suburban Electric Companies (preferred).....	a75	75
Boston & Worcester Electric Companies (common)...	9	10
Boston & Worcester Electric Companies (preferred)...	a51	a51
Brooklyn Rapid Transit Company.....	81½	80¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s... 86		85
Capital Traction Company, Washington.....	a129	127½
Chicago City Railway.....	a195	a195
Chicago & Oak Park Elevated Railroad (common)...	2	6
Chicago & Oak Park Elevated Railroad (preferred)...	6	6
Chicago Railways, pteptg., ctf. 1.....	a84	a84
Chicago Railways, pteptg., ctf. 2.....	a22	a22
Chicago Railways, pteptg., ctf. 3.....	a10	a9½
Chicago Railways, pteptg.....	a6	a5½
Cincinnati Street Railway.....	a133	*133
Cleveland Railway.....	a97½	a96
Columbus Railway (common).....	a96	96
Columbus Railway (preferred).....	a101	101
Consolidated Traction of New Jersey.....	a76	a76
Consolidated Traction of N. J., 5 per cent bonds.....	a105½	a105½
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a100	a100
Detroit United Railway.....	74	a74
General Electric Company.....	164	163¼
Georgia Railway & Electric Company (common).....	150	151
Georgia Railway & Electric Company (preferred).....	92	93
Interborough Metropolitan Company (common).....	19½	18½
Interborough Metropolitan Company (preferred).....	52	51¾
Interborough Metropolitan Company (4½s).....	79½	77¾
Kansas City Railway & Light Company (common)...	a19	a19
Kansas City Railway & Light Company (preferred)...	a44	a44
Manhattan Railway.....	a139½	137½
Massachusetts Electric Companies (common).....	a23½	a23
Massachusetts Electric Companies (preferred).....	a90¾	a92¾
Metropolitan West Side, Chicago (common).....	a26	a26¼
Metropolitan West Side, Chicago (preferred).....	a72½	a72
Metropolitan Street-Railway, New York.....	15	15
Milwaukee Electric Railway & Light (preferred)...	*110	*110
North American Company.....	75½	74½
Northern Ohio Light & Traction Company.....	48	*48
Northwestern Elevated Railroad (common).....	27½	a27¾
Northwestern Elevated Railroad (preferred).....	a69	a67
Philadelphia Company, Pittsburgh (common).....	56½	a56½
Philadelphia Company, Pittsburgh (preferred).....	43¾	a44½
Philadelphia Rapid Transit Company.....	19½	19½
Philadelphia Traction Company.....	86½	a87¼
Public Service Corporation, 5% col. notes (1913)....	101	101
Public Service Corporation, ctf.	a107	a107
Seattle Electric Company (common).....	a111	a111
Seattle Electric Company (preferred).....	a103	a103
South Side Elevated Railroad (Chicago).....	a77	77
Third Avenue Railroad, New York.....	10½	11
Toledo Railways & Light Company.....	8	8
Twin City Rapid Transit, Minneapolis (common).....	a109½	a108¼
Union Traction Company, Philadelphia.....	a9¼	a49½
United Rys. & Electric Company, Baltimore.....	*18¼	18¾
United Rys. Inv. Co. (common).....	41	37¾
United Rys. Inv. Co. (preferred).....	71	68½
Washington Ry. & Electric Company (common).....	35	35½
Washington Ry. & Electric Company (preferred).....	88¾	89¾
West End Street Railway, Boston (common).....	a91½	a90½
West End Street Railway, Boston (preferred).....	a104½	104
Westinghouse Elec. & Mfg. Co.....	76½	76
Westinghouse Elec. & Mfg. Co. (1st pref.).....	118¾	a118¼

a Asked. * Last sale.

ANNUAL REPORTS •

Northern Ohio Traction & Light Company

The income account for the last two years compares as follows:

Year Ended Dec. 31.	1909.	1910.
Gross earnings.....	\$2,177,641	\$2,437,426
Operating expenses and taxes.....	1,190,057	1,348,963
Net earnings.....	\$987,584	\$1,088,463
Interest on bonds and collateral trust notes.....	524,065	521,069
Available for company's uses.....	\$463,519	\$567,394
Dividends.....	157,500	225,000
Balance surplus for years ended Dec. 31.....	\$306,019	\$342,394
Surplus on Dec. 31, 1908 and 1909.....	782,941	947,166
Total surplus Dec. 31.....	\$1,088,960	\$1,289,560
Charged for depreciation, reconstruction, discount on bonds, etc.....	141,794	214,748
Balance surplus, Dec. 31.....	\$947,166	\$1,074,812
Average mileage in operation.....	214.88	215.20

Earnings and expenses in detail for the two years were as follows:

	1909.	1910.
Earnings.		
Passengers.....	\$1,875,334	\$2,080,136
Light and power.....	156,614	204,434
Car mileage.....	4,245	4,421
Freight, etc.....	58,596	67,422
Parks.....	69,746	70,309
Interest and discount.....	5,469	5,496
Miscellaneous.....	7,637	5,208
Total.....	\$2,177,641	\$2,437,426
Expenses.		
Maintenance way and structures.....	\$140,180	\$174,326
Maintenance equipment.....	173,221	212,238
Operating power plants.....	267,342	291,590
Conducting transportation.....	365,718	399,231
General.....	243,596	271,578
Total.....	\$1,190,057	\$1,348,963

H. A. Everett, the president, says in his report, in part:

"The total expenditure for additions and improvements for the year was \$309,779. During the year extensive repairs and renewals have been made on the various divisions of the company by way of reballasting, placing new ties and the laying of new rails. Twenty-eight thousand one hundred and thirty-three ties have been renewed. The tracks of the company are now in first-class condition in every particular.

"The rolling stock and electrical equipment of the company have been maintained in good, first-class operating condition. Twenty additional cars, including equipment, were placed in service during the fiscal year.

"The Canton car barns and shops were equipped with an automatic sprinkling system, and for the location of the new proposed carhouses and repair shops the company has purchased, in the city of Akron, eight acres of real estate favorably situated for this purpose.

"On April 1, 1910, your board of directors authorized the creation of a pension fund from the earnings, on a basis of 1/4 of 1 per cent, for the benefit of employees who have grown old in the service or become totally disabled in the performance of their duties, such employees to be retired on 40 per cent of their wages, based upon ten hours per day.

"The policy adopted by your company in charging from income account a substantial amount for depreciation has been continued, making a total to the credit of this fund Dec. 31, 1910, of \$400,000."

Washington Water Power Company

Results of operation in the year ended Dec. 31, 1910, were as follows:

Gross receipts.....	\$3,155,223
Expenses, including taxes.....	1,678,540
	\$1,476,683
Interest on bonds, less interest on work during construction.....	\$223,424
Premium on bonds exchanged and redeemed.....	4,947
Interest on loans.....	12,772
Profit and loss.....	2,367
Written off for depreciation of plant.....	314,400
	\$918,773
Dividends paid at the rate of 7 per cent, and an extra dividend of 1 per cent.....	708,231
	\$210,542
Surplus from 1909.....	860,499
Surplus Dec. 31, 1910.....	\$1,071,041

D. L. Huntington, the president, said in part:

"During 1910 the outstanding capital stock of the com-

pany was increased April 1, by the issue of 30 per cent at par, from \$7,223,200 to \$9,390,100, and a further issue of 25 per cent was taken Jan. 3, 1911, making the total amount now outstanding \$11,737,600. In anticipation of the stock issue of Jan. 3, 1911, the company borrowed in all \$775,000 toward the end of the year, which was paid off on Jan. 3.

"During 1910 \$42,000 of collateral trust bonds have been exchanged for first refunding mortgage bonds, leaving only \$245,000 of the former now outstanding. Also \$109,000 of first refunding mortgage bonds have been retired by operation of the sinking fund provision of the first refunding mortgage, leaving \$5,593,000 outstanding, of which \$400,000 are still in the treasury.

"The estimates of expenditures for 1911 have now been completed and the board of trustees has decided to make the next issue of stock on Jan. 2, 1912, to the extent of 20 per cent, and to allow prepayment thereof on Nov. 1 and Dec. 1 at a rate of interest to be determined later in the year.

"During the year we have relaid with 70-lb. steel rails, and paved between our rails, 11.09 miles of track. We have double-tracked 1.56 miles of road and extended our lines 7.9 miles. We have added ten passenger cars and one work car to our equipment. We have equipped our interurban railway lines with an automatic block signal system of the most modern and efficient type."

The following comparative statement regarding the railway system is published:

Years.	Miles of Track.	Passengers Carried.	Car Miles Run.	Car Hours Run.
1903	42	8,209,740	1,409,458	194,132
1904	50.39	9,208,058	1,745,790	239,190
1905	72.52	11,210,958	2,242,143	292,745
1906	82.94	13,915,570	2,914,502	378,263
1907	96.21	17,249,527	3,111,563	398,820
1908	97.55	19,520,942	3,393,479	420,836
1909	100.96	21,842,767	3,624,586	435,541
1910	108.92	24,730,145	3,990,653	465,516

These statistics cover the whole system excepting passengers carried, which are for city lines only.

The report says that the property of the company is carried on its books at actual cost, notwithstanding that there is a considerable increase in its market value.

In the balance sheet as of Dec. 31, 1910, the value of the street railway property, city and interurban, is stated as \$3,918,244.

Federal Utilities, Incorporated

Announcement has been made of the organization under the laws of Virginia of the Federal Utilities, Incorporated, with an authorized issue of \$3,000,000 of 6 per cent cumulative preferred stock and \$3,000,000 of common stock, of which \$1,000,000 of the former and \$2,000,000 of the latter have been issued. The company will acquire and sell the securities of public utilities and other corporations having established earnings.

The company will begin operations at once. There has already been paid into the treasury \$1,000,000. The capital stock will be invested in various dividend-paying securities of companies, chiefly public utilities.

The preferred stock has preference both as to principal and dividends. It is expected that the company's revenues will furnish funds sufficient to pay in full the 6 per cent dividend for 1911 on the \$1,000,000 preferred stock outstanding. In addition to the income and profits which will result from the ownership of securities, it is expected that the company will derive its largest profit from the sale of bonds, stocks, notes and other securities to bankers and other investors. Under its charter the company may issue its own bonds secured by the bonds of other companies as collateral.

The executive committee of the company follows: De Forest Condee, formerly of Lee, Higginson & Company; Anson W. Burchard, assistant to the president of the General Electric Company; Samuel McRoberts, vice-president of the National City Bank; Thomas A. Reynolds, of the National City Bank, and Harrison Williams, who is associated with the American Gas & Electric Company, the Federal Light & Traction Company and the Springfield Railway & Light Company. Mr. Condee is president of the new company.

Chicago (Ill.) Railways.—The local transportation committee of the City Council of Chicago has been empowered to appraise the lines of the Chicago Southern Traction Company within the city limits, preparatory to their purchase by the Chicago (Ill.) Railways. If the purchase is made the Chicago Railways will acquire all the properties of the Chicago Southern Traction Company within the city limits.

Danville Railway & Electric Company, Danville, Va.—Local capitalists at Danville are reported to have secured an option on the controlling interest in the Danville Railway & Electric Company, which is held by W. J. Payne, Richmond, Va., president, and J. F. Rison, Danville, vice-president.

Escanaba (Mich.) Traction Company.—Tweedy, Underwood & Edgar, Milwaukee, Wis., are offering for subscription \$150,000 of first and refunding mortgage 5 per cent gold bonds of the Escanaba Traction Company, dated Aug. 12, 1909, and due \$10,000 annually from 1914 to 1933, inclusive. The balance of the issue, of which the total authorized is \$600,000, is due in 1934, but the bonds which remain outstanding are callable at 103 and interest upon any interest date. The Michigan Trust Company, Grays Harbor, Mich., is the trustee of the mortgage.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has made a mortgage to the Guaranty Trust Company, New York, N. Y., as trustee, to secure an issue of \$1,250,000 of first mortgage 5 per cent fifty-year gold bonds dated Feb. 1, 1911, and due in 1961, but subject to call on any interest date at 105 and interest. Of the new bonds \$62,500 are reserved to retire bonds of the same amount due Jan. 1, 1961, issued under a mortgage of Oct. 1, 1910, and \$98,000 for other indebtedness. The remaining \$1,089,500 of bonds will be issued on account of the construction of 33 miles of railroad from Fresno, Cal., to Kingsburg and Sanger at \$33,000 per mile.

Interstate Railways, Philadelphia, Pa.—An initial semi-annual dividend of 3 per cent has been declared on the \$1,000,000 of new 6 per cent cumulative preferred stock of the Interstate Railways, payable on July 5, 1911, to holders of record on June 20, 1911.

Jacksonville (Fla.) Traction Company.—Stone & Webster, Boston, Mass., and Estabrook & Company, Boston, Mass., and Chicago, Ill., offer for subscription at 96½ and interest to yield more than 5¼ per cent, \$750,000 of first consolidated mortgage 5 per cent gold bonds of the Jacksonville Traction Company, dated March 1, 1911, and due March 1, 1931, but callable as a whole or in part for the sinking fund at 105 and interest. Interest is payable in May and September at the office of the State Street Trust Company, Boston, Mass., trustee of the issue.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe in the United States Circuit Court has adjourned the sale of the property of the Metropolitan Street Railway under foreclosure from June 22, 1911, to Sept. 21, 1911. W. L. Turner, special master in the suit of the Pennsylvania Steel Company and the Degnon Contracting Company against the New York City Railway, has filed his report in the United States Circuit Court in the matter of Charles Brenner and others as a committee of the tort creditors of the New York City Railway. After reviewing the testimony taken before him, Mr. Turner said that the lease made by the Metropolitan Street Railway on Feb. 14, 1902, to the Interurban Street Railway, now the New York City Railway, should be decided to have been no longer in effect after the appointment of receivers by the court on Sept. 24, 1907; that from the latter date to July 31, 1908, Adrian H. Joline and Douglas Robinson were acting in a dual capacity as receivers of the Metropolitan Street Railway and the New York City Railway. He further finds that without prejudice to the rights of any creditor of the New York City Railway to claim preference therein over the Metropolitan Street Railway or any of its creditors, secured or unsecured, the receipts of the receivers between these dates are to be credited to the Metropolitan Street Railway; that such moneys, materials, supplies or other property as belonged to the New York City Railway on Sept. 24, 1907, and were not subject to the lease

made by the Metropolitan Street Railway to the Interurban Street Railway, and all proceeds, earnings, rents and profits that were not subject to this lease should be credited to the receiver of the New York City Railway. The special master holds that Receivers Joline and Robinson at no time adopted this lease in respect to the property of the New York City Railway. The Farmers' Loan & Trust Company, successor of the Morton Trust Company, as trustee under the mortgage made by the Metropolitan Street Railway in March, 1902, to the New York City Railway, has filed in the United States Circuit Court exceptions to Special Master Turner's report.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—H. M. Byllesby & Company, Chicago, Ill., are reported to have secured control of the Pueblo & Suburban Traction & Lighting Company through the purchase of the holdings of M. D. Thatcher, T. H. Devine and J. F. Vail.

Schuylkill & Dauphin Traction Company, Pottsville, Pa.—A meeting of the stockholders of the Schuylkill & Dauphin Traction Company has been called for July 29, 1911, to authorize an increase in the bonded indebtedness of the company from \$62,880 to \$67,880.

Springfield Railway & Light Company, Springfield, Mo.—The Springfield Railway & Light Company has sold an issue of \$2,000,000 of first lien fifteen year 5 per cent sinking fund gold bonds to Lee, Higginson & Company, Boston, Mass. The bonds are part of an authorized issue of \$7,000,000, of which the balance of \$5,000,000 is reserved for additions and improvements. The bonds are substantially a first lien on the entire property of the system, being secured by a first mortgage on all capital stock, mortgage bonds and notes of the two subsidiary companies, with the exception of certain non-callable bonds. The bankers are offering the issue at 96 and interest to yield 5.40 per cent.

Susquehanna Railway, Light & Power Company, New York, N. Y.—An initial dividend of 1 per cent has been declared on the \$4,134,500 of common stock of the Susquehanna Railway, Light & Power Company, payable on July 1, 1911, to holders of record on June 15, 1911.

Titusville (Pa.) Electric Traction Company.—The stockholders and directors of the Titusville Electric Traction Company have authorized an increase in the bonded indebtedness of the company from \$300,000 to \$1,250,000, to provide for constructing and equipping 34 miles of line. The proceeds will be used specifically to extend the present line of the company northward to Cambridge Springs, Crawford County, Pa., about 17 miles from the present terminal, and for an extension southward to Oil City, Venango County, Pa., about 17 miles from Titusville.

Toronto (Ont.) Suburban Street Railway.—Announcement has been made that the Toronto Suburban Railway has been purchased by Sir William MacKenzie, president of the Toronto Railway.

Virginia Railway & Power Company, Richmond, Va.—A special meeting of the stockholders of the Virginia Railway & Power Company has been called for June 24, 1911, to vote on the agreement entered into between the directors of the company and the directors of the Norfolk & Portsmouth Traction Company to merge the companies in accordance with the terms which were given in the ELECTRIC RAILWAY JOURNAL of May 27, 1911, page 930.

Dividends Declared

American Cities Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred; 2½ per cent, common.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¾ per cent.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

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

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Columbus (Ga.) Electric Company, 3 per cent, preferred.

Frankford & Southwalk Passenger Railway, Philadelphia, Pa., quarterly, \$4.50.

Traffic and Transportation

New Jersey Employers' Liability Act

A formal notice has been sent to each employee of Public Service Railway, Public Service Gas Company, Public Service Electric Company and Public Service Corporation of New Jersey, Newark, N. J., directing attention to the provisions of the Employers' Liability and Workmen's Compensation act, which becomes effective in New Jersey on July 4, 1911. Duplicates of this notice, which is appended, printed on cardboard and enlarged, have been posted in all the carhouses, shops, terminals and other places so as to be conspicuous and attract the attention of employees. The welfare committee, of which John J. Burleigh, second vice-president of the Public Service Corporation, is chairman, is arranging for a series of meetings of employees at which the purpose and probable effects of the act will be clearly set forth so that all may understand its provisions. The notice to the employees follows:

"The Legislature of the State of New Jersey during its latest session passed an act entitled 'an act prescribing the liability of an employer to make compensation for injuries received by an employee in the course of employment, establishing an elective schedule of compensation, and regulating procedure for the determination of liability and compensation thereunder' (Chapter 95, New Jersey Laws, 1911), which act goes into effect on July 4, 1911.

"The law provides for an elective system of compensation to be paid by the employer to an employee injured in the course of his employment, irrespective of the negligence of the employer.

"Public Service Corporation of New Jersey, Public Service Railway, Public Service Gas Company and Public Service Electric Company, being desirous of co-operating with public sentiment to which the Legislature has given expression, and believing that their employees will be benefited thereby, are willing, notwithstanding the increased expense of so doing, to enter into agreements with their respective employees for the acceptance of the provisions of Section 2 of said act. The companies, therefore, desire an expression of opinion from their respective employees as to their acceptance or rejection of the act, and to facilitate the same will shortly give to each employee an opportunity for such acceptance or rejection in writing.

"As it is desirable that employees should be familiar with the provisions of the act before signing an acceptance of Section 2 thereof, copies of the law may be had on application to the foreman or superintendent of the various carhouses, shops or stations.

"Any employee receiving compensation under this act on account of injuries arising from accidents will not be entitled, on account of such injuries, to compensation under the welfare plan now in force."

Accident Prevention Campaign in Kansas City

The Metropolitan Street Railway, Kansas City, Mo., has prepared a general plan for conducting its campaign to make street car ethics a feature of instruction in the public schools of that city. When the subject was first taken up by the company the idea was to confine the presentation to such information as would help to prevent accidents, but it was decided by H. P. Crouse, special agent to the president, that other things might properly and profitably be added. The plan is to discuss on slips printed for distribution to the pupils as often as once a week, or perhaps twice a month, the special subjects selected with the hope that after the children have read them they will take the slips home to their parents. The distribution of the printed slips will be supplemented by chapel talks once a month on the same subjects treated more liberally.

Among the subjects selected for the printed slips are the following: Getting off and on cars safely; perils to avoid; in the case of an accident, the disposal of the crowd; the conductor's duty; the passenger's duty; the right to a seat; delays in the service—what they mean; private conduct on the car; good rules for children; the dog, the suitcase and the bundle; the public interest in a low cost of

ELECTRIC RAILWAY MONTHLY EARNINGS

BROCKTON & PLYMOUTH STREET RAILWAY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	April, '11	\$8,277	\$6,660	\$1,617	\$1,561	\$55
1 "	" '10	8,744	6,581	2,163	1,807	356
12 "	" '11	119,600	85,449	36,152	19,243	16,909
12 "	" '10	129,792	93,677	36,115	20,872	15,243
CAPE BRETON ELECTRIC COMPANY.						
1m.,	April, '11	\$23,332	\$13,328	\$11,003	\$6,137	\$4,876
1 "	" '10	24,897	13,493	11,404	6,161	5,244
12 "	" '11	327,303	169,856	157,447	73,729	83,719
12 "	" '10	302,472	169,902	132,570	74,083	58,487
DALLAS ELECTRIC CORPORATION.						
1m.,	April, '11	\$125,387	\$83,119	\$42,269	\$27,797	\$14,472
1 "	" '10	113,406	74,510	38,896	26,599	12,297
12 "	" '11	1,527,202	968,529	558,674	313,158	245,517
12 "	" '10	1,371,826	877,527	494,299	328,226	166,074
GALVESTON ELECTRIC COMPANY.						
1m.,	April, '11	\$34,622	\$17,349	\$17,274	\$8,543	\$8,730
1 "	" '10	26,145	18,273	7,872	6,446	1,427
12 "	" '11	385,904	216,932	168,972	95,560	73,413
12 "	" '10	367,600	228,510	139,091	76,765	62,325
HOUGHTON COUNTY TRACTION COMPANY.						
1m.,	April, '11	\$25,509	\$12,810	\$12,699	\$6,491	\$6,208
1 "	" '10	24,248	13,479	10,769	6,317	4,453
12 "	" '11	306,123	166,126	139,997	78,372	61,626
12 "	" '10	322,125	167,617	154,508	76,008	78,450
NORTHERN TEXAS ELECTRIC COMPANY & SUBSIDIARY CO.						
1m.,	April, '11	\$126,681	\$67,123	\$59,558	\$25,354	\$34,204
1 "	" '10	111,280	61,001	50,278	19,081	31,198
12 "	" '11	1,506,633	795,449	711,184	261,193	449,992
12 "	" '10	1,319,993	714,952	605,040	209,711	395,329
PADUCAH TRACTION & LIGHT COMPANY & SUBSIDIARY CO.						
1m.,	April, '11	\$21,452	\$12,395	\$9,057	\$7,723	\$1,334
1 "	" '10	20,389	12,342	8,047	7,047	1,000
12 "	" '11	253,931	140,005	113,927	89,280	24,647
12 "	" '10	234,796	140,899	93,897	81,694	12,203
SAVANNAH ELECTRIC COMPANY.						
1m.,	April, '11	\$55,395	\$36,928	\$18,468	\$18,450	\$19
1 "	" '10	50,651	32,740	17,910	17,901	9
12 "	" '11	651,331	432,691	218,640	217,532	1,108
12 "	" '10	608,256	395,066	213,190	211,134	2,056
SEATTLE ELECTRIC COMPANY & SUBSIDIARY COMPANIES.						
1m.,	April, '11	\$452,178	\$257,695	\$194,483	\$115,501	\$78,982
1 "	" '10	460,490	273,266	187,225	108,709	78,516
12 "	" '11	5,585,558	3,139,671	2,445,887	1,319,891	1,125,996
12 "	" '10	6,049,682	3,515,783	2,533,899	1,278,810	1,255,089
TAMPA ELECTRIC COMPANY.						
1m.,	April, '11	\$55,309	\$28,765	\$26,544	\$6,996	\$19,648
1 "	" '10	48,263	31,209	17,154	4,590	12,564
12 "	" '11	603,567	325,130	278,437	71,866	206,571
12 "	" '10	609,325	346,822	262,503	55,700	206,803

service; offensive habits in the car; individual rights on the car; how everybody can help to make the service good; integrity in the car; good nature in the car; patience and toleration in the car; the rules of the service; principle of the universal transfer; abuse of the universal transfer; humanity on the car; gentility on the car; the motorman's responsibility; important facts in creating good service; some frequent hindrances; maintenance of sanitary conditions; some interesting cost items; conditions governing frequency of service; what a big street car service means.

This list may be amplified from time to time, as subjects are suggested by experience.

Car Signs in New Haven.—The Connecticut Company has had new dasher signs prepared for use on its cars in New Haven so as to aid passengers to distinguish quickly the routes traversed by the cars.

Fewer Stops in Worcester.—The Worcester (Mass.) Consolidated Railway is endeavoring to improve the running time of its cars by eliminating all such special stopping places designated by poles painted white as are not likely seriously to inconvenience its patrons.

Toledo Trolley Trips.—The Toledo Railways & Light Company, Toledo, Ohio, has issued, with the title "Toledo Trolley Trips," an illustrated folder which gives all the information that the traveler by trolley could desire about places of interest on the lines of the Toledo Railways & Light Company and the Toledo & Western Railroad.

Service Between Los Angeles and Huntington Park.—The Pacific Electric Railway, Los Angeles, Cal., contemplates making important improvements in the near future in its service to Huntington Park. J. McMillan, general manager of the company, has stated that the fare between Huntington Park and Los Angeles will be reduced to 5 cents.

Prizes Awarded for Name for Los Angeles Trolley Trips.—The Pacific Electric Railway, Los Angeles, Cal., has awarded the first prize, \$20, in the contest for the name of its new trolley trip along the south coast for the name "Triangle Trolley Trip." The second prize, \$10, was awarded for the name "South Beach Trolley Trip." An additional prize of \$10 was awarded for a design for the trolley trip.

Articles No Longer to Be Carried by Utica & Mohawk Valley Railway.—On July 20, 1911, the Utica & Mohawk Valley Railway, Utica, N. Y., will add the following to the list of articles which will no longer be accepted by the company for transportation: Benzine, carbon oil, coal oil, cordage oil, gasoline, naphtha, neutral oil, petrolatum oil (illuminating or burning), and residuum; also empty barrels or carriers which have contained any of the above articles.

Report on Traffic in Jersey City.—The commission appointed some time ago by Mayor Wittpenn, of Jersey City, N. J., to consider plans for relieving traffic conditions in various parts of the city has submitted to the Mayor a plan by which it is hoped to relieve congestion in lower Jersey City and at the same time provide the facilities frequently urged by the merchants of the Newark Avenue shopping district. The Public Service Railway is willing to reroute its lines, but has stated that it cannot consider the construction of any extensions under the existing twenty-year franchise.

Conference with Employees in Philadelphia.—T. E. Mitten, acting chairman of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, conferred on June 16, 1911, with the representatives of the employees in regard to the wages of motormen and conductors. Mr. Mitten said that other meetings would be held, but that until the conferences were concluded no statements in regard to them would be made public. The relations of the company with its employees were summarized in the statement made by Mr. Mitten following his election to the company. This statement was published in full in the ELECTRIC RAILWAY JOURNAL of June 10, 1911, page 1033.

Service in Jacksonville.—The joint committee composed of members of the City Council and prominent citizens of Jacksonville, Fla., which was appointed some months ago to

take up with the Jacksonville Electric Company the question of extensions, improvements and service in Jacksonville, presented its report to the City Council on June 6, 1911. The report was read and then a motion was carried to have 300 copies of the report printed in pamphlet form and to insert the report in the daily papers. A statement by the Jacksonville Electric Company to the committee was published in part in the ELECTRIC RAILWAY JOURNAL of March 25, 1911, page 531. It contained a tabulation presented by the company to show that the new work of the company for 1911 would call for the expenditure of \$824,412.

Mayor of Kansas City Vetoes Ordinance to Permit Smoking.—Mayor Brown, of Kansas City, Mo., has vetoed the ordinance to permit smoking on the cars of the Metropolitan Street Railway in Kansas City. He said, in part, in vetoing the measure: "One of the fundamental principles underlying our popular form of government is that the functions of government should be exercised in such a manner as to bring about the greatest good to the greatest number. When a man, woman or child enters a street car the company contracts to transport the passenger to his or her destination with the greatest expedition and with due regard to the safety, health, comfort and convenience of the passenger. It would not, therefore, in my opinion, be doing the greatest good to the greatest number to enact a law which would compel the operators of public conveyances to permit a few to indulge in a habit or do a thing which would be a source of discomfort, annoyance and injury to health to the majority of those riding upon such public conveyance."

Through Service Between Sycamore and Marengo.—The Woodstock and Sycamore Traction Company, which has been operating between Sycamore and Genoa, Ill., a distance of 8 miles, began operating through cars on Saturday, June 10, between Sycamore and Marengo, a total distance of 23 miles. The company is running two McKeen motor cars on a three-hour schedule. The time between terminals, including all stops, is 65 minutes. On the opening day more than 200 passengers were carried at a time on several trips, the cars maintaining the schedule. The Sycamore station is near the terminal of the DeKalb-Sycamore & Interurban Traction Company. The terminal at Marengo is near the station of the Elgin-Belvidere Electric Company. The line of the Woodstock & Sycamore Traction Company touches five steam railroads and operates through a rich farming community. It will be extended to Woodstock and eventually will reach Waukegan and the lake region west of that city. The road is built on private right-of-way in the country, but the tracks occupy the streets in cities. The company will handle freight and express.

Fares on Albany Southern Railroad.—The Albany Southern Railroad, Hudson, N. Y., has filed with the Public Service Commission of the Second District of New York the following statement in regard to fares in Hudson: Local fares in Hudson (route: starting at New York Central & Hudson River Railroad over South Front, Warren, North Seventh and Columbia Streets to Cemetery, or to Boston & Albany bridge on Farmers' Turnpike). Round-trip fare: During May, June, July, August and September only (excepting Decoration Day, Independence Day and Labor Day) each year, from any starting point, one continuous trip over the entire Hudson City Railway trackage and back to original starting point, 5 cents; children under five years of age, when accompanied by parent or guardian, free, but not more than three children will be transported free with one person paying fare; children over five years of age, adult fare. Commutation tickets: Books containing 25 coupons, each good for transportation one way between any two points, \$1 per book. School commutation tickets: Books containing thirty-three coupons, each good for one single trip between any two points (for use of students regularly attending any public school), will be sold for \$1 per book. Chartered car rates: Single-truck open or closed cars for one way or round trip between any two points, between 6 a. m. and 11 p. m., \$5; between 11 p. m. and 6 a. m., \$3; new fares and rates. Effective July 12, 1911.

Personal Mention

Mr. Samuel J. Taylor has resigned as secretary of the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway.

Mr. De Forest Candee, formerly with Lee, Higginson & Company, Boston, Mass., has been elected president of the Federal Utilities, Incorporated, the organization of which is noted elsewhere in this issue.

Mr. S. D. Camden has been elected president of the Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., to succeed Mr. C. H. Shattuck, deceased. Mr. Camden was formerly treasurer of the company.

Mr. C. E. Lenhart, superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa., has tendered his resignation to take effect July 15, 1911. Mr. Lenhart has not at this time fully decided on his future plans.

Mr. H. E. Prior has resigned from the electrical department of the Illinois Traction System, Peoria, Ill., to become connected with the electrical department of the Cleveland, Painesville & Eastern Traction Company, Willoughby, Ohio.

Mr. Charles F. Pleming, secretary to Mr. C. H. Harvey, president of the Knoxville Railway & Light Company, Knoxville, Tenn., has been appointed manager of Chilhowee Park, near Knoxville, which is operated by the company. Mr. Pleming succeeds Eugene R. Roberts, who died recently. He will retain his present position in addition to managing the park.

Mr. W. F. Kelly, whose resignation as general manager of the Oakland (Cal.) Traction Company and the San Francisco, Oakland & San José Consolidated Railway was announced in the *ELECTRIC RAILWAY JOURNAL* of May 6, 1911, has been elected vice-president and general manager of the People's Water Company, San Francisco, Cal., of which Mr. Frank C. Havens is president.

Mr. David S. Bachman, superintendent of the Schuylkill & Dauphin Traction Company, Williamstown, Pa., has been appointed freight and traffic manager of the Midland Pennsylvania Railroad, but will retain the office of freight and traffic manager of the Schuylkill & Dauphin Traction Company. Mr. Edgar D. Rank will hereafter act as secretary, treasurer and superintendent of the Schuylkill & Dauphin Traction Company.

Mr. S. W. Greenland, who was appointed purchasing agent of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., recently, has also been appointed assistant general manager of the company in charge of the light and power department, to succeed Mr. M. J. Kehoe, whose resignation from the company to become connected with the Ft. Wayne Oil & Supply Company was noted in the *ELECTRIC RAILWAY JOURNAL* of June 17, 1911.

Mr. J. F. Harmer was elected president of the New England Security & Investment Company, Springfield, Mass., on June 19, 1911, to succeed Mr. L. S. Storrs, who it is reported will be elected a vice-president of the Connecticut Company and the Rhode Island Company, of which Mr. C. S. Mellen, president of the New York, New Haven & Hartford Railroad, is president. Mr. Harmer was also elected a trustee of the New England Security & Investment Company. He was formerly comptroller of the company.

Mr. J. J. Caulfield, who has been appointed superintendent of the lines of the Twin City Rapid Transit Company in St. Paul to succeed Mr. J. S. Pevear, has been connected with the Twin City Rapid Transit Company for more than three years. He was graduated from Cornell, and prior to entering the service of the Twin City Rapid Transit Company he was for some years with the commercial department of the General Electric Company. Mr. Caulfield was assistant to Mr. Willard J. Hield, vice-president and general manager of the Twin City Rapid Transit Company, before being appointed to succeed Mr. Pevear.

Mr. J. A. Trawick, whose appointment as manager of the Mississippi River Power Company, Keokuk, Ia., was an-

nounced in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, was tendered a banquet by the heads of the departments of the Tampa (Fla.) Electric Company, of which he was general manager, when he formally retired from the company. Mr. Trawick was presented with a loving cup by the employees as a token of esteem. The company with which Mr. Trawick has become connected is constructing a dam across the Mississippi River between Keokuk, Ia., and Hamilton, Ill., and will construct a large hydroelectric plant.

Mr. Charles F. Scott has been appointed professor of electrical engineering at Sheffield Scientific School by the Yale Corporation. Mr. Scott was president of the American Institute of Electrical Engineers in 1902-03 and has long been identified with the Westinghouse Electric & Manufacturing Company. His connection in recent years with that company has been of an advisory nature, and he has had the title of consulting engineer. Mr. Scott was graduated from Ohio State University in 1885 and afterward attended Johns Hopkins University. He has always shown a particular adaptability for educational work, and has been closely identified with the apprenticeship work at the Westinghouse Company, as well as that of the Casino School, which is run under the auspices of the company. He is therefore particularly well fitted for his new duties, upon which he will engage at the beginning of the fall term, Sept. 28, 1911.

Mr. D. F. Sherman, whose election as a vice-president of the Rhode Island Company, Providence, R. I., in charge of operation was noted in the *ELECTRIC RAILWAY JOURNAL* of June 17, 1911, succeeds Mr. H. A. Fabian, now manager of purchases and supplies for all of the lines operated or controlled by the New York, New Haven & Hartford Railroad, including the Boston & Maine Railroad, Maine Central Railroad and New England Navigation Company. Mr. E. G. Buckland's jurisdiction in regard to the Rhode Island Company, of which he is a vice-president, has not been changed. Mr. Buckland is a vice-president of the New York, New Haven & Hartford Railroad, a vice-president of the Connecticut Company and a vice-president of the New England Navigation Company, operating the Long Island Sound lines of the New York, New Haven & Hartford Railroad. Mr. Buckland, however, has not operated the property in Rhode Island since 1907. At that time the New York, New Haven & Hartford Railroad established an office at Washington in charge of Mr. Buckland and he relinquished the operation of the Rhode Island Company to Mr. H. A. Fabian.

OBITUARY

W. R. Brixey, of the Kerite Insulated Wire & Cable Company, New York, N. Y., died at his home in Norfolk, Conn., on June 9, 1911. Mr. Brixey was born in Southampton, Eng., in 1851.

Clarence A. Knight, president Chicago & Oak Park Elevated Railway, Chicago, Ill., died on June 21, 1911, following an operation for appendicitis. Mr. Knight was born at McHenry, Ill., on Oct. 28, 1850.

Mr. E. M. Kenly, vice-president, general manager and chief engineer of the Yakima Valley Transportation Company, North Yakima, Wash., died on June 10, 1911. Mr. Kenly was an associate member of the American Society of Civil Engineers.

Charles Allen Bodwell died on June 6, 1911, at Sanford, Maine, aged fifty-three years. He was one of the promoters of the Mousam River Electric Railroad, which became the nucleus for the present Atlantic Shore Electric Railroad, and was superintendent of the company from 1894 to 1903.

Capt. James W. Hinkley, Jr., president of the Poughkeepsie & Wappinger's Falls Electric Railway, Poughkeepsie, N. Y., died on June 19, 1911, at the home of his mother in Poughkeepsie. Capt. Hinkley was forty years old. He was graduated at West Point, and was for two years an instructor in mathematics at the United States Military Academy. He retired from the army in 1904. Capt. Hinkley was second vice-president of the Street Railway Association of the State of New York, and from 1908 to 1910 was a member of the executive committee of that organization.

Construction News

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

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

RECENT INCORPORATIONS

***Mt. Carmel Railroad, Hamden, Conn.**—Application for a charter has been made in Connecticut by this company to build an electric railway from Hamden to Mt. Carmel. Capital stock, \$50,000. Incorporators: Willis M. Cook and Charles F. Clarke.

***Boise-Council-Ladrona Railway, Lewiston, Idaho.**—Application for a charter has been made in Idaho by this company to construct an electric railway from Council, through Adams County and the Seven Devils section. Preliminary surveys have been completed. Capital stock, \$2,000,000. Incorporators: E. W. Rowman, C. M. Hail, D. S. Manville, Harry C. Wyman and George H. Bener.

St. Louis, Arcadia & Jefferson City Railway, St. Louis, Mo.—Chartered in Missouri to build a 15-mile interurban railway between Russell Place, St. Louis, and Fenton, Mo. Capital stock, \$250,000. Officers: E. F. Kinney, St. Louis, president; Charles F. Vogel, St. Louis, vice-president; T. G. Portis, St. Louis, secretary and treasurer. [E. R. J., April 15, 1911.]

Masontown-Morgantown Street Railway, Uniontown, Pa.—Application for a charter has been made by this company in Pennsylvania to build a 4-mile electric railway between Masontown and New Geneva. It will connect at Masontown with the West Penn Railway and will be operated as an extension of that line. Incorporators: Byron Trimble, C. W. Scheck, A. Dubois, Charles C. McBridge and W. F. Craig.

Wenatchee (Wash.) Traction Company.—Incorporated in Washington to build an electric railway in Wenatchee. Capital stock, \$250,000. Incorporators: Louis W. Pratt, president; J. R. Askew, W. M. Harvey, Henry Hewitt, Jr., and A. A. Hilton. [E. R. J., April 29, 1911.]

***Charleston-Dunbar Traction Company, Charleston, W. Va.**—Chartered in West Virginia to build an electric railway from Charleston to Dunbar. Capital stock, \$150,000. Incorporators: Fred Paul Grosscup, Paul B. Grosscup, W. C. Davisson, J. Gluck and H. D. Rummell, all of Charleston, W. Va.

***Mount Morris-Morgantown Traction Company, Morgantown, W. Va.**—Application for a charter will be made by this company in West Virginia to build an electric railway between Mount Morris, Madsville, Jimtown and Morgantown. Work has been begun on the preliminary survey. It will connect with the Morgantown & Dunkard Valley Railway at Madsville. Capital stock, \$12,000. Incorporators: W. K. Hatfield, Thomas Keena, John Long, Rufus Lazzelle and P. Bowley.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company has received a franchise from the City Commissioners to extend its lines along Montgomery Street as far as McDonough Street in Montgomery.

Fowler, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has asked the Council for a franchise to build its tracks through Fowler.

Haywards, Cal.—I. B. Parsons has received a thirty-year franchise for an electric railway over certain streets in Haywards. [E. R. J., Mar. 25, '11.]

Woodland, Cal.—The Vallejo & Northern Railway has asked the City Trustees for a franchise to build its tracks through the main street of Woodland. T. T. C. Gregory, Suisun, president. [E. R. J., Apr. 1, '11.]

La Junta, Col.—The Pueblo & Suburban Traction & Lighting Company has asked the County Commissioners for a franchise to extend its line down the valley to La Junta.

Daytona, Fla.—R. S. Parks, New York, and associates will ask the Council for a franchise for an electric railway between Daytona and DeLand.

Yorkville, Ill.—The Yorkville & Morris Electric Railway has received a franchise in Yorkville.

Athol, Mass.—The Athol & Orange Street Railway has asked the Board of Trustees for a franchise to make extensive alterations, extensions and changes in the location of its railway near the Peoquoig House in Athol.

Springfield, Mass.—The Springfield Street Railway will ask the City Council for a franchise to extend along the south side of Mill River and on Dickinson Street.

Oneida, N. Y.—The Oneida Railway has asked the Common Council for a franchise to extend its line in Oneida on Madison Street.

Schenectady, N. Y.—The Schenectady Railway has asked the Board of Aldermen for franchises to extend several of its lines in Schenectady.

Brantford, Ont.—The Lake Erie & Northern Railway has received a franchise through Brantford. This line will connect Port Dover, Brantford, Simcoe, Waterford and Paris. W. P. Kellett, Brantford, general manager. [E. R. J., Apr. 1, '11.]

Lebanon, Pa.—The Ephrata & Lebanon Street Railway has received a franchise from the Common Council to build its tracks on Walnut, Ninth and Cumberland Streets in Lebanon. [E. R. J., Jun. 17, '11.]

Millcreek, Pa.—The Erie & Suburban Railway, Erie, has received a franchise from the Board of Supervisors to build its tracks on the east side of Millcreek. This line will connect Millcreek and Harborcreek. W. F. Burgess is interested. [E. R. J., Mar. 18, '11.]

New Castle, Pa.—The Beaver Falls, Koppel & New Castle Street Railway has received a twenty-five-year franchise in New Castle.

Washington, Pa.—A. Baughman, representing the West Penn Railways, Pittsburgh, has asked the City Council for a franchise in Washington.

Ft. Worth, Tex.—The Texas Traction Company has been granted a franchise by the County Commissioners for an extension of the Summit Avenue line about a mile to the site of the Texas Christian University.

Waxahachie, Tex.—Stone & Webster, Dallas, representing the Dallas-Waxahachie Interurban Railway, have received a fifty-year franchise through Waxahachie. [E. R. J., Jun. 17, '11.]

Richmond, Va.—The Virginia Railway & Power Company has asked the Council for a franchise to extend its line into the annex west of the boulevard.

***Leavenworth, Wash.**—L. W. Pratt, J. B. Askew and W. M. Harvey have applied for a franchise for an electric railway in Leavenworth.

Wellsburg, W. Va.—The Steubenville, Wellsburg & Weirton Railway, Charleston, will ask the County Commissioners for a franchise from the east end of the Steubenville bridge to the Hancock County line. Albert G. Lee is interested. [E. R. J., 18, '11.]

TRACK AND ROADWAY

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—This company will spend \$200,000 on improvements of its lines. The Garrison Avenue line and the Little Rock line will be rebuilt with 80-lb. rails.

***Vancouver, B. C.**—Plans are being considered by the Board of Trade to build a 14-mile electric railway from Vancouver to Ladner. The carrying out of this project will include the building of a bridge across the north arm of the Fraser River.

Glendale & Eagle Rock Railway, Los Angeles, Cal.—Plans are being made by this company to build a line from its present western terminus, at Fourth Street and Brand Boulevard, through the Valley View tract, across the Los Angeles River into Griffith Park.

Los Angeles & San Fernando Electric Railway, Los Angeles, Cal.—This company advises that it has begun the construction of its 6-mile electric railway between San Fernando and Los Angeles. Capital stock authorized, \$25,000; capital stock issued, \$25,000. The company's power house will be located at San Fernando. L. C. Brand, Title, Guarantee & Trust Company, Los Angeles, president,

and J. W. Reagan, Central Building, Los Angeles, chief engineer. [E. R. J., June 3, '11.]

Petaluma & Santa Rosa Railway, Petaluma, Cal.—This company is arranging to finance an extension from Petaluma southward to the bay, with terminal at McNear's Point. The extension will be 25 miles long and the bay haul 13 miles.

Grand Junction & Grand River Valley Railway, Colorado Springs, Col.—Right-of-way has been secured by this company, and construction will be begun at once to build an extension from Grand Junction to Clifton. Later this line will be extended to Palisades.

Washington Railway & Light Company, Washington, D. C.—Plans are being considered by this company for a double-track line between Anacostia and Congress Heights.

***Lake Weir, Ocala & Silver Springs Suburban Railroad, Ocala, Fla.**—This company has just been organized to build an electric railway between Lake Weir, Ocala and Silver Springs. Capital stock \$500,000. Officers: D. S. Woodrow, president; E. W. Davis, secretary and treasurer, and H. A. Kramer, general manager.

Citrus Southern Electric Railway, Orlando, Fla.—This company advises that it has not awarded contracts to date and that it is finishing the preliminary work and will begin the construction of its 50-mile line in the fall. It will connect Sanford, Lake Mary, Longwood, Altamonte, Springs, Maitland, Winter Park, Orlando, Conway, Taft, Kissimmee, St. Cloud and East Lake. Gasoline-electric cars will be operated. Capital stock authorized, \$500,000. Officers: T. K. Miller, Orlando, president; J. J. Brophy, vice-president; J. M. McCue, secretary; M. Kelly, treasurer, and G. E. Ramsey, Orlando, engineer in charge. [E. R. J., Jun. 17, '11.]

Freeport Railway & Light Company, Freeport, Ill.—During this month this company will rebuild its track, with 80-lb. rails, between Taylor's Park, in East Freeport, and Whistler Street, in Freeport.

Kokomo Western Traction Company, Kokomo, Ind.—This company advises that it expects to begin to build its 18½-mile electric railway about July 1 to connect Kokomo, Burlington and Young America. Negotiations are now under way for the purchase of bonds by two concerns. The company's power house and repair shops will be located at Kokomo. Bonds authorized, \$325,000. Officers: C. C. McFann, Kokomo, president and general manager. [E. R. J., April 9, 1910.]

South Bend & Logansport Traction Company, South Bend, Ind.—S. S. Perley, of this company, denies a rumor that it has sold out to the Vandalia Railroad. This line will be finished shortly and will eventually extend to Logansport, where connections will be made with the Indiana Union Traction Company, thus making a short-line route between Indianapolis and South Bend.

Davenport-Muscatine Railway, Davenport, Ia.—Yale & Regan Company, Chicago, has been awarded the contract by this company for grading the right-of-way from Davenport to Muscatine. [E. R. J., June 17, 1911.]

Des Moines (Ia.) City Railway.—During the next few weeks this company will award contracts to build new track and special work.

Louisville (Ky.) Railway.—Practical agreement has been reached between the Louisville Railway, the Kentucky & Indiana Terminal Railroad and Louisville whereby a viaduct for the elimination of grade crossings along Thirty-first Street, Louisville, will be erected. The cost of the work will be about \$480,000, and the city will pay \$50,000, the remainder being shared by the companies concerned in the project.

***Perth Amboy, N. J.**—W. P. Deering, Perth Amboy, is promoting an electric railway project between Perth Amboy and Dunellen.

New York & North Shore Railway, Mineola, N. Y.—Surveys are being made by this company for building an extension up Broadway, Flushing, to Farrington Street, connecting with its line on Prince and Farrington Streets. It is understood that an agreement has been reached with the New York & Queens County Railroad for the use of

its tracks from Prince to Main Streets and work will be begun as soon as the rails, which have been ordered, arrive.

Niagara Gorge Railroad, Niagara Falls, N. Y.—George A. Ricker, Buffalo, has begun work double-tracking this company's Lewiston-Youngstown division.

East Side Traction Company, Syracuse, N. Y.—The Public Service Commission, Second District, has authorized this company to construct an addition track on Manlius Street in East Syracuse.

***Waterville, N. Y.**—Plans are being considered to build a 20-mile electric railway to connect Vernon, Waterville, Vernon Center, Augusta and Oriskany Falls.

Piedmont Traction Company, Gastonia, N. C.—The Durham Iron Works have been awarded the contract by this company to furnish 700 tons of 70-lb. steel rails for use on its proposed line from Burlington to Haw River. T. C. Lee, chief engineer. [E. R. J., May 20, 1911.]

North Carolina Public Service Company, Greensboro, N. C.—Plans are being made by this company to build several extensions of its lines in Greensboro and High Point.

Cleveland (Ohio) Railway.—During the summer this company will build 22 miles of new track.

Oklahoma (Okla.) Railway.—This company has completed and placed in operation its extension from Britton to Edmund. The line now extends from Oklahoma City to Edmund, a distance of 15 miles. The company intends to extend this line to Guthrie after the completion of the Oklahoma City-El Reno extension now in course of construction.

Guelph (Ont.) Radial Railway.—P. H. Secord & Sons, Brantford, have been awarded the contract by this company to build the St. Patrick's Ward extension.

Grants Pass & Rogue River Railroad, Grants Pass, Ore.—Work has been begun by this company on its 30-mile electric railway to connect Grants Pass, Medford and Ashland. The Pacific Western Company has the contract. Franchises have been obtained in most of the towns. John R. Allen is interested. [E. R. J., April 22, 1911.]

Conewago & Southern Railroad, Bigerville, Pa.—S. S. Johnson, Millersburg, has been awarded the contract by this company to build its line from Bigerville to Arendtsville and Cashtown. H. W. Hamblin, Harrisburg, president. [E. R. J., June 17, 1911.]

Butler, Pa.—It is reported that plans are being made for the construction of an electric railway from Butler, Pa., to Erie, Pa., by Charles Gibson, J. H. Barrett and B. S. Wilson. The statement is made that the road will operate into Pittsburgh, over either the Pittsburgh & Butler Street Railway or the Pittsburgh, Harmony, Butler & New Castle Railway, and that from Erie it will operate into Buffalo, N. Y., over the line of the Buffalo & Lake Erie Traction Company. According to plans now being made, the lines will be built on private right-of-way between Butler and Erie, extending through Slippery Rock, Grove City, Mercer, Polk, Franklin, French Creek, Meadville, Cambridge Springs, Edinboro and Middleboro.

Johnstown (Pa.) Traction Company.—Work has been begun by this company on its extension from the Eighth Ward, Johnstown, to Southmont.

Lewisburg, Milton & Watsonville Passenger Railway, Milton, Pa.—It is reported that this company contemplates the extension of its lines to Northumberland to connect with the line of the Sunbury & Northumberland Electric Street Railway or the Sunbury and Selinsgrove Electric Street Railway.

West Penn Railways, Pittsburgh, Pa.—The contract to build an extension from Vance's Mills to Philadelphia, a distance of 2 miles, has been awarded to Reagom & Lynch Company, Uniontown, by this company.

Titusville Electric Traction Company, Titusville, Pa.—The bonded indebtedness of this company has been increased from \$300,000 to \$1,250,000 to provide funds to construct and equip 34 miles of track. The proceeds of the issue will be used specifically to extend the present line of the company northward to Cambridge Springs, Craw-

for County, Pa., about 17 miles from the present terminal, and for an extension southward to Oil City, and Wenango, about 17 miles from Titusville.

Charleston Consolidated Railway & Light Company, Charleston, S. C.—This company plans to build an extension of its belt line through Columbus Street from Meeting Street to King Street in Charleston.

Franklin, Tenn.—It is reported that the proposed railway from Nashville to Franklin will be operated with steam and operated in connection with the Middle Tennessee Railroad. [E. R. J., Jan. 7, '11.]

Nashville-Gallatin Interurban Railways, Gallatin, Tenn.—This company advises that it has financed its railway and construction has been begun. The Fidelity Securities Corporation is building the line. It will connect Nashville and Gallatin, a distance of 27 miles. The company desires to purchase steel for bridges, 70-lb. rails, etc. Capital stock issued, \$750,000. Bonds issued, \$600,000. Officers: H. H. Mayberry, president and purchasing agent; M. A. Pitts, vice-president; R. A. Bailey, secretary, and M. A. Stainer, chief engineer. [E. R. J., May 13, '11.]

Lake View Traction Company, Memphis, Tenn.—During the summer this company will begin the construction of an extension from South Memphis to its city terminal at Third Street and Union Avenue.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—Contracts have been let and work has been begun by this company on its extension from Corpus Christi to Epworth.

El Paso (Tex.) Electric Railway.—It is reported that this company will build a concrete viaduct to carry its tracks over various steam railroads in El Paso.

Longview & Junction Street Railway, Longview, Tex.—During the next few months this company will award contracts to build one mile of new track and rebuild another mile of track.

San Benito (Tex.) Interurban Railway.—An extension from Santa Maria and Rio Grande City is being considered by this company.

Citizens' Street Railway, Waco, Tex.—An extension from Waco to East Waco will be among the improvements made by this company in the near future.

Myton, Utah.—It is reported that the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is preparing plans, specifications and estimates on contracts for the construction and equipment of an 85-mile electric railway to connect Theodore, Colton, Myton and Roosevelt, Utah. [E. R. J., May 27, 1911.]

***Tacoma, Wash.**—Frank E. Ross, Tacoma, is reported to have stated that preliminary plans have been completed for the construction of an electric railroad from Gig Harbor to the Straits of Juan de Fuca. Survey has been completed and part of right-of-way secured.

Mt. Adams Railway, White Salmon, Wash.—Representatives of this company are negotiating for right-of-way for the construction of a short route from North Bank to White Salmon. W. W. Swan, president. [E. R. J., Jan. 7, '11.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company has completed and placed in operation its new crosstown extension in Milwaukee. It extends from Grand Avenue to Washington Street.

SHOPS AND BUILDINGS

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—This company will soon enlarge its repair shop near Electric Park in Fort Smith.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has purchased property at Fortieth Street and Shafter Avenue in Oakland, on which it will soon build a terminal and depot.

Rockford & Interurban Railway, Rockford, Ill.—This company will place contracts during the next three weeks to build a carhouse in Rockford.

Evansville (Ind.) Railway.—Plans are being made by this company for the immediate construction of a freight and

passenger station at Richland. It will be 60 ft. x 80 ft.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company has decided to build its new carhouse on Spy Run Avenue in Ft. Wayne. Plans will soon be completed.

Twin City Rapid Transit Company, Minneapolis, Minn.—This company's new carhouse will occupy one complete block in Minneapolis and will be constructed of pressed brick. It is estimated that 600 cars can be stored in this building. [E. R. J., May 6, '11.]

Oakwood Street Railway, Dayton, Ohio.—This company will erect at once, on the east side of Brown Street in Dayton, a new carhouse to accommodate upwards of fifty cars. The structure will be of steel and concrete, with tile roof, and the front will be of ornamental brick and tile, and it will be mission in point of architecture. The cost is estimated to be about \$100,000.

Portland Railway, Light & Power Company, Portland, Ore.—Work has been begun by this company on its new building on East Thirteenth Street and East Twelfth Street in Sellwood. The structure will be 200 ft. x 100 ft., one story high, and of reinforced concrete. The cost is estimated to be about \$75,000.

United Railways, Portland, Ore.—This company has acquired terminal grounds and water frontage covering a strip of land about 1500 ft. long near Tallamook Bay, on which it will erect terminals and warehouses.

Galveston-Houston Electric Railway, Houston, Tex.—Harty & Ford have been awarded the contract by this company to grade a site on which to build a machine shop and carhouse in Houston. The structure will be of brick.

POWER HOUSES AND SUBSTATIONS

Los Angeles (Cal.) Railway.—This company is dismantling its power house at the corner of North Broadway and Workman Street in Los Angeles.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Work will be begun at once by this company on an addition to its Brandywine power plant, near Buena Vista Street. The building will be 100 ft. x 80 ft., of steel and brick construction. The plant will be equipped with 300 hp. in boilers, mechanical coal-handling machinery and a Curtis steam turbine, in connection with which a Worthington surface condenser will be installed.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—This company has awarded the contract to J. J. Wuellner & Sons to build its new power station about 9 miles beyond Alton. The cost is estimated to be about \$10,000.

Illinois Traction System, Champaign, Ill.—It is reported that this company has awarded the contract to build three new substations along its new line from Morris to Joliet.

Des Moines (Ia.) City Railway.—This company will purchase during the next few weeks a 2000-kw low-pressure turbine for its power house in Des Moines. It has just awarded a contract for a 300-kw rotary to the Westinghouse Electric & Manufacturing Company.

Berkshire Street Railway, Pittsfield, Mass.—Fred T. Ley & Company have been awarded the contract by this company to build an addition, 35 ft. x 80 ft. high, to its power house on East Street in Pittsfield. The company will also build on the opposite side of the street a transformer station, 40 ft. x 50 ft. Both structures will be of brick.

Cape Breton Electric Company, Ltd., Sydney, N. S.—This company has now under construction an addition to its power house in Sydney. It will install a 500-kw Allis-Chalmers turbo-generator and necessary auxiliaries. The cost is estimated to be about \$75,000.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company is reported to have awarded a contract for electrical equipment for its new power plant at Cuyahoga Falls and six substations to the Westinghouse Electric & Manufacturing Company.

Beaumont (Tex.) Traction Company.—This company has purchased and is now installing a 200-hp Heine boiler in its power house in Beaumont.

Manufactures & Supplies

ROLLING STOCK

Evansville (Ind.) Railways have purchased one electric locomotive from the Cincinnati Car Company.

United Traction Company, Albany, N. Y., has ordered twelve cars from the Pressed Steel Car Company.

Longview & Junction Street Railway, Longview, Tex., expects to purchase two small second-hand cars.

Oakland & Antioch Railway, Antioch, Cal., has ordered one 45-ft. express car from the W. L. Holman Company.

Stockton Terminal & Eastern Railway, Stockton, Cal., has ordered one trail car from the W. L. Holman Company.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., is in the market for two new or second-hand closed cars.

Central California Traction Company, San Francisco, Cal., has ordered two 34-ft. express cars from the W. L. Holman Company.

Piedmont Traction Company, Charlotte, N. C., has ordered six four-compartment, high-speed interurban cars 60 ft. long from the Jewett Car Company.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C., has ordered seventeen four-compartment, high-speed interurban cars 60 ft. long from the Jewett Car Company.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont., has purchased one 35-ton Baldwin-Westinghouse locomotive from the Westinghouse Electric & Manufacturing Company.

New Jersey & Pennsylvania Traction Company, Trenton, N. J., has ordered one 25-ft. 4-in. closed motor-car body mounted on Brill-27-G-1 trucks from The J. G. Brill Company.

People's Street Railway, Nanticoke, Pa., has ordered two quadruple equipments of No. 101-B-2 motors with type K-28-B control from the Westinghouse Electric & Manufacturing Company.

Peterborough (Ont.) Radial Railway has purchased three cars and one snow sweeper from the Ottawa Car Company. The motor equipments for these cars were ordered from the Canadian General Electric Company.

Illinois Traction System, Champaign, Ill., has ordered twelve 57-ft. interurban trailer coaches from the St. Louis Car Company. Subsequently the company ordered twelve M. C. B. trailer trucks from the St. Louis Car Company to be placed under the coaches.

Altoona & Logan Valley Electric Railway, Altoona, Pa., has specified that the five single-truck, pay-within motor cars ordered from the Cincinnati Car Company shall be 25 ft. long over all, 8 ft. 5 in. wide over all, and equipped with Hedley anti-climbers, Tomlinson couplers, Pantasote curtains, H-B life guards, Peacock hand brakes, Consolidated heaters, Universal step treads and Taylor single trucks.

New York, New Haven & Hartford Railroad, New Haven, Conn., reported in the ELECTRIC RAILWAY JOURNAL of May 27, 1911, as having ordered fifteen electric locomotives from the Westinghouse Electric & Manufacturing Company, has ordered fourteen articulated-truck switching locomotives from that company. Each locomotive is to be equipped with a quadruple equipment of No. 410 motors and type HB unit-switch control.

Northern Texas Traction Company, Ft. Worth, Tex., mentioned in the ELECTRIC RAILWAY JOURNAL of May 6, 1911, as having ordered four single-end, straight-sided vestibuled motor cars with smoking compartment at front end from the St. Louis Car Company, has included the following details in the specifications for these cars:

Seating capacity.....54	Air brakes.....West. Trac.
Length of body.....40 ft.	Bumpers...Hed. anti-climber
Over vestibule.....51 ft.	Control, type M non automat.
Width over sills...8 ft. 10 in.	Couplers.....Van Dorn
Over all.....9 ft.	Curtain material...Pantasote
Height, rail to sills.....43 in.	Heaters.....Consol.
Sill to trolley base.9 ft. 5 in.	Headlights.....Wagenhals
Body.....wood	Motors.....four G-E 73
Interior trim.....mahogany	Seats.....Heywood Bros.

Roofmonitor Trucks.....Baldwin 78-25-A
Underframewood Wheels....37-in. rolled steel

Iowa City (Ia.) Electric Railway, noted in the ELECTRIC RAILWAY JOURNAL of April 22, 1911, as having ordered four closed, single-truck motor cars from the McGuire-Cummings Manufacturing Company, has specified the following details for this equipment:

Weight, body.....13,000 lb.	Fenders.....McGuire-C.
Length of body...31 ft. 11 in.	Gears and pinions.....G-E
Over vestibule...31 ft. 3 in.	Gongs.....McGuire-C.
Width over sills...8 ft. 1½ in.	Hand brakes....McGuire-C.
Over all.....8 ft. 6 in.	Heaters.....Consol.
Height, rail to sills.2 ft. 6 in.	Headlights.....McGuire-C.
Sill to trolley base.....9 ft.	Journal boxes...McGuire-C.
Body.....wood	Motors.....G-E-54
Headlining.....sheet steel	Paint.....green
Roof .....monitor	Sash fixtures.....drop sash
Underframe.....composite	Seats.....F. & J.
Axles.....McGuire-C.	Seating material.....rattan
Bumpers.....McGuire-C.	Springs.....Union
Car trimmings...McGuire-C.	Step treads.....wood
Control.....G-E	Trolley base.....G-E
Couplers.....McGuire-C.	Trucks.....McGuire-C.
Destination signs...Hunter	Wheels.....33 in.

TRADE NOTES

Philadelphia Locomotive Works, Philadelphia, Pa., have increased their capital stock from \$50,000 to \$40,000,000.

Automatic Car Coupler Company, Los Angeles, Cal., has delivered 270 Bonney car couplers to the Terre Haute, Indianapolis & Eastern Traction Company which are now being operated successfully.

Scofield Engineering Company, Philadelphia, Pa., has completed plans and specifications for the power plant and equipment for the Helena Gas & Electric Company, Helena, Ark. Bids are now being received for this work.

Standard Steel Works Company, Philadelphia, Pa., announces that Arthur S. Goble, formerly with the testing department of the Chicago & Northwestern Railway, has become connected with the New York office of the company.

Railway Roller Bearing Company, Syracuse, N. Y., has just completed delivery for The J. G. Brill Company of "railway" journal boxes ordered for thirty-five new storage battery cars to be operated by the Third Avenue Railroad, New York, N. Y.

American Brake Shoe & Foundry Company, New York, N. Y., has purchased from the Chicago, Burlington & Quincy Railroad a tract of ten acres at the northeast corner of Twenty-sixth Street and Forty-sixth Avenue, Chicago, Ill., on which it is building an extensive plant.

McClintic-Marshall Construction Company, Pittsburgh, Pa., has moved its Pittsburgh offices from the Park Building to 1218-1224 Oliver Building. The contracting and treasury departments have also been removed from Rankin, Pa., to the new quarters in the Oliver Building.

Canadian Car & Foundry Company, Montreal, Que., has announced that \$200,000 will be spent in extensions to its Montreal works. The present capacity of the works is about seventy cars a day and this will be increased to one hundred cars. The Canadian Car & Foundry Company ordered 50,000 tons of structural steel from the United States Steel Corporation.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports the receipt of an order for export from the Elektrisk Bureau for Holmenkollenbanen, Norway, for three equipments of type HL unit switch control for a quadruple equipment of motors aggregating 89 hp. The Westinghouse Company has also recently shipped twenty-five double equipments of interpole railway motors to South America.

Brown Hoisting Machinery Company, Cleveland, Ohio, has elected Harvey H. Brown president to succeed his brother, the late Alexander E. Brown, founder of the company. Other officers were elected as follows: Alexander C. Brown, director and vice-president; George C. Wing, secretary; Charles T. Pratt, treasurer and Richard B. Sheridan, general manager.

Thomas W. Pangborn Company, Jersey City, N. J., announces the removal of its New York office, 90 West Street,

New York, to Hudson Street and Morris Street, Jersey City, where all business of the company will be transacted in the future. The New York office comprised the executive, sales, accounting and purchasing divisions of the company and has been consolidated with the Jersey City plant, which represented the manufacturing and engineering division and showrooms.

The J. G. Brill Company, Philadelphia, Pa., has received the following orders for export: Macartney, McElroy & Company, one 1800-gal. centrifugal sprinkler motor car body with Brill 21-E truck; Cie J. G. Brill, Paris, France, two radial axle motor trucks without wheels and axles; M. E. Curwen, London, forty Brill 21-E trucks without wheels, axles and journals. The company has also received an order from R. D. Campbell, Indianapolis, Ind., for seven 51-ft. omnibus motor bodies.

Sangamo Electric Company, Springfield, Ill., announces that it has completed arrangements with the Westinghouse Electric & Manufacturing Company which permits the use of inductive load compensating devices as covered by Shallenberger patents of June 1 and Oct. 22, 1895. As the result of this arrangement, the Sangamo type H induction meters are now fully compensated for use on inductive loads of all power factors and will be supplied in all capacities up to the largest commercial sizes.

General Railway Signal Company, Rochester, N. Y., has made a contract to install automatic block signals on the Chicago, Indianapolis & Louisville Railroad between Hammond and Indianapolis, 163 miles of single track. Upper quadrant signals, type 2A, will be used. The company will also furnish block signals to the Chicago, Burlington & Quincy Railroad for installation between Cameron Junction, Mo., and Harlem, 44.7 miles of single track and 7.3 miles of double track. Signals of type 2A, lower quadrant, will be used.

Wonham, Sanger & Bates, New York, N. Y., report the receipt of recent contracts for H-B life guards from the following companies: All cars of Union Traction Company, Coffeyville, Kan.; 300 guards for Wilkes-Barre (Pa.) Railway, repeat order for fifty guards for the Sao Paulo Tramway, Light & Power Company; repeat order for sixty guards for the Brooklyn (N. Y.) Rapid Transit Company and all cars of the Orange County Traction Company, Newburg, N. Y. In Rome, Italy, 750 cars are to be equipped with this device. Nearly every large system in Europe and Asia now includes the H-B life guard among its equipment.

C. G. Young, New York, N. Y., consulting engineer, recently has visited the city of Panama, on his way to Hayti, where he is consulting engineer on 350 miles of railroad construction. In an interview published in the *Panama Journal* of June 5 Mr. Young is quoted as saying that he was investigating the possibilities of building an electric railway system in Panama and the suburbs in the interests of a group of New York capitalists, who are negotiating for the purchase of the franchises held by Henry T. Cook. The details of the franchises held by Mr. Cook were published in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, p. 684.

General Electric Company, Schenectady, N. Y.—The sixth annual outing and games of the New York office of the General Electric Company were held at Lange's New Dorp Beach Hotel, Staten Island, on June 17. In addition to the regulation field events, there was the annual baseball game between the "Old Boys," headed by S. W. Trawick, of the railway department, and the "Young Men," under M. F. Reardon, of the P. & M. department. This was won for the third consecutive time by the "Old Boys," by a score of 11 to 9. In the regular baseball game between the New York office and the Harrison Lamp Works teams, the game was won by the former; score, 16 to 4. There were 122 present at the outing.

Western Electric Company, New York, N. Y., reports that the May gross earnings were 12 per cent in excess of the same month a year ago and for the five months to June 1 sales have exceeded the same period of 1910 by 8 per cent. This means a gross business for the full fiscal year, if maintained, of between \$70,000,000 and \$71,000,000. At the end of May the company was employing 26,000 men

compared with 25,000 two months ago and 23,464 at the beginning of the fiscal year. When business was at the top in 1907 the company had 29,000 employees, or 10 per cent more than at present, although the volume of production was between 4 per cent and 5 per cent less than this year. Increased efficiency of operation explains the difference.

ADVERTISING LITERATURE

Frank Ridlon Company, Boston, Mass., has issued its June list of second-hand electrical machinery.

Indianapolis Brass Company, Indianapolis, Ind., is mailing a double post card which describes its Clark trolley splicer.

Precision Instrument Company, Detroit, Mich., is mailing a card which calls attention to the Precision dead-beat draft gage.

Duplex Metals Company, Chester, Pa., is mailing a circular calling attention to its four grades of copper-clad steel wire.

Western Electric Company, New York, N. Y., is mailing a circular entitled "Our Contribution" which contains illustrations of many recent types of Western Electric train-dispatching telephone equipment.

International Steam Pump Company, New York, N. Y., has issued two bulletins describing and illustrating type D centrifugal Worthington pumps for low-head service and Worthington centrifugal house and sump pumps.

Crocker-Wheeler Company, Ampere, N. J., has issued a booklet in which are discussed the merits of the Renek transformer. The pamphlet also contains a table showing the comparative efficiencies of the leading transformers on the market.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has published a thirty-two-page booklet which is devoted to H-B ball bearings in woodworking machinery. It contains illustrations of different types of woodworking machines equipped with these bearings.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder calling attention to some of the contracts it has received recently for registers. Among these were registers for the Chicago, South Bend & Northern Indiana Railway and the Puget Sound Electric Railway Company.

Ohio Brass Company, Mansfield, Ohio, has printed the "O-B Bulletin" for May-June, 1911, which contains among others the following articles: "O-B Thermo Bonding Process," "New O-B Trolley Wire Pick-Up," "Rock Island Southern Railway," and "O-B Type B Section Insulator."

Linde Air Products Company, Buffalo, N. Y., has issued a fifty-page catalog which describes and illustrates its oxy-acetylene apparatus for welding and cutting metals. It also contains instructions for using the blow pipe and other valuable data and several illustrations showing repairs on castings of various kinds which have been made with the oxy-acetylene.

McGraw-Hill Book Company, New York, N. Y., announces an edition in cloth of Frederick W. Taylor's "Shop Management." This is a reprint of Mr. Taylor's paper delivered before the A. S. M. E. in 1903. It embodies the essentials and fundamentals of Mr. Taylor's principles of efficiency and has for several years been the standard work on the subject. It is now available in permanent binding for the first time.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4851, which contains data relative to the use of electricity in the service of steam roads. The publication comprises forty-eight pages, which illustrate and describe both station and road equipment of the New York Central & Hudson River Railroad; the Detroit Tunnel of the Michigan Central Railroad; the Cascade Tunnel of the Great Northern Railroad; the equipment of the Baltimore & Ohio Railroad; the West Jersey & Seashore Railroad; the West Shore Railroad, etc. The company has also issued Bulletin No. 4845, which contains illustrations and descriptive matter in considerable detail of its horizontal steam turbo-generators of from 100-kw to 1000-kw capacity at 3600 r.p.m.