

Street Railway Journal

VOL. XXVII.

NEW YORK, SATURDAY, MAY 19, 1906.

No. 20.

PUBLISHED EVERY SATURDAY BY THE
McGraw Publishing Company

MAIN OFFICE:

NEW YORK, ENGINEERING BUILDING, 114 LIBERTY STREET.

BRANCH OFFICES:

Chicago: Monadnock Block.

Philadelphia: Real Estate Trust Building.

Cleveland: Cuyahoga Building.

London: Hastings House, Norfolk Street, Strand.

Cable Address, "Stryjourn, New York"; "Stryjourn, London"—Lieber's Code used.

Copyright, 1906, McGraw Publishing Co.

TERMS OF SUBSCRIPTION

In the United States, Hawaii, Puerto Rico, Philippines, Cuba, Canada, Mexico and the Canal Zone.

Street Railway Journal (52 issues).....\$3.00 per annum
Single copies 10 cents
Combination Rate, with Electric Railway Directory and Buyer's Manual (3 issues—February, August & November) \$4.00 per annum
Both of the above, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, \$5.00 per copy).....\$6.50 per annum

To All Countries Other Than Those Mentioned Above:

Street Railway Journal (52 issues), postage prepaid..... \$6.00
25 shillings. 25 marks. 31 francs.

Single copies20 cents
Remittances for foreign subscriptions may be made through our European office.

NOTICE TO SUBSCRIBERS

REMITTANCES.—Remittances should be made by check, New York draft, or money order, in favor of the **STREET RAILWAY JOURNAL**.

CHANGE OF ADDRESS.—The old address should be given, as well as the new, and notice should be received a week in advance of the desired change.

BACK COPIES.—No copies are kept on sale beyond fifteen months from date of issue, except in bound volumes.

DATE ON WRAPPER shows the month at the end of which the subscription expires.

NOTICE TO ADVERTISERS

Changes of advertising copy should reach this office by 10 a. m. Monday preceding the date of publication, except the first issue of the month, for which changes of copy should be received two weeks prior to publication date. New advertisements for any issue will be accepted up to noon of Tuesday for the paper dated the following Saturday.

Of this issue of the Street Railway Journal, 8000 copies are printed. Total circulation for 1906 to date, 163,300 copies, an average of 8165 copies per week.

Fire Protection at Passenger Stations

The importance of fire protection has been thoroughly brought home to electric railway managers by the experience of the last three or four years, and it is most gratifying to note the improved conditions now existing on many systems. Special attention has been paid to car house and repair shop protection, and of late power houses and sub-stations have been, in many cases, well provided with facilities for extinguishing fires. On progressive roads newly designed structures are carefully considered from the standpoint of fire risk,

and both cars and stations are built with particular regard to the reduction of such hazards as the occurrence of even a slight blaze tends to create.

It sometimes happens that even if a structure is well designed, a fire hazard arises in the course of its use, and through alterations in equipment the possibility of trouble exists in considerable measure. Passenger stations well illustrate this point, particularly if they are so designed as to preclude the free movement of very large crowds from the platform to the street. A station at a large park, on an elevated structure, or in a tunnel, needs extra watchfulness in comparison with an ordinary surface platform or shelter. The walls of the station, its approaches and exits, or its platform, may not be composed of inflammable material, and yet a company finds itself obliged to look out for possible trouble in quite a number of directions. If the public could be relied upon to remain cool-headed in time of emergencies when no real danger exists, the matter would be very simple, but, unfortunately, the most trifling accident, such as the blowing of a fuse or the throwing of a lighted match into a waste barrel partly filled with waste paper, is frequently sufficient to start a panic among the timid passengers.

Bearing in mind these conditions, it is a good plan to install metal waste barrels at stations, with covers which can be closed tightly by the station attendants in case a smudge is started. In cases where wooden platforms are used, it is important to close every opening into the sub-platform spaces through which rubbish might fall and accumulate, thereby preventing the chance of a panic in case smoke should appear. There should, as far as possible, be no place about a station where lighted matches, cigar stubs, etc., can cause trouble, although, of course, the fire risk presented by heavily loaded news stands must in the main be watched by the attendants. In addition to the supply of sand pails, water pails and extinguishers, ordinarily provided in good practice, concrete flooring or cement and expanded metal platform surfaces, together with auxiliary sources of station lighting and a force of well disciplined employees, will do much to minimize any unusual occurrence in the way of short-circuits, motor flashing and carelessly thrown combustibles. The whole matter is simply an illustration of the "stitch in time" philosophy. With the opening of the park season it is well worth thinking about.

Commutator Maintenance

The electric equipment of an ordinary 600-volt direct-current power station has now become so thoroughly standardized, and, consequently, so reliable, that there is in some plants a tendency to slight the detailed care of the generators and motors necessary for the best maintenance. In a large power plant there is almost always something to do in the way of keeping the steam piping, valves and other auxiliary apparatus in repair, and in a small station the variety of work

per employee is so great that it is easy to overlook any except the most necessary duties.

Under all usual conditions of operation the commutator is the only weak spot of a direct-current machine built by reliable makers, and the commutator is vulnerable inherently, no matter how well designed it may be electrically and mechanically. Aside from an occasional inspection of the bearings and a blowing out of the armature by compressed air once a week or thereabouts, practically no attention needs to be given to any part of a direct-current generator except the brushes and commutator. Once in awhile it is well to feel of the different field coils immediately after a shut-down, or to take their temperatures externally by thermometer while current is on, but as long as these points are not entirely overlooked from quarter to quarter, there is little real need of frequent attention to them.

To insure continuous service and to ward off trouble from sparking, it is well to keep a regular watch of the behavior of the brushes and commutator, taking care to clean off carbon dust frequently, and to make sure that oil or dirt does not collect. The practice of using waste or emery cloth on commutators is bad, on account of the tendency of the former to disintegrate and catch between segments, and the wearing effect of the latter is injurious. Ordinarily a commutator only requires to be wiped off with a piece of canvas and occasionally lubricated by a very small amount of oil applied with a cloth. The main point is to keep a smooth and true surface, looking out for looseness and flat spots. The latter are generally induced by excessive brush pressure or too great hardness in the brushes, by too much end play or by loose bars.

Sparking is common in machines which are operated without proper care, and the ordinary causes are so easily remedied that they are worth mentioning again. The brushes may not be set at the point of commutation, or fitted to the curvature of the commutator surface. Insufficient brush pressure or brushes burned at the ends frequently cause sparking. An open circuit, loose connection or rough bar is also provocative of trouble. These points are supposed to be kept constantly in mind in power plant operation, but, unfortunately, they are frequently neglected, for the reason that there is a widespread idea that electrical machinery can be left without attention for long periods without the least chance of disturbance. In comparison with steam equipment and intricate mechanical apparatus this is, of course, true, but unless the points mentioned above are looked after from time to time the best results cannot be secured from the machines.

Inducing Traffic on Interurban Lines

Occasionally managers of electric railway systems seem to regard it their duty simply to care for that traffic which comes to them, and they make very little effort to increase the travel over the line by advertising, or by soliciting business. Managers of electric light and power plants a few years ago were inclined to operate their systems on the same principles, but they have now discovered that by going after business vigorously they can increase the demand for current three or four fold. Many railway managements, it is true, do go after business in a systematic manner, but there are some who should take pointers from the electric light and power companies. There is just as much occasion for advertising an electric railway system as there is for advertising any other business concern.

In general, advertising should be intended to do two things; to acquaint traveling men and strangers of the existence of the road, and to keep in the minds of the local people the fact that the road is ready to be used at their convenience. For the benefit of the traveling men or strangers advertisements of some kind should be sent to hotels and other public places in neighboring towns. Time cards should also be available in these distant towns, as with them the traveling man can make out his route in advance before reaching a town through which the road is operated. For the benefit of local persons the advertising should be of a general character. The newspaper and the theater program should not be neglected. The newspaper advertising need not all be in the advertising columns. To be sure, a time table should be kept there, and these columns should be used freely to make special announcements of excursions or special occasions in neighboring towns. Usually, however, a great deal of prominence may be gained in the reading columns of the paper, if the management will furnish the editor with genuine news notes concerning the road or news in which the road is mentioned. Aside from returns through increased travel, newspaper advertising is often advantageous in another way. If the newspaper is given business it is most probable that the paper will be favorably disposed toward the management of the road. In view of the fact that new franchises may be required at a future date, or that special privileges may be desired at any time, it is desirable for the railway company to be as much in favor with the press as possible.

Some roads have aroused the interest of local people by offering prizes, either in money or free trips over the line, for the best name for new parks, new stations along the line, trade marks for the road, or for the best verse of poetry concerning the road. Such schemes as this tend to make the people in general feel that they have an interest in the road, and that it partly belongs to them. When this feeling can be aroused, increased receipts are certain to follow.

Some specific soliciting of business should also be done. Churches, lodges and other organizations, which have occasional conventions, picnics, or other large gatherings, should be repeatedly reminded of the fact that the road is ready at all times to run special cars and furnish special accommodations to care for unusually large gatherings. Such announcements may be made to all societies in the vicinity by means of printed circulars, but personal letters should be sent to those most likely to have assemblages in the near future. Often a personal representative of the road sent to the entertainment committee of a society will be able to suggest means of entertainment of guests by an excursion over the road.

A great deal of traffic may sometimes be induced by advertising interesting places along the line. An illustrated booklet describing such places may often be gotten out to advantage. There is hardly a road that does not have peculiarly attractive points near the line. If history attaches romance to any of the points, this should be dwelled upon in the descriptive booklet. A great deal of travel is always occasioned by base ball or other leagues, embracing several of the towns along the line. When interest is aroused in the local team, a game with the team of a neighboring town usually results in a crowd of supporters following the team. If a road is operating through a district where base ball enthusiasm does not exist, certainly the management should consider seriously the organization of a league.

When people can be induced to take up homes along the line, permanent and steady traffic is assured, and if rents are cheap enough in the outlying districts to warrant people paying fare into the cities, this fact should be well advertised. Occasionally managements of roads have been instrumental in organizing land or real estate companies to develop town sites or residential districts along the line. It is usually well to encourage companies who wish to do this, and concessions in fares or promise of more frequent schedules when the population of the proposed community reaches a certain amount will often assist.

No cut and dried rule can be formulated for inducing traffic on an interurban road. It is up to the management to exert itself to a point where the best means naturally suggest themselves, but certainly no management is doing its duty to the stockholders when it is content to take only that business which is forced upon the road.

Electrification of the West Shore Railroad Between Utica and Syracuse

In many respects there is no work in electric traction of greater interest and significance than that comprised in the electrification by the Oneida Railway Company of the West Shore Railroad between Utica and Syracuse, the plans for which are outlined elsewhere in this issue. The electrification of the trunk terminals in and around New York City has undoubtedly involved larger and more complex engineering problems, but all of these terminal propositions must be classified as special and unique. Although they are none the less interesting on that account, it is likely that nowhere else in this country, or at least not outside of half a dozen of the very largest population centers, will similar propositions be encountered. On the other hand, the work now in progress by the Oneida Railway Company on the West Shore Railroad, and by the Pennsylvania Railroad on its Camden & Atlantic City line, involves the application of electric traction to out-and-out steam railroad trunk service, where the choice between steam and electricity as motive powers was made upon their abilities as transportation agents rather than primarily upon the question of the production of smoke. These installations may, therefore, well be considered as the forerunners of a vast amount of similar work—just how vast, steam railroad engineers are not yet prepared to admit and electric railroad engineers hardly dare to guess.

In the Oneida Railway work, so far as the plans have been announced, there is much that attracts attention. In the first place, perhaps the most important feature is the experiment of moving trains of varying velocities at high speeds and short headway with the trends of traffic in the same direction. Three classes of service will be conducted over this section. There will be limited single electric cars and trains traveling at a schedule speed of 40 miles per hour. Operating between these high-speed units will be electric cars and trains for local travel, moving at a schedule speed of 24 miles per hour. In addition, there will be on the same tracks fast freight trains drawn by steam locomotives scheduled to make 15 miles to 18 miles per hour. The problem which the engineers and managers of the Oneida Railway Company will undertake, therefore, will be to pass the higher grade units around the slower trains with safety and without delays to the units of any grade. As the present line has only two tracks, it is proposed to solve this problem by the use of a long third track on grades, and

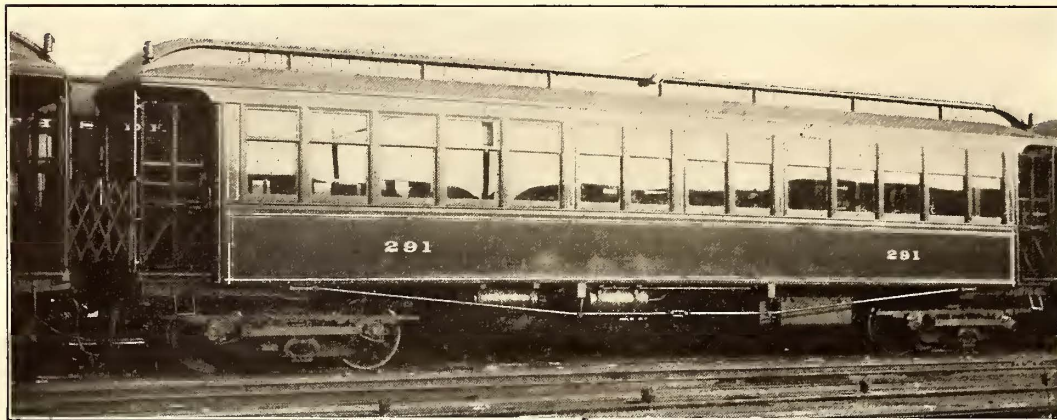
by the use of four tracks within certain yard limits. It so happens that the section between Clarks Mills and Vernon, a distance of $8\frac{1}{2}$ miles, involves a grade, for a portion of the distance, of approximately 0.57 per cent. Throughout this section there will be built a middle track over the grade with Y-connections to both outside tracks at convenient locations. By means of properly placed interlocking switch towers, this middle track will be used for executing passing movements of both eastbound and westbound units. On the 5-mile section between Oneida and Canastota, where there are certain yard limits and water receiving stations which will be used by the steam locomotives, there will be installed two additional tracks, making this a four-track section, for the purpose of expediting traffic of all classes. With this lay-out, the handling of the different services becomes a matter of proper adjustment of schedules in conjunction with a few easily understood rules for the guidance of tower men, formulated upon principles now clearly defined by standard practice in handling train movements on single-track and double-track roads.

The second feature of interest in this electrification, and perhaps the most interesting from the electrical engineering standpoint, is the selection of the standard 600-volt, direct-current system. It may be that the ardent advocates of higher voltages will experience a qualm of regret that this, one of the first applications of electricity to trunk-line conditions, was not used as an opportunity for letting either the single-phase or the higher voltage direct-current motor demonstrate what it could do. We sympathize to a certain extent with this view. At the same time we do not take the decision as evidence of serious doubt in the minds of those who must stand sponsors for the work as to the future success of some higher voltage system, but merely that local reasons made tried and familiar practice preferable. It must be remembered that the transportation problem already described is a considerable innovation, and the introduction of electricity at all is another. The management of trunk-line railroads look upon any experiments in motive power, and properly, in a most conservative spirit and place the continuance of traffic and safety of operation above all other considerations. The condition is not unlike that of an important trunk-line electric railway, like Broadway in New York City, which cannot afford to adopt any new system until it has been thoroughly tested on a less important line. In one sense, the conditions between Utica and Syracuse were especially favorable to the adoption of direct current, from the fact that its employment practically does not debar the management from installing a higher voltage system at a later period, say in five years, if during that time such a change should be proven desirable. In such an event, the present rolling stock and the rest of the direct-current equipment could always be used upon some of the extensive d. c. systems with which the operating company is affiliated.

In conclusion, we wish to take this occasion of congratulating the Oneida Railway Company upon its enterprise in equipping this important section of the West Shore with electric power. The decision to use electricity and the satisfactory results which we anticipate as a result will do a great deal toward solving the wider applications of electricity to transportation problems, which are bound to come in the future. It is also satisfactory to know that the work has been intrusted to those who have had wide experience in handling electric transportation problems.

THE NEW CARS OF THE SOUTH SIDE ELEVATED RAILWAY, CHICAGO, AND THEIR EQUIPMENT

After steel cars were adopted for the New York Subway, there was a general movement towards the use of cars with



SIDE VIEW OF THE SOUTH SIDE ELEVATED CAR

steel-floor framings by interurban and elevated railroads. Steel cars have one feature which makes them almost a necessity for underground service. This is their fire-proof construction. For elevated service, however, this feature is of much less importance. Other considerations and the fact that no trouble whatever had been experienced with the cars of wood construction which have been in operation on the road in the past caused the managers of the South Side Elevated Railroad, Chicago, to decide in favor of the usual wood construction for their new cars. These cars, of which seventy have been built by the Jewett Car Company, and eighty additional ones are now being constructed by the American Car and Foundry Company, at Jeffersonville, Ind., were illustrated and described in a short article in the *STREET RAILWAY JOURNAL* for Dec. 2, 1905. The article did not, however, enter into the details of the car. Very little was said concerning the new features embodied in the cab, and no reference at all was made to the electrical and brake equipment. All of these, as well as other features of the car, embody new ideas. Through the courtesy of the South Side Elevated Company it is possible now to give a detailed description of the car and its equipment.

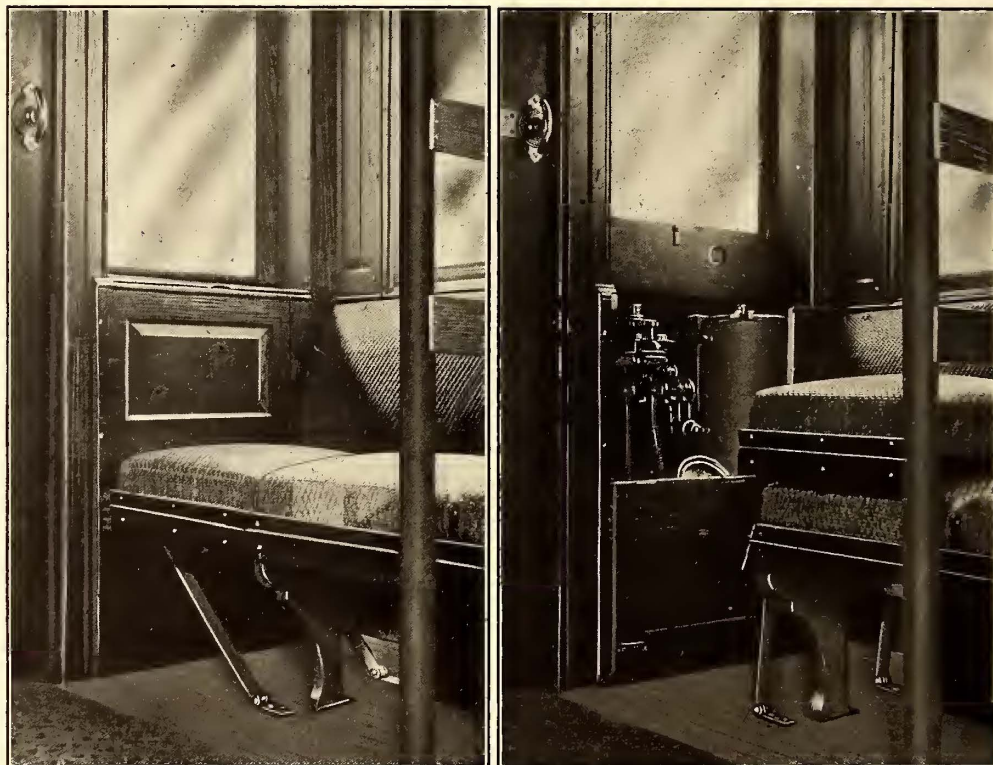
THE CAR-BODY

The arrangement of the cab is probably the most interesting feature of the car body and is well shown in the accompanying illustrations. When occupied by the motorman it has all the conveniences of other styles of cabs placed inside the car. When not at the front end of the train, however, the only evidence of it being a cab is iron post extending to the floor and a canopy overhead. All of the control apparatus is enclosed, and the doors covering it are securely locked by

an automatically fastened latch, so that a passenger sitting inside the cab cannot tamper with the controller or brake valve. The change to a motorman's cab is very quickly effected. The forward seat is raised and drawn back to rest on the one immediately behind it. Hinged arms extending to the floor keep the seat in the proper position. When the forward seat is raised a lever automatically unlocks a hinged covering, forming the inside finish of the car, immediately below the arm rest of the front window. After this cover has been swung down, the arm rest, which is hinged, may be raised and all the control apparatus, consisting of master controller, brake valve, air gage, and whistle cord, is exposed. The motorman is isolated from the re-

mainder of the car by drawing down two pantasote curtains, one at the rear, the other at the side of the cab. When arranged to be used by passengers, the cab seats two people, and these are in no way isolated from the remainder of the car. No seating room at all is lost in the car by reason of the presence of the cabs when the car is used in the middle of the rear end of a train.

In all other respects than this cab feature, the interior of



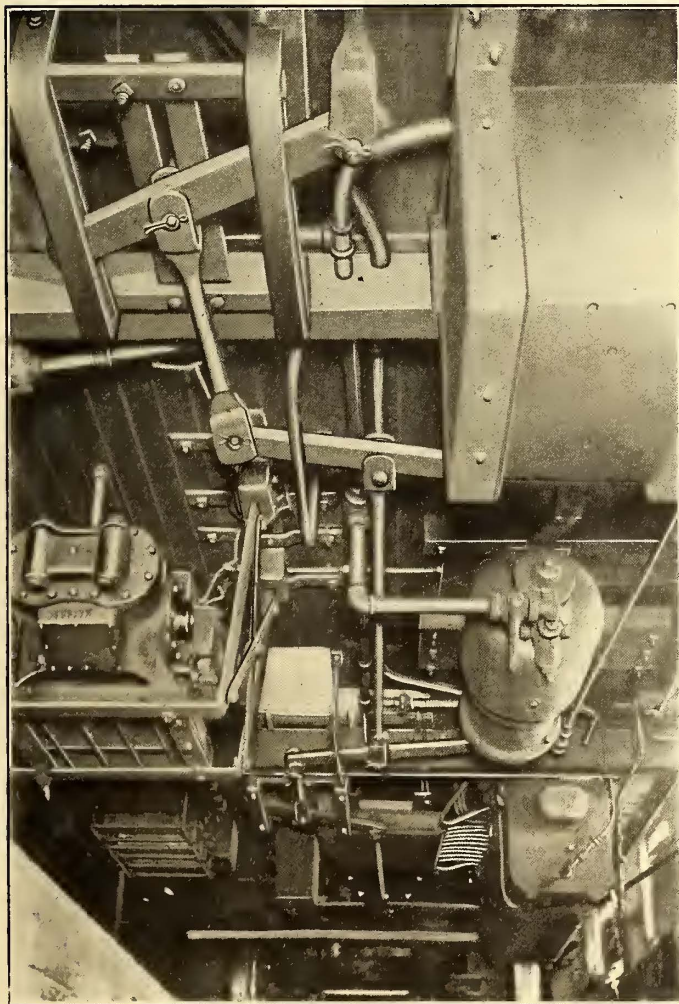
MOTORMAN'S CAB WITH SEAT LOWERED FOR PASSENGERS AND RAISED FOR MOTORMAN

the car is much the same as with the cars that have been in service on the company's line for several years. The interior is finished in mahogany rubbed to a dull finish. The headlining is of quartered oak. Deep mouldings and flutings, which would have increased the difficulty of keeping the interior of the car clean, have been avoided. Shallow panels in the finish between the windows,

above the truss plank and at the ends of the car prevent an unduly plain appearance. The lamps are well distributed throughout the car and the electric heaters are placed under the seats. On some of the old equipment the end doors are over at one side of the center line of the car, and by being so placed two seats are cut out at each end of the car. The additional seats gained by placing the end doors in the center of the new car, together with the seating room obtained in the cab, give the later cars a seating capacity of eight more than that of the old cars, which are the same length. In other words, since the new car seats 52 people and the old one 44, the increase in seating capacity is about 18 per cent, without changing the dimensions of the car.

One of the accompanying reproductions shows the steel platform used on the cars. The side arms are of 6-in., 17 $\frac{3}{4}$ -lb. I-beams placed directly under the side sills, to which they are bolted. They extend back beyond the bolster and have a sufficient offset to allow them to pass under it. The two center I-beams under the platform extend back toward the middle of the car, a distance of 18 ft. from the bumper. The draw-bar rigging is bolted to these I-beams and the draw-bar strains are consequently transmitted direct to the center sills of the car. A 6-in. 15 $\frac{1}{2}$ -lb. channel bar, which forms the front of the

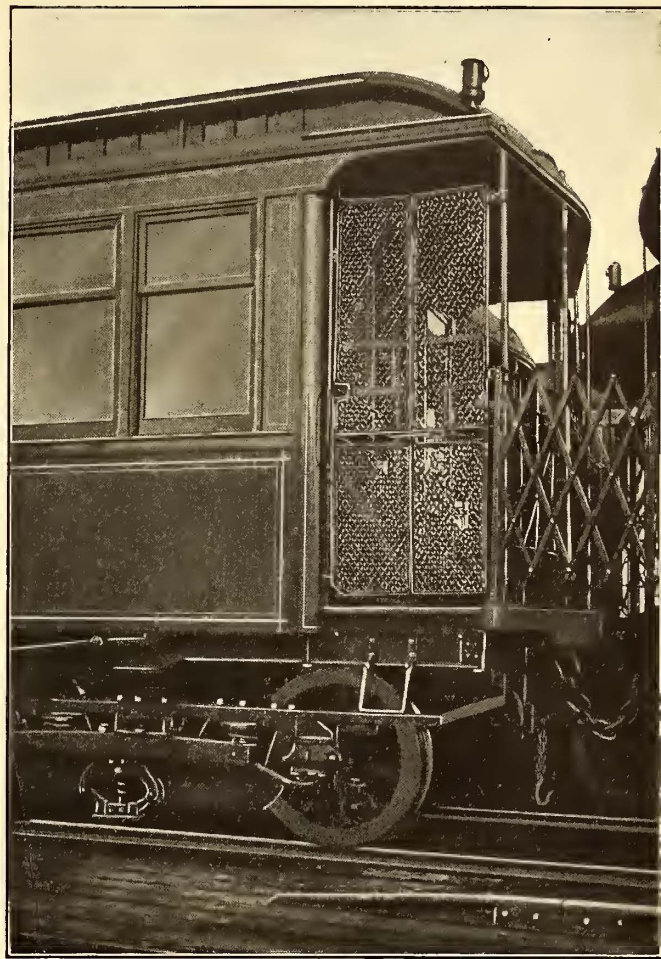
diate sills are employed. This gives a construction which, it has been computed, will stand a greater crushing strength in the event of collision than a steel floor framing of the design usually used under cars of the same dimensions. Over the



VIEW OF APPARATUS UNDER THE CAR

steel platform framing, is secured to the longitudinal I-beams by means of angle plates.

The platforms were designed in the shops of the company and were built on several of the old cars to replace platforms of wood construction before the new cars were built. The bottom framing, as has been said, is of wood. In addition to the center and side sills, two sets of interme-



END OF CAR SHOWING I-BEAM CONSTRUCTION OF PLATFORM AND HIGH GATES

rheostats, controller apparatus and cables, the underframing is lined with $\frac{1}{4}$ -in. transite board, and above the trucks this transite is covered with galvanized iron.

One of the illustrations shows the new folding gate used on the platforms. The gates are of wire mesh and extend to within a few inches of the hood over the platform. The object of these high gates is to prevent accident to passengers in a hurry who might attempt to jump over gates of ordinary height.

GENERAL WIRING PLAN

The motor wires and train line cables are carried in a box conduit, built between two of the sills and lined on all sides with $\frac{3}{4}$ -in. transite. The cables are cleated firmly to the sides of the conduit in such a manner that they are held apart from each other notwithstanding the jarring and vibration of the car.

Where the cables pass over the transoms or other iron work they are protected with circular loom in addition to the transite board. Both resistance and motor cables are of No. 00 extra flexible flame-proof wire. This wire is considerably in excess of the required capacity, but the company has found the use of extra heavy wire very desirable, in that it insures against overheating of cables under almost all circumstances, and this reduces the fire risk to a minimum. The heater circuit is carried in Sprague flexible conduit. Flame proof wire is used on the light circuits. The general layout of controller

and air brake equipment located beneath the car is shown in the accompanying plan.

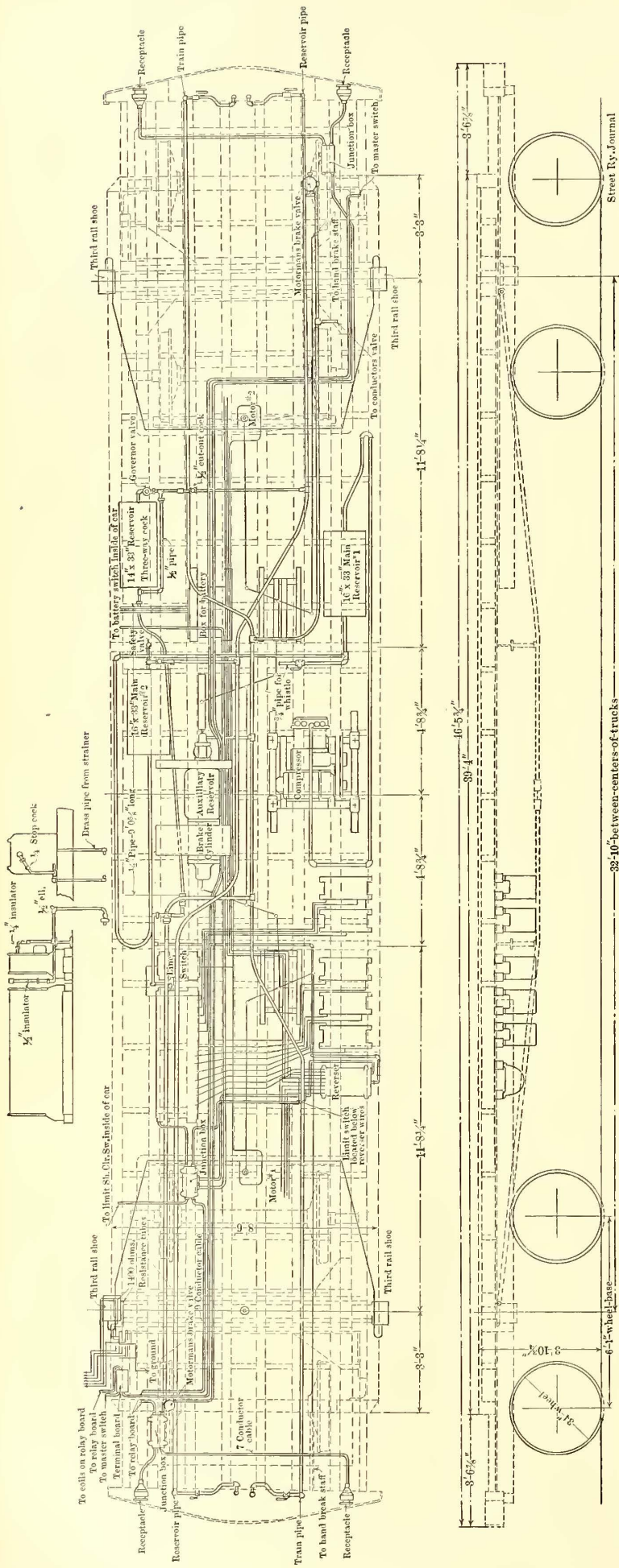
THE MOTOR AND TRUCKS

The car is mounted on Baldwin trucks, having 34-in. steel tired wheels and equipped with inside-hung brakes. One motor, mounted on each truck, is placed on the inside axle. Westinghouse motors known as style No. 121 of 75 hp each are employed, and the general type to which they belong was described at some length in the STREET RAILWAY JOURNAL for Sept. 23, 1905. The frame is split at an angle of 45 degs. The armature is usually changed by removing the top half of the motor casing, and this operation requires only about 30 minutes. If it is desired to change motors rather than armature, the motor may be lifted from the truck by simply removing the gear case and the axle caps.

The brush holder consists of two parts, that holding the terminal, which is bolted to the motor shell, and the carbon holder, which in turn is secured to the terminal holder and is so designed that as the commutator wears down it can be lowered, while the terminal holder remains in one position. This arrangement permits the part holding the brushes to be adjusted or removed from the motor without in any manner disturbing the leads. The armature shaft is much heavier than usual and was so made at the solicitation of the railroad company. A special grade of bronze without babbitt lining is used for the axle bearings. Steam road practice is followed in fitting these bearings. They are fitted direct to the axle by repeated trial and scraping, and with the employment of black lead to indicate the close fitting surfaces. After being so fitted the cars are not given any lengthy preliminary test but are put in service at once. The success of the method of fitting the bearings may be judged from the fact that in the last three years but one car has been brought into the shop because of hot motor axle bearings, and this was caused by negligence in oiling.

THE CONTROLLER

The controller is a special design of the Westinghouse electro-pneumatic system. The chief point of interest about it is probably the fact that it operates in connection with the Sprague multiple-unit system of control. The greater number of the old cars on the company's lines are equipped with this latter type of control, in fact, the system was first installed and was developed largely on this road. At the present time, cars having both the Sprague and Westinghouse controllers are made up in trains indiscriminately, no attention whatever being paid to the type of control on the car. This harmonious operation was accomplished without any rearrangement or changes in the Sprague controller circuits. On the new cars the leads from the control or train line are connected to five relays, shown in the diagram of circuits herewith. These relays close the Westinghouse pneumatic control storage battery circuits and thereby operate the controller. The controller is a modification of the Westinghouse turret type, which was described



PLAN OF CAR ON SOUTH SIDE ELEVATED RAILWAY AND SIDE ELEVATION OF FLOORING, SHOWING ARRANGEMENT OF UNIT SWITCH CONTROL APPARATUS

in the STREET RAILWAY JOURNAL, May 6, 1905, in connection with an article dealing with Brooklyn Rapid Transit cars. The unit switches, instead of being arranged on a circular frame, are installed in a long box in such a manner that hinged covers give access to the main contacts on one side and to the interlock fingers on the other. Although as previously mentioned, this control apparatus was specially designed to work jointly with the original Sprague multiple unit control, the Westinghouse pneumatic system sacrificed none of its automatic devices for the protection of the equipment.

The operation of the controller may be understood by following the wiring as shown in the diagram. On the first point of the controller, relay No. 2 and one of the reverser relays are

gram of the motor and resistance circuits, it will be seen that the closing of the unit switches M1 and JR throws the motors in series with all the resistance in the circuit, and the controller is on the first notch or in the switching position. The closing of these switches also closes a return to B— for wire No. 8, which is supplied with battery current over relay No. 2. Wire 8 leads by way of the limit switch to L, and thence the path continues over M1 interlock (M1-unit switch being closed) to wire 16, over J interlock to 17, over JR interlock to 18, then through the S lifting magnet to 12, and to the line relay, which is located on the relay board with the five relays connected to the Sprague cable. After passing over the relay the path continues through wire 11 to 9 and over the circuit breaker trip to B—. When S closes, wire 20 is connected to

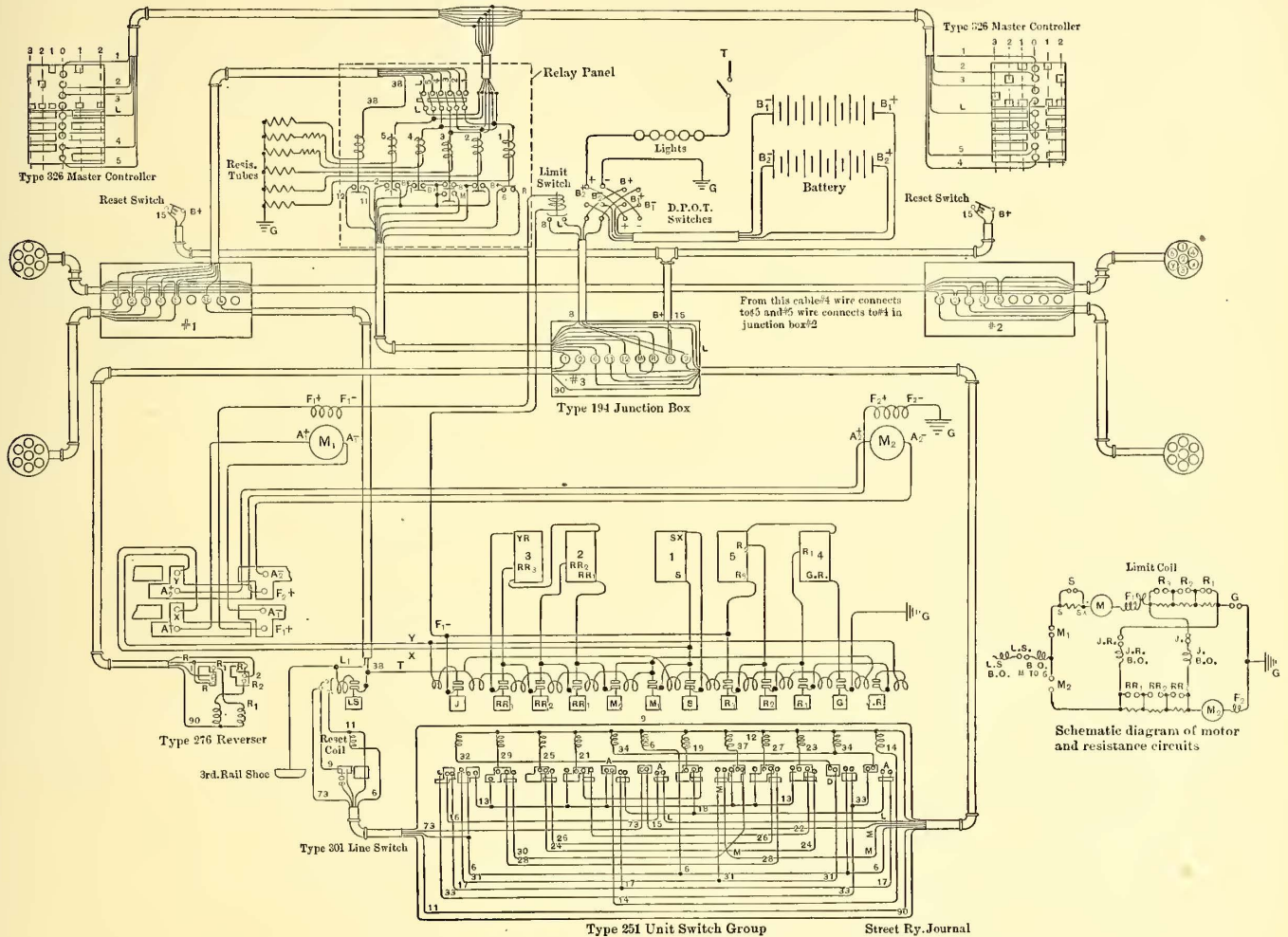


DIAGRAM OF CONNECTIONS, UNIT SWITCH SYSTEM, SOUTH SIDE ELEVATED CARS

lifted. Should number 4 be the reverser relay lifted, wire 1 of the control circuit is connected to B+. Current then flows through No. 1 wire and over the reverse interlock to R1, through one of the reverser coils to 90, through 90 to the line switch interlock, thence to No. 9 and to B— by means of one of the double point double-throw battery switches. The current energizes the reverser magnet, which admits compressed air to its cylinder and throws the reverser, and when the reverser operates, wire R is connected on the reverser interlock to wire 1. Part of the current is shunted through R over to No. 1 relay to wire 6. This wire leads to the interlocks of unit switches S and J. The branch to S passes on through the operating magnet of M1 unit switch, closing this switch, and to B— over 9. The path to the J interlock continues over wire 13 to the M2 interlock, thence to wire 14 and through the JR operating magnet. By reference to the schematic dia-

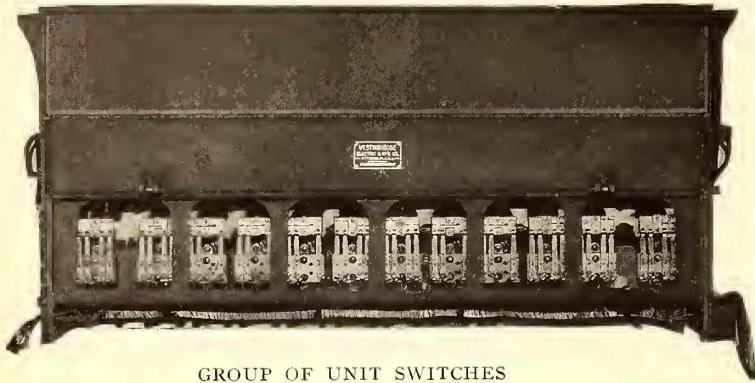
wire 18 over the S interlock and this starts a progressive lifting of the resistance switches. Wire 20 supplies current to the magnet of RR1 switch and this is closed. Then R1 magnet obtains current over 22 and is closed. Switches RR2, R2, RR3, R3, are closed successively in the order given, and the motors are then connected in series with all the resistance cut-out. After these switches have operated they are held closed by current over wire 13.

Throwing the master controller to the second point drops No. 2 relay and raises No. 1. This cuts the battery current off of every part of the controller, with the exception of the reverser and, consequently, all the unit switches are opened.

On the third point of the master controller, No. 1 relay drops and No. 3 picks up. The current over No. 1 relay to wire 6 lifts M1 and JR switches, as before. When these are raised current over wire 8 lifts the switches, cutting out the

resistance and throwing the motors in full series as before. When R3, the last of the resistance switches to operate, closes,

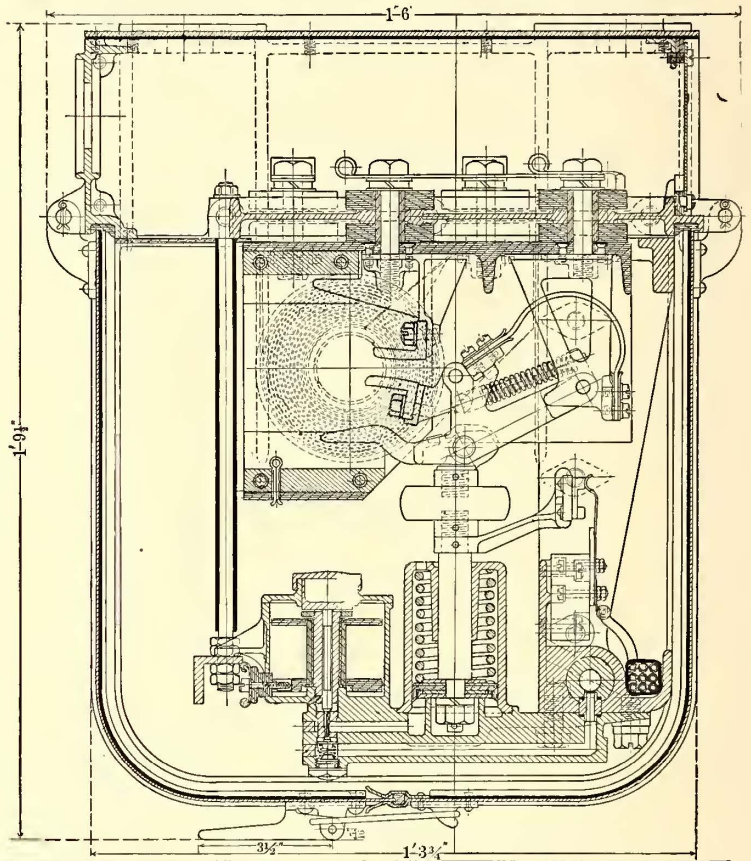
circuit breaker, the circuit breaker trip is operated and the contact between wires 11 and 9 is broken and the current is cut off from the line switch operating coil and from all the switch magnets, with the exception of M1. Before the circuit breaker can be thrown in again, the circuit breaker trips must be reset by closing for an instant the reset switch located under a seat in the interior of the car. Closing this switch supplies battery current to wire 15 and over M1 interlock to 73, and to the reset coil, which throws the trip in and restores connection between wires 11 and 9. The circuit through the reset coil is broken at the M1 interlock when this unit switch is closed, and this prevents the circuit breaker being reset, except when the controller handle is in the "off" position.



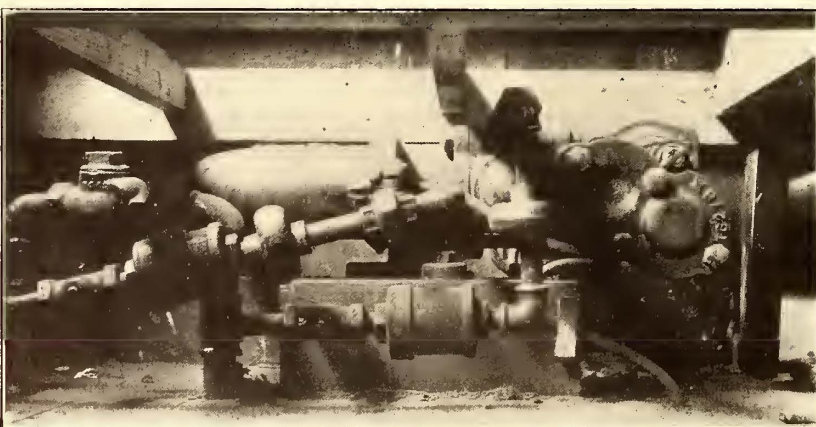
GROUP OF UNIT SWITCHES

wire M from No. 3 relay supplies current over wires 31 and 32 to the magnet of the J unit switch. This switch closes and current is cut off from wire 13. Switch JR and all of the resistance switches, with the exception of S, are consequently opened. The closing of J also connects 33 with B+ through wires 16, L and 8. Current through 33 closes unit switches G and M2. When G closes, J drops as the connection between wires 31 and 32 is broken at the G interlock. The only switches closed now are M1, S, M2 and G. The motors are, therefore, connected in multiple with all the resistance in circuit. When J drops, however, current is supplied to the magnet of S unit switch through wire 18, M2 interlock, wire 17, J interlock, wire 16, M1 interlock, L and the limit switch. Current is also supplied to wire 13 by the dropping of J. All the resistance switches again close successively in their previous order and the motors are connected in full multiple.

By reference to the diagram it will be seen that the return circuit of all the magnets, with the exception of M1, passes from 12 to 11 over the line relay and from 11 to 9 by way of the circuit breaker trip. The magnet of the line relay is connected between the third rail and the ground. The function of this relay is to drop the controller to the "off" position when the power is interrupted, because of gaps in the third rail or any other cause. When the power is restored the switches will automatically notch up again to the former position of the controller without the motorman moving his handle. This prevents the damage to the equipment that would result if power were suddenly resumed with the controller in the



SECTION OF PNEUMATIC UNIT SWITCH



PUMP GOVERNOR INSTALLED UNDER ONE OF THE CROSS SEATS

full multiple position. If by reason of a grounded armature or for any other cause an abnormal current flows through the

limit switch is connected in the circuit of No. 1 motor and when the current through it exceeds a predetermined amount, contact between wires 8 and L is broken. As previously traced, current through L operates the unit switches, cutting out the resistance. When the circuit is broken the progressive lifting of these switches is stopped until the current decreases and the limit switch drops. Those resistance switches that have already lifted, however, do not drop, as they are retained by current through wire 13.

The batteries operating the controller are housed in a box under the car. Two sets of seven cells each are employed. The double-pole double-throw battery switches are mounted on a board under a seat in the interior of the car. When both switches are thrown in one direction, one set is connected to the control system, while the other set is being charged through the ground connection of

the car lights. It is customary to change the position of the switches once each day.

It will be noted that the interlocking arrangement is thoroughly worked out. The switch group cannot operate unless the reverser switch is thrown in the proper direction and in the full position, otherwise the R wire will not make contact. Neither can the reverser be operated if the line switch is closed, as the circuit through wire 90 is open. The control equipment consists of the following parts, the line switch, upon which the circuit breaker is mounted; the unit switch group, the reverser switch, the limit switch, five resistance grids, two double-pole double-throw battery switches, two master controllers, the relay panel and three junction boxes.

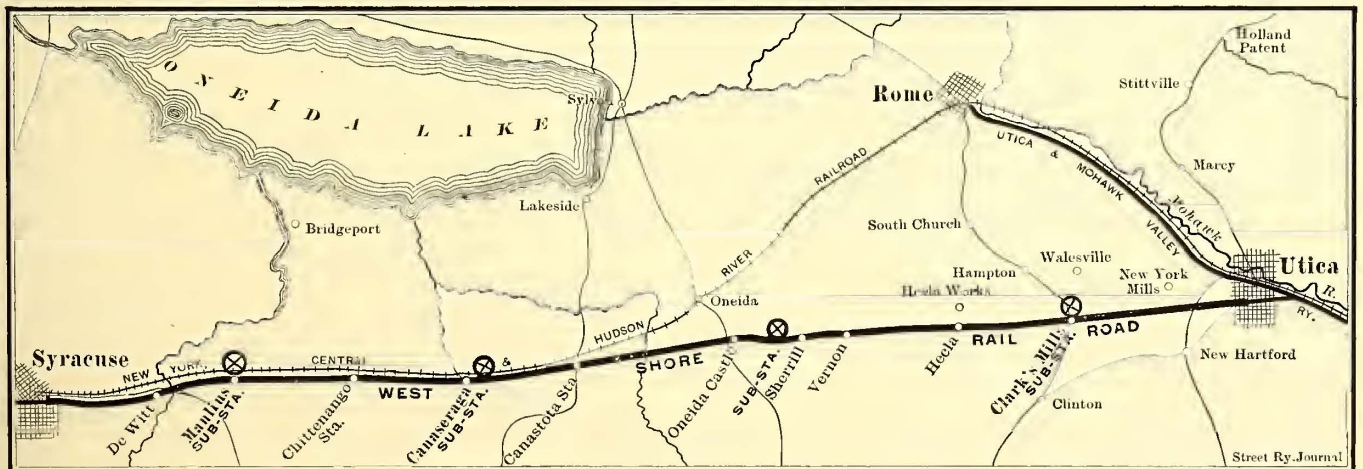
A practice somewhat unusual was carried out in connection with the installation of the apparatus on these cars. When the cars were equipped they were not given trial runs, as is customary, but were put into regular service at once. They are moreover not brought into the shop for inspection until their regular turn, which comes at ten-day intervals. It is possible to follow such a method successfully only by exercising extreme care in the installation of the apparatus. The successful installation of the work is due to the efficiency of the shop corps, under the management of General Foreman George H. Hopkins.

ELECTRIFICATION OF THE WEST SHORE RAILROAD BETWEEN UTICA AND SYRACUSE

About a year ago an agreement was closed between interests identified with the Utica & Mohawk Valley Railway Company, the Oneida Railway Company and the West Shore Railroad whereby, under certain restrictions and stipulations, the Utica & Mohawk Valley and the Oneida Railway interests agreed to lease the tracks of the West Shore between Utica and Syracuse, and to equip this section for electrical operation, the West Shore consenting to relinquish all its passenger business between these two points, but reserving the right to operate freight trains over the section by steam locomotives. Acting under this agreement most of the contracts have been

track road throughout its length. The rails and roadbed of the steam road will not be disturbed but will be bonded at the joints and utilized for electric service. Track connections will be made in Utica with the system of the Utica & Mohawk Valley Railway Company and in Syracuse with the system of the Syracuse Rapid Transit Company, and it is the plan to give through service into the centers of the respective terminal cities, and also to other points on the respective systems. As is generally known, the Utica & Mohawk Valley Railway Company has for some time operated a high-speed, double-track interurban road through the Mohawk Valley from Rome to Little Falls, and the West Shore electrified section, in connection with the systems already in operation, will make possible continuous service from the city of Little Falls to the city of Syracuse and points reached by existing lines radiating from the latter city, thus closing one of the longest gaps in the much discussed continuous electric service from Albany to Buffalo. The distance from Little Falls to Syracuse is 76 miles, of which the section included in the West Shore division, from the city line of Utica to the city line of Syracuse, comprises 44 miles.

It is proposed to give three classes of service over the West Shore tracks between Utica and Syracuse. There will be fast limited cars or trains scheduled to make 40 miles per hour, and local cars or trains scheduled to make 24 miles per hour. These two classes of passenger service will be operated entirely by electricity. In addition, the West Shore will maintain fast freight service, the freight trains to be drawn by steam locomotives and scheduled to make from 15 miles to 18 miles per hour. In order to provide for passing the faster moving units around the slower trains, a third or middle track will be laid between the stations of Clarks Mills and Vernon, a distance of 8½ miles. This middle track will have Y-connections with both outside tracks, and will be used jointly by eastbound and westbound traffic, in order to expedite the movements of all trains. This section will be under the control of switchmen located in interlocking switch towers situated at points that will insure safety and dispatch in the handling of train movements under all conditions of traffic.



MAP SHOWING SECTION OF WEST SHORE RAILROAD BETWEEN SYRACUSE AND UTICA, NOW BEING ELECTRIFIED BY THE ONEIDA RAILWAY COMPANY

let for work and materials involved in electrifying this division of the West Shore. For general convenience and for simplifying the keeping of accounts, all of the construction work will be carried on under the name of the Oneida Railway Company.

The section of the West Shore included in the agreement runs from the westerly city line of the city of Utica to the easterly limits of the city of Syracuse and comprises a double-

On the section between Oneida and Canastota, a distance of 5 miles, two additional tracks will be laid, making four in all, as there are yard limits and watering stations in this section, and it will be necessary to provide the four tracks in order to pass the electric units around freight trains that may be held up in the yards or at water stations.

Power for the electric service will be furnished by the Hudson River Electric Power Company, which controls extensive

water power developments on the Hudson River at Spier Falls, Trenton Falls and Mechanicsville. This company is now building transmission lines from its water power plants as far west as Rome, but, pending the completion of these lines, has built a temporary steam-generating station at Utica to supply the needs of the Utica & Mohawk Valley Railway Company and the Oneida Railway Company. For the electrified section of the West Shore the power company will deliver 60,000-volt, three-phase, 40-cycle current to the Oneida Railway at a sub-station located near Clarks Mills, a short distance west of the city of Utica. From this station west the Oneida Railway Company will build and maintain its own 60,000-volt transmission line and sub-stations. For serving the entire section between Utica and Syracuse there will be four sub-stations, as follows: Station No. 1, located at Clarks Mills; station No. 2, located $1\frac{1}{2}$ miles west of Vernon; station No. 3, located 2 miles west of Canastota; station No. 4, located at Manlius Center. The distance between the sub-stations will average approximately 10 miles.

The operating company's 60,000-volt transmission line will start at sub-station No. 1, and, following in general the line of the West Shore, will run to sub-station No. 4, at Manlius Center. This line will be continuous, that is to say, it will pass into and through each sub-station, taps to the bus bars in each case being taken off within the building through disconnecting switches.

The equipment at all the sub-stations will be the same, and in each case will comprise two 300-kw rotaries, and one three-phase, oil-cooled transformer for each rotary. The design of the sub-stations and of the equipment follows standard practice, no attempt having been made to introduce exceptional features. The General Electric Company will furnish all of the apparatus. The sub-station buildings will be of brick with litholite trimmings, and provision will be made in each station for a lineman's room, store room, hot-water heaters for heating the buildings, lavatories, etc. The rotaries will deliver direct current to the line at 600 volts.

The operating company's high-tension transmission lines will be formed of a seven-strand copper cable for each phase, and the line will be carried on steel tower designed and erected by the Archbold-Brady Company, of Syracuse. These towers embody a number of new features, which will be described in a later article. They are of the square, or four leg, type and the average height of tower will be 39 ft. from the ground to the bottom pin. In special cases, however, taller towers will be installed. The standard spacing between towers will be 480 ft., but this will also be changed in special locations. The transmission cables will be carried on Thomas No. 4002 porcelain insulators. The line has purposely been designed with sufficient capacity to meet the future demands for some time to come.

Direct current will be distributed to cars and trains by means of a third rail of the protected under-running type, as adopted by the New York Central Railroad in its New York City electrical zone. This rail was described in the *STREET RAILWAY JOURNAL* for Sept. 2, 1905. It is of the bullhead, or double head, type, but on the West Shore it will be made of standard carbon steel, as the density of traffic will not require the unusual carrying capacity which impelled the New York Central management to adopt a rail of special composition having low resistivity. The details of the protection for the rail and the exact location on the ties have not yet been fully decided, but the rail will be thoroughly protected with some form of enclosing cover. The third rail weighs 70 lbs. to the yard, and contracts have been placed with the Lackawanna Steel Company for 6000 tons. The third rail will be carried on a bracket which is a modification of the pattern adopted by the New York Central.

For the initial equipment the Oneida Railway Company has placed contracts with the J. G. Brill Company for 15 cars which will measure 50 ft. over all. These will be of the regulation Brill semi-convertible type, and will be mounted on Brill 27-E-2 trucks. The electrical equipment will include four GE-73 motors to each car in connection with the General Electric-Sprague system of multiple-unit control. These cars will also be equipped with graduated release automatic air brakes of the new type recently brought out by the Westinghouse Traction Brake Company. This type of automatic brake is arranged to give perfect control when cars are operated either as single units or in trains, thereby offering all the advantages of straight air in single-car operation and automatic air in train operation.

Contracts have been let to the Roebbling Company for all the bonds required for bonding the third-rail conductor. These bonds will be the regular Roebbling soldered type, and they will be attached to the upper head of the protected third rail. Each joint will be single bonded, having a capacity of 1,000,000 circ. mils at each joint. The third rail will be supplied in 30-ft. sections and a two-bolt fish plate will be installed at each joint.

The track rails are to be bonded with the Ohio Brass Company's all-wire bonds throughout the entire section, with the exception that orders have also been placed for several sample installations of other types of bonds.

The work on the West Shore electrified section is being carried out by the Oneida Railway Company, of which the following are the officers: H. C. Andrews, president; J. J. Stanley and W. K. Vanderbilt, Jr., vice-presidents; Walter Kernan, counsel; Charles B. Rogers, treasurer; C. Loomis Allen, general manager; and W. J. Harvie, electrical engineer.

CAR TESTS ON BOSTON & WORCESTER STREET RAILWAY

A series of tests have been made, during the last month, on one of the passenger cars of the Boston & Worcester Street Railway Company's cars, as thesis work by L. S. Lord and W. C. Redding, post-graduate students at Worcester Polytechnic Institute, under the direction of A. S. Richey, formerly chief engineer of the Indiana Union Traction Company, now assistant professor of electric railway engineering at the institute. A special recording apparatus was built for these tests, semi-autographic in nature, recording speed, line volts, line current, motor volts, motor current, brake pressure, locations and time. These values were plotted on a sheet of paper, 30 ins. in width, which moved at a constant speed of 2 ins. per minute. Each of the six first values mentioned above were allotted a space $3\frac{1}{2}$ ins. in width, and were represented by curves, while the locations and time were each represented by a straight line at one side of the paper. In addition to this recording apparatus, wattmeters were installed on the car, showing total power consumption, power used by air compressor, power used by type-M control circuits, and I^2R losses in one motor's field. A General Electric recording ammeter served as a check on the total current curve of the larger recording apparatus. The car was run on regular schedule time, making all stops, and five round trips were made between Worcester and Boston. About 300 lineal ft. of record was made, from which the results are now being deduced.

The American Street & Interurban Railway Association has just printed in bulletin form the constitution and by-laws of its three affiliated associations: The Accountants' Association, the Engineering Association, and the Claim Agents' Association,

TABULATION OF TRAFFIC STATISTICS IN BERLIN

BY A. STAVENOV,
Traffic Manager, Grosse Berliner Strassenbahn.

It is of great importance for the traffic manager of a street railway company to analyze the conditions under which his individual lines are operated. He should not only know whether too many or too few cars are being run to satisfy the demand on each portion of each route, so that he can change the schedule if necessary, but should also be acquainted with the class and direction of passengers carried on each route and their average length of ride. The value of this latter information is particularly important in the case of suburban lines. If, for instance, a line extends through a high-class residential district to a manufacturing center; or vice versa, if it passes through a manufacturing district into a high-class suburb, it may be well to determine whether it would not be better to give each district a separate service. On the other hand, it may often be desirable to consolidate two services,

voice their requests so loudly, are often more valuable to the railway company from a traffic standpoint. If a railway company knows exactly where its passengers come from and where they are going, and how many passengers are using each line, it is in the best position, not only to arrange its schedules in the most efficient way, but also to prove to the

REPORT FOR WEDNESDAY, FEB. 8, 1905.	
Line No. 23/24.	
Gesundbrunnen (Pankstrasse E. Badstrasse)	Nettelbeckplatz-Potsdamerstrasse. (E. Gross Gorschenstrasse)
Passenger Km	48,288
Motor-Car Km	2,329.92
Trail Car Km	997.12
	3,827.04
Passengers on fare tickets	10,821
Passengers on commutation tickets (collected Feb. 9. 05.)	2,866
	13,687
Fare Ticket Receipts on Feb. 8, 1905	1,082.10 marks
Commutation Ticket Receipts for Feb. 8, 1905	153.66 marks
	1,235.76 marks
Average increase per passenger, km	2.55914 pf
Average ride of a passenger	3.53 km

FIG. 1.—TYPICAL REPORT, REPRODUCED FROM FRONT OF TRAFFIC CARD.

No. of Passengers Counted.	Line No. 23/24. Gesundbrunnen - Nettelbeckplatz - Potsdamerstrasse.										No. of Trips	
	386 Trips					382 Trips						
10000	217.04 Car-Km.	370.56 Car-Km.	432.32 Car-Km.	679.36 Car-Km.	308.80 Car-Km.	366.72 Car-Km.	214.48 Car-Km.	305.60 Car-Km.			390	
9000			7125 Pass.	7844 Pass.	7734 Pass.						360	
8000				272 Trips							330	
7000				478.72 Car-Km.	217.60 Car-Km.	257.28 Car-Km.	171.52 Car-Km.	214.40 Car-Km.			300	
6000	174.08 Car-Km.	261.12 Car-Km.	304.64 Car-Km.	13805 Pass.-Km.	6187 Pass.-Km.	5437 Pass.-Km.	5220 Pass.-Km.				270	
5000	218.61 Car-Km.	123.52 Car-Km.	5612 Pass.-Km.								240	
4000	146 Trips	3532 Pass.									210	
3000	163.52 Car-Km.	87.04 Pass.-Km.	2390 Pass.-Km.								180	
2000	1855 Pass.										150	
1000	2088 Passenger Km.	594									120	
											90	
											60	
											30	
	Km.	1.12	0.32	0.64	0.96	1.12	1.76	0.80	0.96	0.64	0.80	= 9.12 Km.
	Park	Nettelbeckplatz	Weddingplatz	Nordhafen	Stendaler	Criminal Court	Brandenburger Thor	Potsdamerplatz	Lützow	Bilow	Gr. Gorschen	
Receipts, Marks	53.43	15.20	57.84	143.62	204.22	353.29	158.33	133.59	65.36	50.88	Receipts	1235.76
Expenses, Marks	55.22	33.24	56.48	84.73	98.85	155.33	70.61	83.70	55.79	69.75	Expenses	758.70
Surplus			1.36	58.89	105.37	197.96	87.72	49.89	9.57		Surplus	477.06
Deficit	1.79	13.04								18.87	Deficit	

FIG. 2.—REPRODUCTION OF BACK OF TRAFFIC CARD, COMPILED EVERY SIX MONTHS FOR EACH LINE.

and so economize in operating expenses. In determinations of this kind, statistics point the way with greater accuracy than the opinions of conductors or the suggestions of passengers. Both conductors and passengers are often guided in their advice by purely personal reasons. Thus the higher class residential districts are occupied, as a rule, by influential citizens who will often demand better transportation facilities than their patronage warrants. On the other hand, the people in the more densely populated sections, who do not

authorities and others that its decisions are based upon a scientific and business basis.

City electric railroading has now reached a point where the most serious technical questions concerned with construction and equipment have been settled. Apparatus is now so standardized that the most important problems connected with city transportation is the proper handling of the traffic. This is, of course, as it should be, because the handling of traffic is the life business of every railway company. In Ber-

lin the work of keeping track of the changes and traffic conditions is carried on as explained in the following paragraphs:

An elaborate report or "census" is taken twice a year of the passengers carried on a day of normal traffic. For this purpose the entire surface railway system of Berlin, which includes the Grosse-Berliner Strassenbahn, the Western and Southern Berlin Suburban Line and the Berlin-Charlottenburg division is divided into about 300 sections, from 1 km to 1½ km (2-3 mile to 1 mile) in length. Upon entering each section, the conductor looks over his passengers and

(g) free tickets for the employees of the railway, nurses in charitable institutions, etc.

The figures thus compiled are compared for the different lines, and calculations are made of the receipts and expenses per passenger kilometer; motor-car kilometer, and the trail-car kilometer. The average operating expenses for all lines last year, exclusive of depreciation, was 27 pf. (6¾ cents) for a motor-car kilometer, and 13 pf. (3¾ cents) per trail-car kilometer. It will be noted that the novel features of these statistics are the determination of the passenger kilometers, the income per passenger kilometer, and the average length



FIG. 3.—RELIEF MAP OF THE SURFACE RAILWAY SYSTEM OF BERLIN AND ENVIRONS, INDICATING THE DENSITY OF TRAFFIC

marks their number on a special form. He also notes the number of seats within the car, and how many of them are empty. Further, the conductor must indicate how many persons were not permitted to ride on account of the necessity of complying with the police regulations, which permit only a certain number of standing passengers. For instance, only three school children, riding on reduced fare tickets, are permitted to stand in a car.

The different classes of passengers are tabulated according to the following six classes of tickets, which are in force: (a) Ordinary tickets sold by the conductor; (b) monthly commutation tickets; (c) workmen's weekly tickets; (d) school tickets; (e) postmen's tickets; (f) policemen's tickets;

of a ride taken by a passenger. This last fact naturally is of great value in determining the earning capacity of a given line.

A typical card, tabulating the results secured at the "census" taken Wednesday, Feb. 8, 1905, on line No. 23-24, is reproduced in Figs. 1 and 2. The front of the card (Fig. 1) gives a resumé of the detailed data presented on the back (Fig. 2), and shows the average income per passenger kilometer and the length of an average ride. From Fig. 2 it will be seen that for varying distances along the line observations are taken of the number of passengers, the number of trips, car kilometers, etc. The operating expenses are then figured out for every section of the line, so that it is possible to tell

whether the service is paying expenses or not. Reference to the number of passengers on the different sections will show the possibility of cutting down useless mileage, by reducing the number of trips on sections where the passenger traffic begins to show a decided decrease.

If objection be made that the statistics thus secured are inexact, the writer would point out that the same relative figures were obtained when observations were obtained on a number of days. It is understood, of course, that the entire inspection staff gives careful attention to statistical work of the conductors on the day set, helping them out where necessary. The results are then worked out by one official, who has done this work for the last five years. The statistics thus secured, and the results deduced from them, are of great assistance to the traffic officers, and give them additional pleasure in pursuing their work.

In connection with the annual traffic census, the writer has devised a method for showing the density of traffic on all of the lines of the Berlin Street Railway system and its suburban connections. For this purpose strips of wood of varying thickness are prepared and placed on a map of the city, so as to cover the routes of the different lines. The thickness or height of each piece of wood is made proportional to the passenger traffic per kilometer, that is, 1-mm thickness corresponding to every 1000 passengers. The strips are also colored, blue strips being used for traffic between 1000 and 25,000, yellow for 25,000 to 50,000, green for 50,000 to 75,000, red for 75,000 to 100,000, and white for 100,000 to 125,000. It is possible, therefore, from this relief map, to secure rapidly an exact idea of the amount and distribution of traffic on all the lines. It will be noted from the perspective view, Fig. 3, that the heaviest traffic is in the center of Berlin, along Potsdamerstrasse and Leipzigerstrasse. Along this route the company intends to build a four-track shallow subway, through which it will operate cars of the ordinary surface type. The completion of this subway would greatly reduce the traffic congestion on two of the main streets of Berlin.

AUTOMATIC SPRINKLER SYSTEM IN CLEVELAND

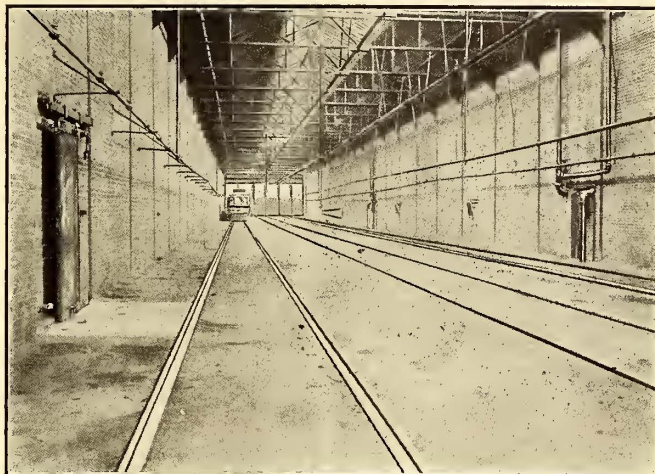
The Cleveland Electric Railway Company, of Cleveland, has just completed the equipment of all of its permanent car houses with automatic sprinkler systems. There are twelve houses, including the repair and car shops, making the most



WINDERMERE CAR HOUSE

extensive installation of sprinklers ever ordered by a street railway company. It will be remembered that the first tests of automatic sprinklers for car house protection took place in Cleveland, and the installations which have been perfected as the results of these tests may now be regarded as standard.

After the first tests the company placed its entire contracts open for competitive bidding, and the order was secured by the General Fire Extinguisher Company, of Providence, R. I. The system of placing sprinklers between tracks of car houses, which was demonstrated in the early Cleveland tests to be most desirable, was adopted for all of these installations,



WINDERMERE CAR HOUSE, SHOWING SIDE LINES AND NEW FIRE WALL

the repair shops included. The extent of the Cleveland installation may be seen from the following table showing the number of roof and side sprinklers installed, the height and size of tanks, etc.

CLEVELAND FIRE PROTECTION EQUIPMENT

Name	Cars, Cap.	Roof Sprinklers	Side Sprinklers	Tanks	Height, Feet	Capacity, Gallons
Windermere	84	942	592	1	65	50,000
Lake View shops	8	1,440	521	1	65	50,000
Wilson	54	742	440	1	75	50,000
Rocky River	64	1,036	700	1	75	40,000
Lorain	64	1,345	612	1	75	50,000
Hough	40	540	390	1	75	30,000
Cedar	72	900	700	1	55	40,000
St. Clair	40	433	235	1	55	40,000
Superior	60	550	450	1	75	50,000
W. Madison	40	282	346	1	65	30,000
S. Brooklyn	36	336	420	1	65	30,000
Miles Ave.	80	795	800	2	75	35,000

The sprinkler heads are of the standard Grinnell type which are fusible at a predetermined temperature. The roof and side sprinkler systems are connected separately, and there is a 6-in. riser to each 200 sprinkler heads. The side sprinkler lines are placed according to the height of the standard car, so that the water will discharge just below the top of the car windows. The sprinklers under ordinary pressure will cover 64 sq. ft. of surface. The side sprinklers on the lines between the cars are placed 7 ft. apart. Those in the roof are 8 ft. to 9 ft. apart, depending somewhat upon the character of the roof. In the early fire tests it was thought that it would be necessary to provide some sort of a hood for the aisle sprinklers to prevent them becoming flooded and cooled by those above, as the roof sprinklers usually open first, but in later tests it was found that this was not necessary, so that the sprinkler heads are uniform throughout. The various mains are controlled by gate valves at the bases of the risers, so that in case of breaks in any portion of the system, that section can be cut off. There are also post indicator valves on the outside of the building, and some 30 ft. away, so that in case of fire and a desire to throw extra pressure on certain sections, any section can be shut off from the outside without endangering the lives of attendants.

At the Lake View shops, which are heated, the various pipes are constantly under water pressure, but during the win-

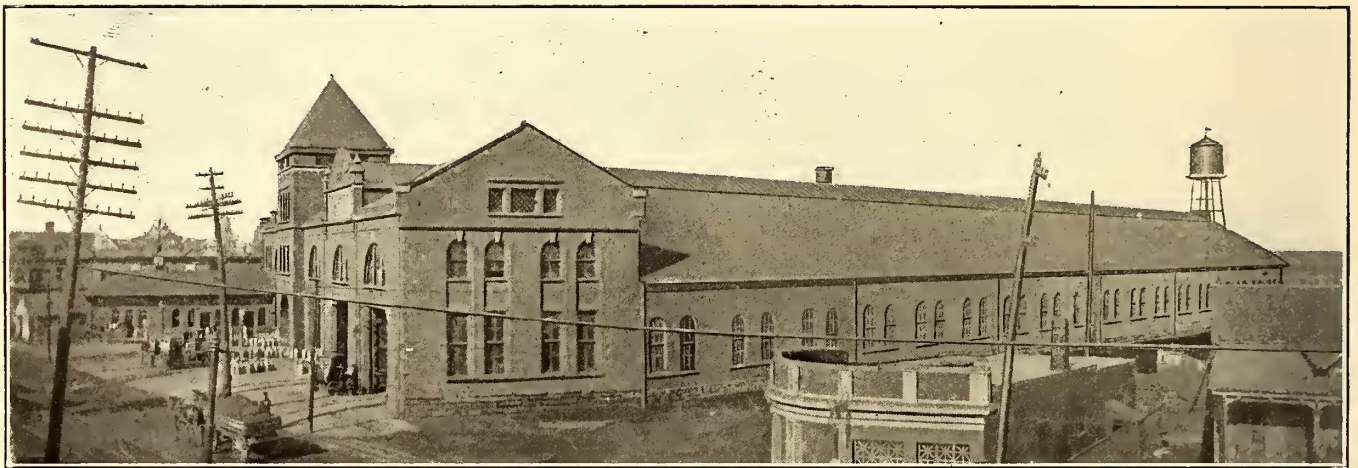
ter in the other houses the air system is used. The various pipes are charged with air at from 20 lbs. to 40 lbs., and the water is held below the freezing point by a valve in which the area on the air seat is 8 times greater than the area on the water seat. When a fire occurs and the sprinklers are fused, the air pressure is released and the water quickly follows to the sprinkler heads that have been fused.

Each system has two sources of water supply; water from the city mains and pressure from a large wood tank placed on a steel tower. In various parts of the city, where the city water pressure is from 70 lbs. to 90 lbs., this is used as the main supply, and the tanks are considered an auxiliary, while in other parts of the city, the chief dependence is placed upon the tanks. At the Miles Avenue car house, two 35,000-gallon tanks were erected to insure ample pressure and supply. Each system is provided with two or more Siamese fire steamer connections, and the chief of the fire department, after seeing numerous tests, has given orders that the first steamers arriving at a car house fire shall connect with the Siamese sprinkler connections and throw their pressure into the sprinkler system. It has been found that the pressure furnished by a steamer is sufficient to deluge any fire in a very short time.

All parts of the Lake View shops are protected by roof

rooms, motormen's and conductors' rooms and other places designated for that purpose. Oil must be kept in the oil storage house. If a fire is started in a car stove while the car is in any building, or if kindling is saturated with oil in any building, or if ashes are taken from any car stove while the car is in the building, the fact must be reported. If a car stove or chimney is broken or in bad condition, it must be reported at once for repair. The apparatus for heating must be safely arranged and all chemical extinguishers charged free from frost and in good order. Fire pails must be kept full of water in summer and with sand in winter. All fire hose must be in place and in good condition, and employees should know where to find it and how to use it. Hydrant houses must be kept in good order and equipped with lanterns, axes, spanners, wrenches and hose ready for use. All pits, closets, floors, benches, shelves and corners must be kept free from dirt and grease, and all oily waste not in immediate use must be placed in standard waste cans with self-closing lids. The inspectors are encouraged to suggest any improvements or changes in construction or operation that will, in their opinion, lessen the hazard of fire. All reports of repairs or suggestions must be sent to the master mechanic.

The equipping of the various houses with sprinkler systems



LORAIN CAR HOUSE, SHOWING TANK

sprinklers, and wherever cars are placed for repairs or painting there are aisle sprinklers as well. The company stores a number of cars in the open, and plans are being made to place sprinklers between the tracks in these yards. In these cases it is not the intention to install automatic sprinklers, as each yard has attendants whose first duty it would be to open the valves as soon as a fire was discovered.

In connection with the installation of sprinkler systems, the company has done a large amount of work in the way of otherwise reducing fire risks. Fire walls were built in a number of car houses, thus reducing the chances of fire spreading. Tracks were inclined at the front entrances to facilitate easy removal of cars. A large number of windows were bricked up and fireproof doors installed in place of ordinary wooden doors. Fire hydrants with hose have been installed in a large number of places, and chemical extinguishers have been placed in all buildings. An employee of intelligence and ability has been appointed at each building to have charge of the fire apparatus and make inspections, and printed instructions as to the general care and degree of cleanliness to be observed are posted in all buildings.

A chief inspector also examines all buildings twice a week and reports all necessary repairs. Floors must be swept once a day and all dirt and refuse placed in proper receptacles. Smoking is not permitted in any building, except in club

and other improvements instituted represent an investment of between \$175,000 and \$200,000, but it has effected a saving in premiums of more than \$35,000. The company also has the protection, which cannot be measured in dollars and cents, of feeling almost absolutely assured that it is not likely to again have its service interrupted by the loss of a lot of cars, which was its experience in three serious fires within the past few years.

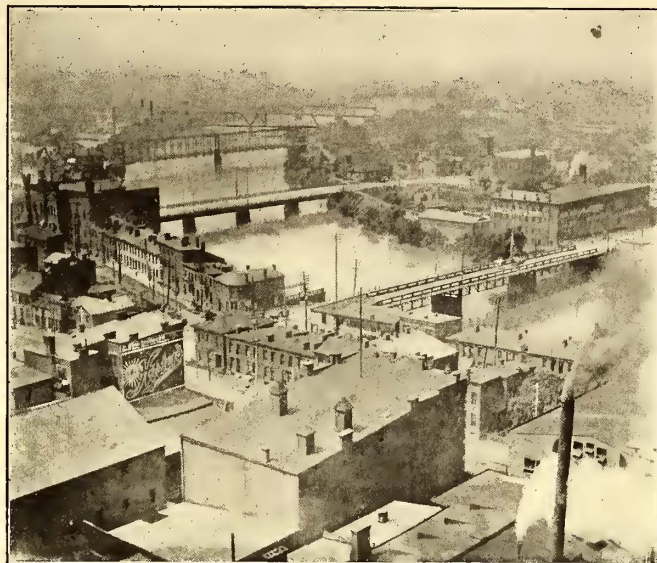
The Central Passenger Association has decided that steam roads in Ohio shall make a charge of 10 cents more than the regular fare for cash fares on trains. The cash-fare receipt to be good for a rebate of 10 cents if presented at any station in the State within 30 days. Several of the electric railways in that State have also adopted this policy, as it discourages the payment of cash fares on trains and relieves the conductors of having to carry so much change. The Central Passenger Association has announced that in the future all fare-and-a-third convention rates will be cut out in Ohio, as the result of the 2-cents-a-mile law in that State.

The waiting room for the interurban lines leading into Detroit has been moved to a more accessible location in the Newberry Building, on the corner of Larned and Griswold streets.

PLANS FOR THE COLUMBUS CONVENTION

A meeting was held in Columbus, May 14-15, of representatives of the American Street & Interurban Railway Association, the American Street & Interurban Railway Manufacturers' Association, and the Columbus Board of Trade, to discuss the preliminary arrangements for holding conventions of the four street railway associations in Columbus next October. There were present from the American Street & Interurban Railway Association, President Ely, Secretary Swenson, Richard McCulloch, of St. Louis; John J. Stanley, Cleveland; F. N. Brooks, of Detroit, and Theodore Stebbins, of Columbus, and the following representatives of the street railway companies in Columbus: Columbus Railway & Light Company, President R. E. Sheldon, Vice-President and General Manager E. K. Stewart, Secretary and Auditor P. V. Burington, Assistant General Superintendent L. G. White; Columbus Railway Company, President Butler Sheldon; Scioto Valley Traction Company, President Frank A. Davis, Vice-President E. R. Sharpe, Counsel H. N. Daugherty; Columbus, New Albany & Johnstown Railway Company, President D. J. Ryan; Columbus, London & Springfield Railway Company, General Manager J. L. Adams. Those representing the American Street & Interurban Railway Manufacturers' Association were: James H. McGraw, of New York; Charles C. Pierce, of Boston; E. H. Baker, of New York; J. R. Ellicott, of New York; C. A. Tupper, of Milwaukee; C. K. King, of Mansfield, Ohio; D. B. Dean, of Chicago, and Secretary Keegan. Those representing the Columbus Board of Trade were: President R. Grosvenor Hutchins, Secretary John Y. Bassell and Henry C. Pirrung, chairman, and B. H. Harmon, secretary, of the Convention Committee of the

one of the private cars of the Columbus Railway & Light Company. The grounds are reached in about 15 minutes from the center of the city by the street railway line extending out High Street. The Ohio State Fair Grounds comprise 115



THE SCIOTO RIVER AT COLUMBUS

acres, and are undoubtedly the largest and finest in the country. They represent, with their buildings, an investment on the part of the State of about \$2,000,000, and heretofore have been used exclusively for the State agricultural fairs, which are held during the first part of September. Through the



VIEW OF COLUMBUS, LOOKING NORTH ON HIGH STREET TOWARD STATE FAIR GROUNDS

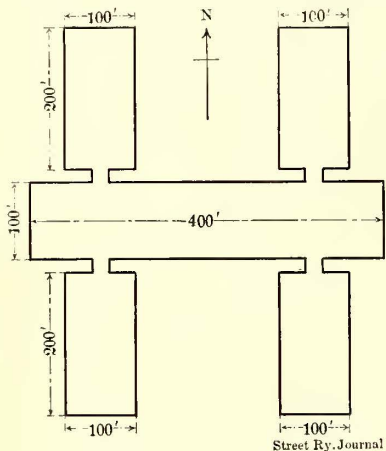
Board of Trade. The State Board of Agriculture, which extended the use of the Fair Grounds, was represented by Messrs. Taylor, Calvert and Fleming. D. N. Kelly, president of the Iroquois Hotel Company, which controls a number of the principal hotels in the city, was also present.

The delegates first visited the State Fair Grounds, where it is proposed to hold the convention, and were taken there on

courtesy of the State Board of Agriculture, however, permission has been accorded to the Columbus Board of Trade to extend their use, without charge, to the American Street & Interurban Railway Association during its convention on Oct. 15-19.

For practically the first time in the history of the association, with the exception of Philadelphia, more exhibit space

is available than will be required. The spacious grounds are dotted with a large number and variety of buildings for exhibit purposes, but it has been decided to confine the exhibits at the convention to a substantial and handsome group of five brick buildings, which are near the entrance to the grounds, and which provide in the neighborhood of 120,000 sq. ft. All of this space will probably not be required. The central building of the group, shown in the accompanying plan, is divided by walls into three rooms and the meetings of the main association will be held in one of these rooms, known as "West Central Hall." This hall is approximately 100 ft. x 150 ft. Several smaller halls adjoin this main hall and are well suited for the meetings of the Engineering, Accountants' and Claim



PLAN OF CONVENTION BUILDINGS AT COLUMBUS

Agents' associations. There is also a large number of still smaller rooms, suitable for committee use. It has also been thought advisable to establish a buffet on the grounds during the convention week for the convenience of those who do not wish to return to the city between the morning and afternoon sessions. The grounds are eminently suited for this purpose, as they possess several buildings with permanent kitchens and dining rooms, and arrangements will be made for having a first-class caterer on the grounds.

As the State Fair will be held about a month before the street railway convention, the grounds will be put in good

put the exhibits in condition, also to secure a switch into the grounds from either the Big Four Railroad or the Pennsylvania Railroad, both of which pass by the grounds, so that exhibits can be taken directly to the buildings. Satisfactory arrangements have also been made with the proprietors of four principal hotels in the city by which accommodations, which it is expected will be sufficient for the purposes of the associations, will be reserved for those attending the convention. If this number is not sufficient the hotel proprietors promise additional rooms, and have given every assurance that ample space will be provided. An agreement has been made that only regular rates will be charged. As Columbus is the capital of Ohio, it is exceptionally well provided with good hotel accommodations.

In the evening of May 14 the delegates present were entertained by Mr. Pirrung, of the Board of Trade, at a very handsome dinner at the Hotel Chittenden. Among the table decorations was a miniature electric train, which traveled around the table and was stopped by the toastmaster in front of each speaker as he was called upon for remarks. The menu was in the form of a strip of street railway tickets, similar to those issued by the Columbus Railway & Light Company.

PROGRAM OF THE CONVENTION

During the meetings of the convention committee, a meeting was also held of the Committee on Papers and Topics, of which two members, Messrs. McCulloch and Stebbins, were present with the secretary of the association. While the program cannot yet be announced in detail, it might be said that it is proposed at present to hold sessions of the Engineering and Accountants' associations on Monday, Tuesday and Wednesday; of the main association on Wednesday, Thursday and Friday, and of the Claim Agents' Association on Thursday and Friday of Convention Week. Meetings of all the associations will be held both morning and afternoon. The Wednesday morning session will probably be made a joint session of all five of the associations, including the Manufac-



VIEW OF STATE HOUSE AT COLUMBUS

shape at that time and the Board of Trade has agreed to see that the grounds are maintained in good condition at the time of the meeting, to make provision for heating the buildings if necessary, for lighting them and for supplying them with power. Telephone, telegraph and postal facilities will also be installed. The power for the buildings will be taken from the mains of the Columbus Railway & Lighting Company near the grounds, and will be 500-volt d. c. and 110-volt and 220-volt a. c. The Board of Trade has also agreed to see that no excessive charges are made to exhibitors by local teamsters, carpenters, sign painters and others who will be required to

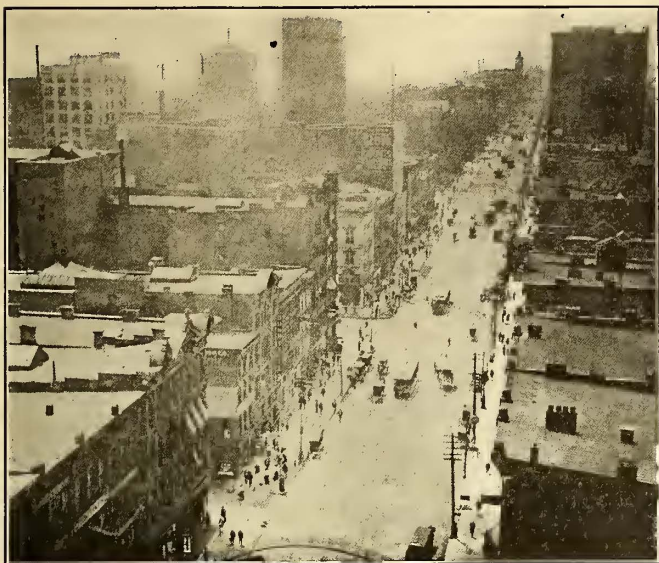
turers' Association, with addresses by the five presidents, which will outline the progress made during the year in association work.

The Wednesday afternoon session of the main association will be devoted to reports of standing committees. At Thursday morning's session interurban railway topics will be considered and an excellent line of papers discussing interurban railway management and operation has been secured. Thursday afternoon's session will be devoted to subjects connected with employees, and several papers have been promised on welfare work, selection, instruction and discipline of em-

ployees and kindred topics. Friday morning's session will probably be executive in its character and Friday afternoon will be devoted to unfinished business and the reports of any

cities in Ohio, such as Cleveland, Toledo, Dayton and Cincinnati, and the city is connected by several routes with the inter-urban electric railway systems of Indiana and Southern Michigan. Although in size the city is somewhat smaller than any which has been adopted as a convention city by the association in recent years, its hotel facilities are excellent and commodious, and its facilities for exhibits, as already outlined, are unexcelled. Moreover, the city has taken care of a number of conventions during past years and is used to carrying meetings of this character. It is the capital city of Ohio and has a population at present, on a basis of registered voters and school enumeration, of somewhat over 160,000, or nearly double the population in 1890.

It is reached by all of the principal trunk lines, eighteen steam railroads entering the city. A circle with a 500-mile radius and drawn with Columbus as a center would include a large number of the most thickly populated portions of this country, and would embrace within its outside limits such cities as New York, Toledo, Milwaukee, Dubuque, St. Louis, Memphis, Birmingham, Ala., Atlanta, Savannah, and Norfolk, Va. This location brings the city within a night's ride of a very large portion of the Eastern, Middle and Southern States.



HIGH STREET, LOOKING SOUTH, COLUMBUS

committees, such as the Nominating Committee, which have been appointed during the session.

COLUMBUS AS A CONVENTION CITY

Columbus seems eminently suited for the purposes of the association as a convention city, and its choice is particularly appropriate at this time, as it possesses an up-to-date and well-equipped street railway system of its own, and is also the terminus of a large number of extensive interurban systems, among which are some of the longest and highest speed lines in the country. It is possible to travel from Columbus by electric car to all of the principal

TRAFFIC STATISTICS FOR NEW YORK CITY

The Board of Railroad Commissioners has just issued its quarterly report of statistics of passengers carried, car mileage, etc., for the street railway companies of New York City, covering the first three months of 1906. The principal figures are given below, with the percentage increase in the cash fares, transfers, and car miles run. As will be noticed, the increase is large, owing largely in the case of the surface roads to the fact that the very severe winter experienced during the first three months of 1905 reduced the traffic on these lines below the normal. On the other hand, the Subway figures cover a larger mileage than did those of 1905.

TABLE SHOWING TRAFFIC STATISTICS FOR ALL ROADS IN NEW YORK CITY FOR FIRST THREE MONTHS IN 1906

	Cash Fares	Increase	Transfers	Increase	Car Miles	Increase
New York City Railway.....	89,454,011	8,769,416	44,436,241	6,820,867	13,620,424	1,382,099
Interborough—Elevated	65,733,985	3,219,025	†	.....	15,253,524	1,147,729
Interborough—Subway	41,029,733	11,491,007	†	.....	8,469,144	1,498,505
Total Manhattan Borough.....	196,217,729	23,479,448	44,436,241	6,820,867	37,343,092	4,028,333
Brooklyn Rapid Transit.....	80,184,600	10,021,446	19,679,629	4,763,391	14,723,417	1,646,438
Coney Island & Brooklyn.....	6,520,794	323,111	1,335,259	11,201	1,406,494	87,833
Van Brunt Street & Erie Basin.....	418,310	21,285	31,730	*2,873	53,549	3,617
Total Brooklyn Borough.....	87,123,704	10,365,842	21,046,618	4,771,719	16,183,460	1,737,888
New York & Queens County.....	3,379,883	615,110	771,210	182,903	828,246	102,964
Long Island Electric.....	599,305	82,556	†	.....	184,495	21,199
Ocean Electric.....	95,022	35,667	†	.....	48,340	14,454
Total Queens Borough.....	4,074,210	733,333	771,210	182,903	1,061,081	138,617
Staten Island Midland.....	603,535	110,967	53,110	9,001	274,730	64,388
Richmond Light & Railroad.....	966,670	154,061	96,501	13,910	286,237	29,799
Total Richmond Borough.....	1,570,205	265,028	149,611	42,911	560,967	94,187
Union Railway.....	8,156,836	2,161,718	1,711,808	*970,955	1,762,625	516,847
Southern Boulevard.....	196,481	55,881	97,276	*24,574	86,991	6,562
Total Bronx Borough.....	8,353,317	2,217,599	1,809,084	*995,529	1,849,616	523,409
Total New York City.....	297,339,165	37,061,250	68,212,755	10,822,871	56,998,216	6,522,434
Percentage increase.....	12.4	.....	15.7	.....	11.5	.....

* Decrease. † No transfers reported.

STREET RAILWAY SITUATION IN SAN FRANCISCO

(From Our Own Correspondent.)

Through the magnificent work of the officials and employees of the United Railroads the street railway situation in San Francisco is being materially improved every day. On May 8th every electric line in the city outside of the burned district was in operation. Cars are now operated on Market Street as far as Twentieth and Castro Streets, which is as far as electric cars can be operated in that direction, on account of the heavy grades on Castro Street.

O'Farrell, Ellis, Eddy and Turk streets have practically been cleared of all dangerous walls, and as a result there will be an improved service between Fillmore and Market streets. Cars on the Ellis and O'Farrell Street lines will run through

also had to be torn down in places, and braced in others. From now on the company expects to have plenty of power to operate sufficient cars to meet street railway transportation needs of the city.

Under the temporary system of making the trolley wires carry the current, the feed wires having been disconnected by orders of the lighting committee, the United Railroads is experiencing considerable difficulty in meeting the heavy demand for power at points remote from the power stations. This condition of affairs, however, will be remedied as fast as the construction crews can restore the connections.

The officials of the United Railroads are bending every effort toward placing the system on a practical operating basis, and already has 350 cars in operation. Out of a total of 3000 men employed previous to the fire, 2200 men are



VIEW REPRODUCED FROM PHOTOGRAPH TAKEN MAY 6, 1906, INDICATING RESTORATION OF ELECTRIC RAILWAY SERVICE TO SAN FRANCISCO'S FAMOUS FERRY BUILDING

the burned district as far as Market Street, and on the Turk and Eddy Street line to the Ferry, by way of Market Street.

A regular service has been established to San Mateo, the first car getting through to San Mateo on May 5th. The tracks of this line were badly depressed at several places where they crossed filled ground, and a large force of men has been continuously engaged since the first day of the earthquake in getting the roadbed into shape. The car that first reached San Mateo, eighteen days after the earthquake, received a big ovation from the citizens of that popular suburb.

The large North Beach power plant of the United Railroads, which suffered considerable damage from the earthquake, has been repaired and was placed in operation on May 6 for the first time since April 18. Steam and water pipes had to be repaired and the heavy roof of the power house, which partially fell in on the machinery, had to be removed and replaced by a temporary canvas covering. Damaged walls

now at work. Weekly pay days have been established to meet the necessities of its employees, in lieu of the former practice of paying once a month.

In a report on the street railway situation to the general relief committee, Thornwell Mullaly, assistant to the president of the United Railroads, stated that of the 280 miles of street railways in San Francisco 258 miles belonged to the United Railroads. Ninety-three miles of road lay within the burned district, and of this eighty miles were in the United Railroads system, consisting of twenty-five miles of cable road and fifty-five miles of electric lines. He declared that the work of reconstruction following the earthquake and fire had never been equaled in the country, and praised the labors of the company's employees that resulted in putting a number of its lines in shape for operation so soon after the calamity.

At the request of the relief committee, the company is now keeping its receipts from car fares, after having donated for

the relief work about \$10,000 of gross receipts for the first four days' operation. In addition to this donation, the United Railroads contributed \$75,000 to the relief fund. Of this latter amount \$14,000 was expended for provisions at the very beginning of the trouble. A man had been hurried to Sacramento to purchase supplies, and a boatload of provisions had been hurried to San Francisco and landed at the Government dock, where they were distributed by the military authorities. This was the first boatload of supplies that reached San Francisco.

The officials of the United Railroads state if the company is given a free hand it will provide San Francisco with adequate transportation facilities in every section of the city. Discussing the situation, President Calhoun is quoted as follows:

"We are prepared to convert our cable roads, wherever practicable, into electric roads, and if the Board of Supervisors will give the United Railroads a permit—it would have to be something more than a temporary permit, owing to the



RUINS OF THE VALENCIA & MARKET STREETS CABLE POWER HOUSE, OFFICES AND MAIN REPAIR SHOPS OF THE UNITED RAILROADS, OF SAN FRANCISCO. THE BRICK-RIBBED CHIMNEY WAS CRACKED TO THE FOUNDATIONS BY THE EARTHQUAKE

great outlay involved—we will convert the Sutter Street system into an overhead trolley road and have it in operation in thirty days.

"An underground conduit system is out of the question so far as the United Railroads is concerned. Under no circumstances, after our experience with slots during the recent earthquake, would we think of installing any conduit systems in San Francisco. The damage done to the cable roads makes it clear to my mind that it would be foolish to install any conduit systems. It will take a year to repair the damage done to the cable roads, if they are to be repaired and operated as cable roads. Conduit systems would have been in a similar predicament had there been any in San Francisco during the recent calamity. Wherever we have had trolley lines, however, we have found it possible to resume operations the instant the roadbed could be cleared of debris. This has been one big object lesson in support of my previous contentions regarding the comparative efficiency of overhead and underground electric systems."

Mr. Calhoun says that if the people want a trolley system on Sutter, Larkin, and Polk streets and Pacific Avenue, he will put 2000 men to work immediately upon the granting of

the necessary permit by the Supervisors, and will have the entire system in operation as an electric road within thirty days. He has ordered 7000 tons of 9-in. Trilby rails for reconstruction work in San Francisco, and has been assured by the United States Steel Corporation, which has the order, that it will be given precedence over all orders that its rolling

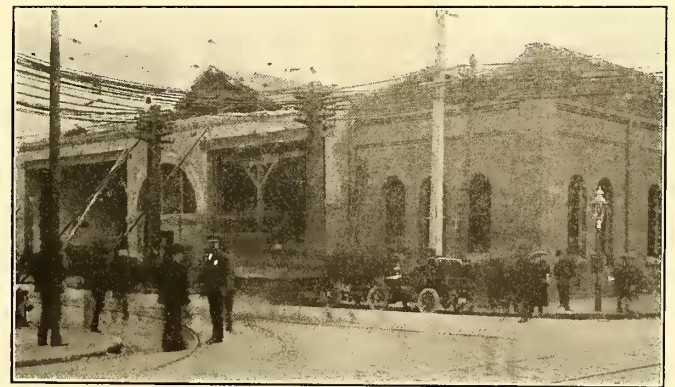


RUINS OF THE SUTTER STREET CABLE POWER HOUSE, UNITED RAILROADS, OF SAN FRANCISCO

mills now have on hand. Deliveries ought to be made very shortly.

It is pointed out that the conversion of the Sutter Street system into an electric road is the only chance that a considerable section of the city, including Pacific Heights, Presidio Heights and the Presido, now has for an early restoration of street railway transportation. The Union Street line is so badly crippled, by injury to the roadbed and the destruction of its power house and cars, that it will probably not be rebuilt except on a renewal of its franchise for a long term of years. The cable lines on Sacramento, Clay, Washington and Jackson streets will also be out of commission for perhaps a year.

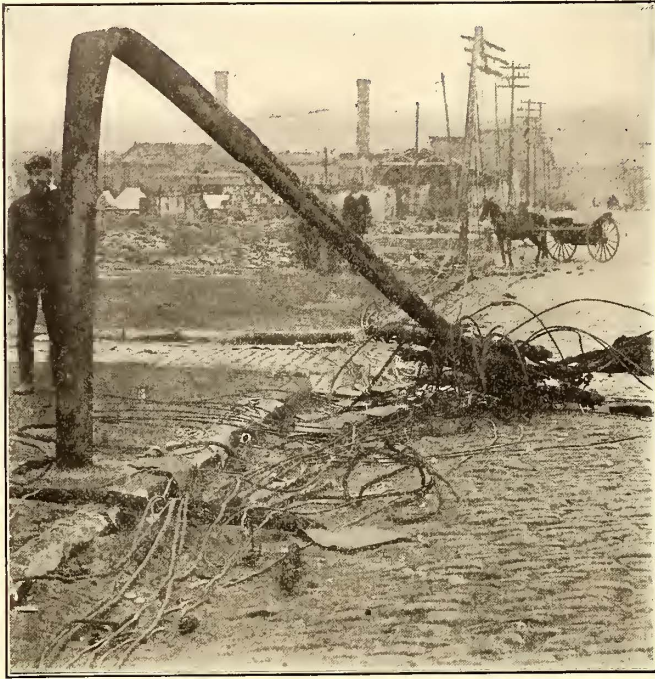
C. E. Loss & Company, the firm having the contract for building the Geary Street municipal road, have raised the question whether or not it is practicable to proceed with the



CAR HOUSE AT TURK AND FILLMORE STREETS, SLIGHTLY DAMAGED BY FIRE AND EARTHQUAKE, BUT NOW USED AS MAIN OFFICES BY THE UNITED RAILROADS, OF SAN FRANCISCO

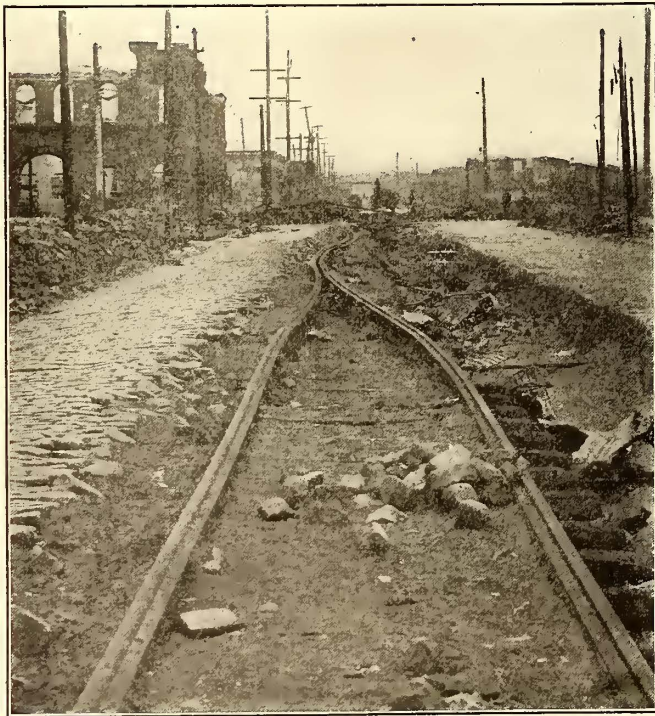
underground conduit plans in the light of experience of the cable roads in the earthquake. C. E. Loss claims it is not advisable to use the conduit system in San Francisco, and points to the experience of the United Railroads as supporting his argument. He points out that the United Railroads was able to operate its overhead trolley system within a few days after the fire, while it will be months before any of the cable lines will be started. As it was with the cable, so it

would be with the conduit, he claims, in case of another tremor. Both use the cable slot, and it was the closing of these



IRON TROLLEY POLE ON BRYANT STREET, BENT AS A RESULT OF THE INTENSE HEAT. THE VIEW, INCLUDING THE CHINAMAN REFUGEE ON THE LEFT AND THE DEAD DOG ON THE RIGHT, IS TYPICAL OF SCENES COMMON AFTER THE FIRE

slots which made it impossible to operate cars on the cable systems in this city. Mr. Loss suggests that the Mayor ap-



ELECTRIC RAILWAY TRACKS OF UNITED RAILROADS, OF SAN FRANCISCO, SHOWING HOW RAILS WHERE PAVING HAD NOT BEEN RELAID WERE TWISTED OUT OF SHAPE BY BURNING GAS FROM STREET MAINS. THE TIES WERE FIRST BURNED, PERMITTING THE HEAT TO WARP THE RAILS IN THE STRANGE MANNER INDICATED

point a committee of prominent citizens and experts to go over the Geary Street roadbed, and decide for themselves if an underground system is practicable.

Loss & Company have over 1000 men at work laying tracks in the streets of the city, under lease of the Ocean Shore Railway, and with the permission of the Mayor. When completed this road will be used to carry off debris from private property and will be used in conjunction with the Southern Pacific and Santa Fe railroads. The laying of the tracks has already been begun, and the road will be operated along the following route: From Twenty-Fourth and Clapp Streets to Fifteenth Street; along Fifteenth Street to Howard Street; Howard Street to Spear Street to Market Street, to connect with the State Harbor Commissioners' Belt Line Railway. These tracks will connect with the Ocean Shore tracks on Twelfth Street, for which it has a franchise granted by the Board of Supervisors some weeks ago.

Through the New York representatives of United Railroad interests it is stated that the affairs of the company are rapidly assuming even more satisfactory conditions than had been anticipated from the inventory taken after the fire showed the physical loss of the company to be surprisingly small. It has now been determined that the actual loss through destruction of property owned by the United Railroads will not exceed \$1,500,000, all of which is covered by insurance. As far as earning capacity is concerned, the property is showing remarkable recuperative powers, the receipts, despite abnormal conditions, having increased satisfactorily since the disaster, and it is stated the company's earnings are now considerably more than 50 per cent of the normal earnings before the quake. By the middle of summer the company will have in regular operation a daily average of 400 cars, as compared with an average service of 518 cars before the fire, so that long before fall it is anticipated that the company's operations will be better than 60 per cent of normal and, if the present rate of progress is continued, by the end of the year the company will be earning as much as, or more than, it did before the quake. This condition of affairs offers eloquent testimony to the energy, courage and efforts of the personnel constituting the organization of the United Railroads of San Francisco, and of all those associated with electric railway interests in the city.

The interesting announcement is also made that the Board of Supervisors of San Francisco, on May 14, passed a resolution calling upon the United Railroads to proceed as rapidly as possible in the work of converting its cable roads into trolley lines, so that the great northern section of the city may be served, trade resumed and confidence restored. There is no question that the resolution will be finally passed, and that as one of the beneficial results of the disaster the entire city of San Francisco will be given a thoroughly up-to-date overhead trolley system, and will no longer be required to put up with the disadvantages and limitations of the cable roads or of conduit electric roads.

Through the courtesy of T. E. Mitten, president, and J. A. Spoor, chairman of the board, of the Chicago City Railway Company, Ford, Bacon & Davis have been able to purchase for immediate delivery in San Francisco fifty of the latest type of car that have been under construction for the Chicago City Railway Company at the works of the American Car Company. This car was fully described in the STREET RAILWAY JOURNAL for Sept. 16, 1905. The cars will be shipped direct from the plant of the manufacturers, and will be of the greatest help in enabling the United Railroads of San Francisco to restore its service. Ten of the cars will be equipped with four 75-hp motors, and will be immediately placed on one of the interurban lines out of San Francisco. The action of the Chicago City Railway Company in releasing these cars at considerable inconvenience to itself exhibits a spirit of courtesy and helpfulness that is fully appreciated by the United

Railroad interests. Concerning the general reconstruction of the city, the Council on Building Laws has definitely decided to recommend the following ordinances: "On streets 100 ft. wide or over, the height of buildings facing thereon shall be unlimited; on streets 80 ft. wide or over, the height of buildings shall be limited to 200 ft.; on streets less than 80 ft. wide, the height of buildings may be one and one-half times the width of the street upon which the buildings face."

A NEW AUTOMATIC WRENCH

The Bullard Automatic Wrench Company, of Providence, R. I., has placed on the market an automatic wrench which is a radical departure in wrench construction, being designed on a novel application of scientific principles to overcome all the defects of other wrenches. In the first place this tool does not convert the power applied to the handle into a crushing strain, as all other wrenches do. This is best illustrated by the accompanying Fig. 1, which shows a common type of wrench in operation. The handle H may be considered a lever fulcrumed at A, with its operative end, the jaw J, engaging the pipe P. It must be evident that a downward pressure, applied to the handle H, will be transmitted through the jaw J in the direction indicated by the arrow, directly toward the center of the pipe. This pressure, on the pipe, then, is a crushing strain, increased several fold by leverage, over the power applied to the handle. If the pipe and the wrench can stand this strain, the joint will loosen up, but if the joint is a stubborn one, the chances are that the pipe will give first and be crushed. In time the wrench itself will succumb to this abnormal strain and the jaws will be bent out of alignment.

In the new wrench the principle of operation is entirely different. There are three separate levers, compounded, and so arranged that the power applied to the handle is transmitted through the jaws in a tangential direction to the pipe. Hence the power is applied in a wringing manner similar to what would be effected in using manual means. In fact., the Bullard wrench is modeled exactly on the principle of the

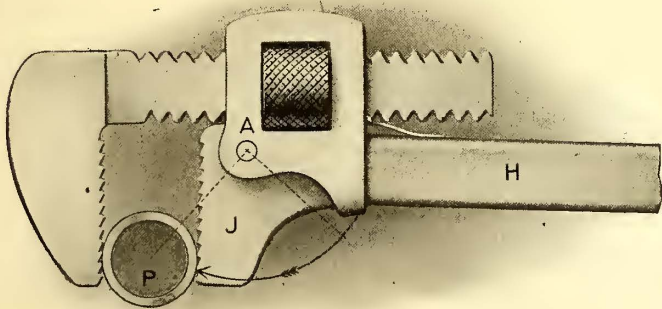


FIG. 1.—COMMON TYPE OF PIPE WRENCH WHICH EXERTS A CRUSHING STRAIN.

human hand. For instance, take any cylindrical object, as a mailing tube, about $1\frac{1}{2}$ ins. in diameter, and grasp it with the right hand thumb down. Hold the tube firmly with the left hand and turn down with the right. This gives a torsional or twisting strain on the tube with no tendency to crush it, as is precisely the effect of this novel wrench. The outer jaw corresponds to the fingers, the inner jaw to the thumb, and the handle to the wrist.

The wrench is constructed to withstand the severest strains. The inner jaw, which takes the brunt of the work, is made of solid bar steel, machined to shape. The removable tooth section in the jaw is made of hardened tool steel.

The spring is merely auxiliary, serving only to keep the jaws together when the wrench is used with the jaw side up. Under ordinary conditions the weight of the jaws tends to keep them closed.

There are no sliding parts and no loose, shakky joints. All



FIG. 2.—SCIENTIFIC WRENCH, DESIGNED TO EXERT WRINGING EFFECT ON PIPE, IMITATING HUMAN HAND GRASP.

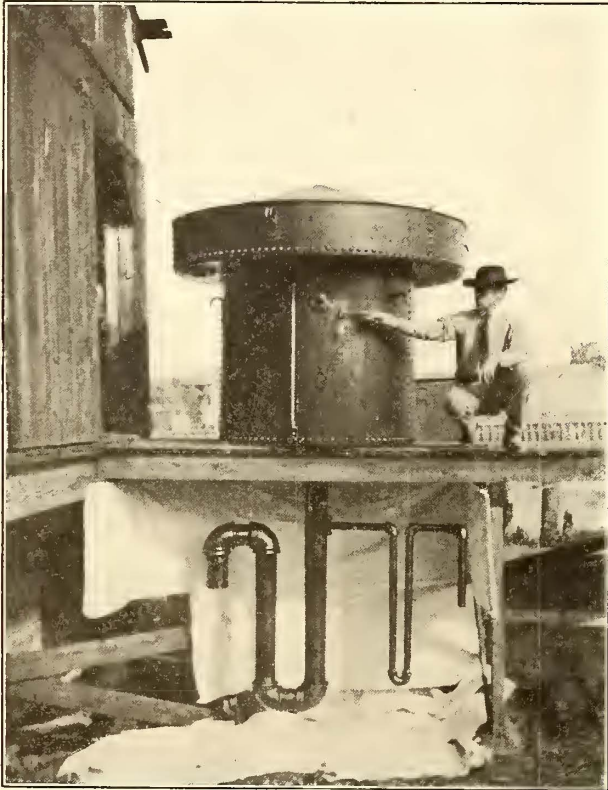
the joints are pivot bearings, and the strain at these points is a shear strain on the rivets. These are made of best grade Bessemer steel, of ample diameter to stand the wear.

A wrench of this type of the same capacity as an ordinary wrench is stated to weigh about half as much, that is, it has twice the strength and efficiency of the ordinary wrench. This is because all the power applied to the handle goes to turn the pipe and not to crush it. There is no wasted power, and no abnormal strain on the parts. It requires but one hand for operation. There are no nuts or screws to adjust, so that no time is lost in changing from one size pipe to another. All that is necessary to attach it, is to bring the outer jaw against the pipe and apply pressure. The jaws will then open automatically to receive the pipe. After the wrench is on the pipe it can be turned both ways, either backward or forward, if desired. It turns backward to get a new grip, in the manner similar to any ratchet wrench. It can be turned forward by applying an upward pressure on the handle to release the jaws. This is a desirable feature, for sometimes it is necessary to move the wrench to a new position on the pipe when there is no room to turn it backward. In all other wrenches, the adjustment must be loosened and the wrench taken off, before it can be turned forward; then the jaws must be tightened up again.

President Sullivan, of the Boston & Northern Street Railway and Old Colony Street Railway, in his reply to the requests of the employees of both of the companies, who, on April 24, asked for an increase in wages and other changed conditions, sets forth in detail clearly the objections. He says: "Careful analysis of said request shows amazing results, and also that you do not fully understand or appreciate the situation. There are three parties to a controversy between the employees of a street railway company and the company, namely, the public, the investor, and the employees. The first is entitled to reasonable accommodations at reasonable cost. The second to a fair return upon the investment, as fully as if such investment were made in a savings bank. The third to just treatment and to as good compensation for service as is paid for similar, or nearly similar conditions. Your request loses sight of all three conditions. If granted by this company it can be granted only by increasing fares from a unit of five (5c.) cents to a unit of six (6c.) cents, or by ceasing to pay dividends."

FEED-WATER MEASURING APPARATUS

The Willcox Engineering Company, of Saginaw, Mich., has developed a new automatic liquid measuring device, an important use for which will be the measurement of feed water at power houses. The apparatus accommodates itself



AUTOMATIC LIQUID-MEASURING APPARATUS

to an irregular supply and delivers in intermittent charges or units of uniform weight. It is designed to operate under a wide range of supply and delivery and adapts itself to extraordinary fluctuations. The device consists of two tanks, placed one above the other. The upper or receiving tank stores the liquid and automatically delivers it at intervals as required to the lower tank, where it is weighed. The lower or weighing tank delivers the unit charge intermittently, the intervals between deliveries varying with the rate of supply.

The engraving, reproduced from a photograph, shows the apparatus for weighing feed water supplied to a battery of six 350-hp Wickes vertical water-tube boilers, generating steam to operate a 1600-kw generator with auxiliaries and pumps. The average flow through the tank is 63,000 lbs. of water per hour, at a temperature ranging near the boiling point, fluctuating between 205 degs. and 210 degs. F.

The dimensions of the tank illustrated are as follows: The upper tank is 72 ins. in diameter and 3½ ft. deep. The height from floor to top of cover is 5½ ft. The discharge pipe projects below the floor 5½ ins.

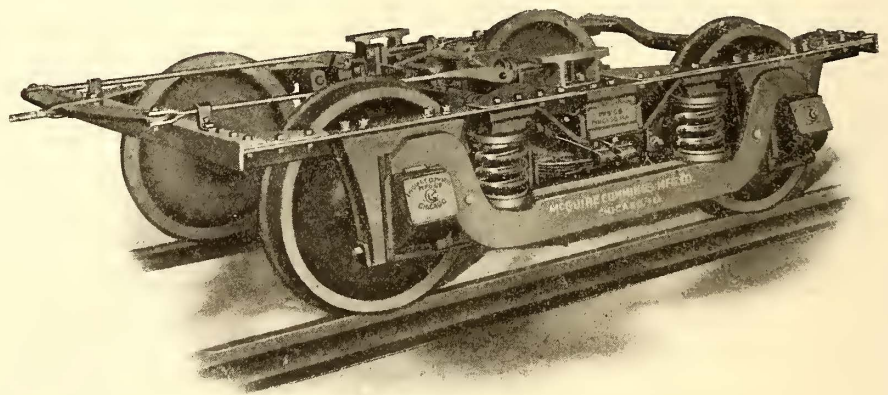
It is stated that numerous trials of this apparatus as a feed-water weigher show a maximum error, after four months' constant service, of less than one-fourth of 1 per cent. A temperature fluctuation of 10 degrees causes no appreciable error in operation. The error that would naturally be intro-

duced by increase of volume incident to increased temperature is small, and even this small error appears in practice to be offset by expansion or contraction of the weighing tank as the temperature rises and falls.

As indicating that change in rate of supply does not affect the efficiency the company cites a test on its apparatus, made at the Mechanical Laboratory, University of Michigan, in April, 1906. In this test the rate of flow of water through the apparatus was varied from 460 lbs. per minute to 653 lbs. The efficiency was found to vary from 99.7 per cent to 100 per cent. The efficiency in this case was obtained by dividing the weight of water actually weighed by the weight of the unit charge. In the case where 100 per cent efficiency was obtained, these two quantities were the same. On another test, run on this same apparatus, the flow was as low as 116 lbs. per minute, at which flow the efficiency was 99.8 per cent. The device will be placed on the market by the Willcox Engineering Company under the name of the Lowrey patent automatic liquid measuring apparatus.

TRUCKS FOR THE HAVANA CENTRAL RAILWAY COMPANY

The McGuire-Cummings Manufacturing Company, of Chicago, has just finished an order for 200 trucks for the Havana Central Railway Company, Havana, Cuba, of the type illustrated in the accompanying cut. This truck was designed by the company for heavy loads especially, and also to meet the requirements of a truck for high-speed interurban service. It is, in fact, built to carry a load of 50,000 lbs., or a total load on two trucks of 100,000 lbs. As may be observed by reference to the reproduction, the truck is constructed along the M. C. B. lines. The top frame is of heavy angle bars, well braced by extra large gusset plates at the corners of the truck and at the transoms. To the side frames are bolted the cast-steel pedestals, a machine fit being secured between the pedestal and the frame. The journal boxes, which are of malleable iron, are fitted with oil-tight covers, and are machined to give a clearance of 1-31 in. on each side of the box between the box and the pedestal. The truck is so designed that when a pair of wheels is to be removed, it is necessary to take off but



HIGH-SPEED, HEAVY SERVICE TRUCK FOR THE HAVANA CENTRAL RAILWAY

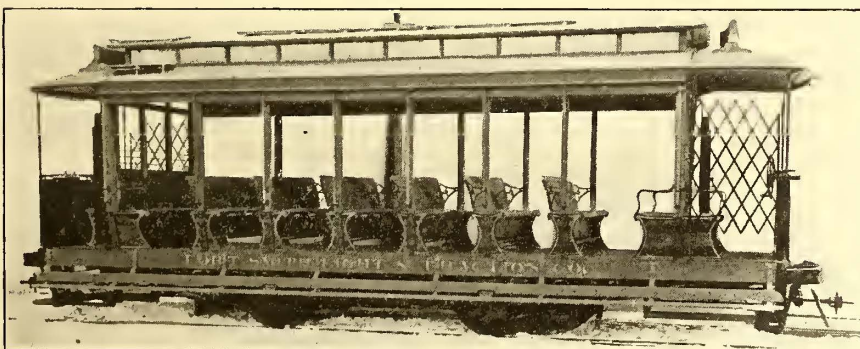
two nuts to drop the boxes down out of the pedestals. The bolster, which is of the built-up steel type, is supported by links, provided with rocker bearings resting on top of the transom members. These bearings eliminate to a great extent the wear present on the pins in the usual construction. The truck has a wheel base of 6 ft. 3 ins., and is provided with 33-in Schoen rolled-steel wheels, mounted on 5½-in. axles.

The company has also shipped from its Paris, Ill., shops, 400 cars, of different types of construction, for this road.

SUMMER CARS FOR FORT SMITH, ARK.

The ten-bench open car shown in the photograph is one of six which have recently been put in operation on the lines of the Fort Smith Light & Power Company. The cars were built by the American Car Company, and the order placed through H. M. Byllesby & Company, of Chicago, and the cars are similar to others built for the same railway last year. This makes about forty cars in operation on the lines, which, with a trackage of twenty miles, gives a frequent schedule. Fort Smith is close to the western boundary of the State, on the Arkansas River, and is the second city in size and importance. Six railroads enter the city, which, together with the river, make it an important shipping center. Extensive coal mines are in the neighborhood and fruit growing is one of the principal industries. There are two union stations between which and the business section the cars of the city lines are constantly running, loaded to their full capacity. The lines are well laid out, and embrace the business streets and the principal residence sections. The baseball park makes it necessary to run a number of extra cars, and on holidays the capacity of these cars is taxed to the utmost. Baseball Park and Electric Park are owned and operated by the company.

The cars are of the standard form and are mounted on trucks of the No. 21-E type. The gates at either end are unusually high and of channel construction for extra strength; these are used to enable the motorman to prevent more passengers being carried on the platform than can be seated, as the large crowds carried to the park have at times in the past seriously interfered with operation. The general dimensions are as follows: Length over the end panels, 21 ft. and over the crown pieces, 28 ft. 8 $\frac{3}{8}$ ins.; width over the sills, 6 ft. 3 ins.; and over the seat ends, 7 ft. $\frac{1}{2}$ in.; sweep of the posts, 5 ins.; centers of the posts, 2 ft. 8 ins.; height from the floor to the ceiling, 7 ft. 11 $\frac{3}{4}$ ins.; from the track to the underside of the sills, 2 ft. 2 $\frac{5}{8}$ ins., and from the underside of the sills over the trolley board, 9 ft. $\frac{1}{2}$ in. The running boards are 17 ins. from the track, and from the boards to the car floor, 16 $\frac{1}{2}$ ins. The side sills are 3 $\frac{3}{4}$ ins. x 7 ins. thick, with



TEN-BENCH OPEN CAR FOR FORT SMITH

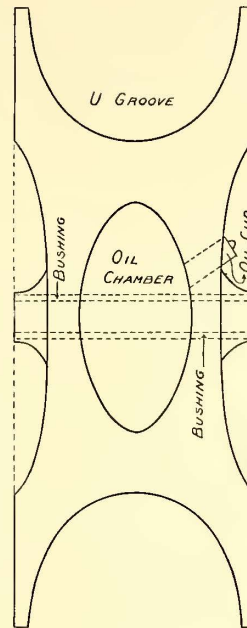
8-in. x $\frac{5}{8}$ -in. sill plates on the outsides. The truck wheel base is 8 ft.; diameter of the wheels, 33 ins.; diameter of the axles, 4 ins. Two 30-hp motors are used per car. The weight of the car and the truck without motors is 12,300 lbs.

Officers of the Chicago & Milwaukee Electric Railway have incorporated the Chicago & Milwaukee Power Company, to build and own the railway company's power plant, soon to be erected at Waukegan. It is said that by having a power company own the plant electricity may be sold to factories and farmers, or for any other use, along the line.

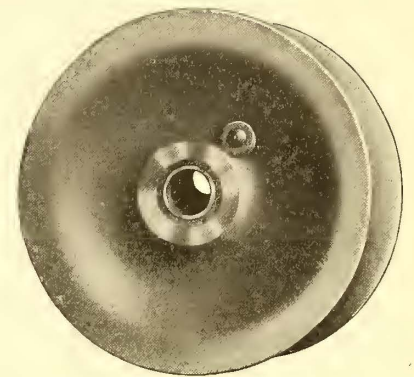
A U-GROOVE TROLLEY WHEEL

The Electrical Specialty Manufacturing Company, of Allentown, Pa., is making a self-oiling trolley wheel, called the "Peerless," which has a U-shaped groove and is composed of a new alloy combining long life and high electrical conductivity.

This wheel is made with a U-shaped groove or slot, instead of the usual V shape, upon which fact the manufacturer bases the claim that the wheel will remain on the wire in ninety-nine out of every 100 cases where a V-grooved wheel would run out, thus saving time, annoyance and care. The self-oiling feature combines a chamber in the body of the wheel that will contain one-half ounce or more of lubricating oil, which is supplied through an oil-



CROSS SECTION U-GROOVE TROLLEY WHEEL



U-GROOVE TROLLEY WHEEL, SHOWING VALVE TO OIL CUP

cup equipped with a spring valve that closes automatically, and retains the oil. By this method the pinion is constantly lubricated in the proper manner, a constant feed is obtained, and the bushing is thus preserved to a marked extent. A record test of over 9000 miles on one bushing left the latter in prime condition as the result of this lubricating method.

The wheel is composed, as previously noted, of an alloy, from a secret formula. It is carefully machined and is finished in a thorough, mechanical manner. Its weight is 2 $\frac{3}{4}$ lbs.

The May number of the "Third Rail," the new magazine, edited and published under the auspices of the Brooklyn Rapid Transit Employees Benefit Association, is out. One of the striking features is a five-page article on "Veterans in Street Car Service," devoted to a mention of many of the very old employees of the Brooklyn Rapid Transit. The real "veteran" is "Pop" Burns, who first began working for the Brooklyn City Railroad in 1861. The first installment of Deputy Police Commissioner Arthur J. O'Keeffe's article on "Old Haunts of Criminals in Brooklyn" is another interesting feature, which will be continued. There are three pages, with illustrations, devoted to the San Francisco earthquake; one of "Reminiscences of the Early Days;" a well written article on "The Cause and Value of the Mardi Gras;" one on "Homes for the Men," and a goodly assortment of miscellany.

FINANCIAL INTELLIGENCE

WALL STREET, May 16, 1906.

The Money Market

There has been a decided change for the better in the monetary situation during the past week, rates for all maturities working substantially below those prevailing at the close of last week. The improved conditions resulted largely from the extremely light shipments of money to San Francisco, and in banking circles the opinion prevails that the movement of funds to the Pacific Coast is practically over. The elimination of this important factor from the situation, together with the heavy influx of money from the interior, has materially strengthened the resources of the New York City banks. During the week ending May 11 the local banks gained on the interior movement more than \$3,000,000, and it is expected that the movement in this direction will assume larger proportions and will continue for some weeks to come. These favorable developments resulted in some pressure of funds upon the market, which was reflected in a general reduction in interest charges for both call and time loans. Money on call was in plentiful supply at $3\frac{1}{2}$ and 3 per cent. Sixty-day contracts were obtainable at $4\frac{3}{4}$ per cent, while for all other periods up to six months accommodations could be had at 5 per cent. A feature of the week was the sale and ready absorption of \$50,000,000 $4\frac{1}{2}$ per cent notes by the Pennsylvania Company, due in November, 1907, and guaranteed by the Pennsylvania Railroad Company. It is understood that the notes were sold at $99\frac{3}{4}$, less a commission. Subscribers to the loan are required to make payment on May 29, but the bankers having the flotation in charge are of the opinion that no tension in the money market will result from this settlement, as the money received in payment for the notes will immediately be redeposited in the banks, and will be available for market purposes for some time to come. The continued strength in foreign exchanges has prevented further engagements of gold for import. The total engagements of gold from April 12 up to May 5, the date of the last engagement, amounted to about \$48,500,000, of which about \$32,575,000 has been received. The European money markets have displayed increasing ease, especially at London and Paris, and there was some talk at the close of a reduction in the Bank of England discount rate in the near future. The bank statement, published on last Saturday, made a very satisfactory exhibit. Loans decreased \$16,460,400, due in part to the liquidation in stocks in the preceding week. The increase in cash was \$3,815,800, or considerably smaller than expected, but as the reserve required was \$3,179,275 less than in the previous week, the surplus reserve was increased by \$6,995,075. The surplus now stands at \$12,894,600, as compared with \$16,712,575 in the corresponding week of last year, \$12,827,250 in 1904, \$8,990,625 in 1903, \$8,346,525 in 1902, \$12,299,925 in 1901, and \$15,332,725 in 1900.

The Stock Market

Dealings in the local securities market was upon a fairly large scale during the past week, and although they were accompanied by more or less irregularity, the general trend of values was toward a higher level. During the early part of the week there was a continuance of the heavy buying by the strong interests which characterized the trading in the preceding week, and this resulted in a further sharp rise in prices practically throughout the entire list. Later on, however, there was a considerable falling off in the buying from this source, an opportunity which the speculative element was not slow to take advantage of. During the last half of the week the market was subjected to rather heavy profit taking, and although prices yielded rather sharply under this selling the undertone held decidedly strong, with final prices well above those prevailing at the close of last week. The noteworthy features of the week were the Hill stocks, the upward movement of which influenced the entire market. Union Pacific was also conspicuously strong. Later on Reading was taken in hand and made the feature, and the other coal stocks were advanced sharply. At the close the market is in a much stronger position. Sentiment was more cheerful, and in some quarters an active and higher market is looked for during the summer months. This belief is based upon the expectation that money will rule rela-

tively cheap until the beginning of the outflow of funds for crop-moving purposes. In fact, there is nothing in the general situation that does not favor higher prices for stocks. Domestic conditions are all that could be desired. The great activity in the iron and steel industry continues. Copper metal is selling at the highest prices in years, and crop conditions are unusually good. In addition to these the foreign trade of the country is larger than ever before. According to the figures made public by the Department of Commerce, the increase in the foreign trade for the ten months ending April 30, amounts to \$300,000,000, as compared with the corresponding period of last year, and an increase of \$400,000,000 compared with the same months in 1904.

The local traction stocks have been decidedly strong, influenced largely by the favorable reports of the different properties. There was aggressive buying of Interborough-Metropolitan issues which advanced prices sharply, while in Brooklyn Rapid Transit the buying was based upon the largely increased earnings of the company.

Philadelphia

Extreme dullness prevailed in the local traction issues during the past week. Dealings included a much smaller number of stocks than in the preceding week, and while prices displayed some heaviness the net changes were for the most part confined to the fractions. A noteworthy strong feature of the trading was the sharp advance in Consolidated Traction of New Jersey, which moved up $2\frac{1}{8}$ points to $81\frac{1}{8}$ on investment buying. About 500 shares were dealt in. Philadelphia Rapid Transit sustained a loss of $\frac{1}{2}$ point, about 2500 shares changing hands at from 27 to $26\frac{1}{2}$. Philadelphia Company's stocks were unusually quiet, several hundred shares of the free common selling at from $50\frac{7}{8}$ to $50\frac{3}{8}$, a loss of $\frac{5}{8}$, while 1500 unstamped receipts changed hands at $33\frac{7}{8}$ and 34. The preferred stock sold at 49 and $49\frac{1}{4}$. Philadelphia Traction ruled fractionally higher, transactions taking place at 99 and $98\frac{3}{4}$. Union Traction was quiet but firm, several hundred shares selling at $63\frac{1}{8}$ and 63. United Companies of New Jersey brought $263\frac{1}{2}$ and 262, and odd lots of American Railways brought $51\frac{3}{4}$ and $51\frac{1}{2}$.

Chicago

Trading in the Chicago market has been somewhat more active, but prices have displayed some irregularity. The shares of the surface lines ruled generally lower. North Chicago opened at 31, and rose to 33, but later fell back to 32, a loss of 3 points. West Chicago sold from 26 to 28, a loss of a point. Other sales included Metropolitan Elevated at $27\frac{1}{2}$, the preferred at from $66\frac{3}{4}$ to $68\frac{1}{2}$; South Side at 90, Chicago & Oak Park at $6\frac{1}{2}$, and the preferred $22\frac{1}{2}$ and 24. Northwest Elevated brought $5\frac{3}{4}$, Union Traction sold at $5\frac{3}{4}$.

Other Traction Securities

Greater activity accompanied by further sharp advances in United Railway issues constituted the chief feature of the week's dealings in traction issues at Baltimore. About 3500 shares of the free stock sold at $16\frac{3}{4}$ and 16, while upwards of 2700 of the pledged stock brought prices ranging from $16\frac{3}{4}$ to $16\frac{3}{4}$, the final transaction taking place at $16\frac{3}{8}$. The 4 per cent bonds moved up a fraction to $92\frac{1}{8}$ early in the week, but later went back to 92, upwards of \$75,000 changing hands. The free incomes rose from $68\frac{1}{2}$ to 72, on transactions aggregating about \$100,000, while the certificates representing bonds deposited sold at from $69\frac{3}{4}$ to 71, a net gain for the week of $2\frac{1}{2}$ points. The advance in these issues was attributed in part to the expectation of an early announcement of the company plans for improvements. Other transactions included \$18,000 Norfolk Railway & Light 5s at $99\frac{1}{2}$.

The Boston market was dull and irregular. Massachusetts Electric common was exceptionally strong, the price advancing about 2 points to $19\frac{5}{8}$, on the purchase of about 800 shares. The preferred displayed considerable strength in the early part of the week by advancing from $64\frac{1}{2}$ to 68, but toward the close there was a reaction to $65\frac{1}{2}$. Boston Elevated sold from $154\frac{1}{2}$ to $153\frac{3}{8}$ and back to 154. Boston & Worcester common sold at 36, and the preferred brought 88. Other sales include West End common at 99 and 98, the preferred at 114 and 113, and \$1,000 4 per cent bonds at $100\frac{1}{2}$. In the New York curb market trading was practically at a standstill. Interborough Rapid Transit receipts sold as high as 232, about 1000 shares changing hands on

the advance. Jersey City, Hoboken & Paterson 4s sold at 73 and interest for \$5,000.

Tractions had a boom in Cleveland last week and nearly every issue showed an advance. The feature of the week was the activity of Northern Ohio Traction & Light, which sold to the extent of about 1200 shares. The demand was due to the announcement that the stock would be placed on a dividend-paying basis in the near future. It opened the week at 28¾, advancing to 32. The early part of this week it had another advance to 33¾. The 5 per cent bonds of this company advanced to 89, while the 4s sold at 72¾. Cleveland Electric moved up from 78 to 79½. Cleveland & Southwestern Traction common advanced from 14½ to 16½. Aurora, Elgin & Chicago new securities came in for considerable activity. The common moved up from 31¾ to 35¼, and the preferred advanced from 79½ to 81.

At Cincinnati the common stock of the Cincinnati, Newport & Covington had a phenomenal advance. It opened the week at 66, and sold as high as 73. Later it sagged and closed at 71¾. The advance was due to persistent rumors of negotiations by Eastern interests. Positive statements by President Ernst that no negotiations were on were disregarded. The preferred made only a slight advance to 97¾. Sales of the common aggregated about 3100 shares. Cincinnati Street Railway had a fractional advance to 144¾, Toledo Railways & Light had a fractional decline to 31½. Cincinnati, Dayton & Toledo was active to the extent of about 900 shares at 27; stationary with previous sales. The 5s of this company sold to the extent of \$30,000 worth at 92¾ to 93¾.

Security Quotations

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

	May 9	May 16
American Railways	51½	51½
Boston Elevated	153	154
Brooklyn Rapid Transit	82½	83¾
Chicago City	150	150
Chicago Union Traction (common).....	6½	4
Chicago Union Traction (preferred).....	21½	12½
Cleveland Electric	78	78
Consolidated Traction of New Jersey.....	79	80
Detroit United	94	95
Interborough Rapid Transit receipts	223	231
Interborough-Metropolitan Co. (common), W. I.....	52	53¾
Interborough-Metropolitan Co. (preferred), W. I.....	85¼	86¼
Interborough-Metropolitan Co. 4½s, W. I.....	87¾	—
International Traction (common).....	36½	38¾
International Traction (preferred), 4s.....	71	72
Manhattan Railway	152½	153
Massachusetts Elec. Cos. (common).....	17¾	18
Massachusetts Elec. Cos. (preferred).....	65	64
Metropolitan Elevated, Chicago (common).....	26½	27½
Metropolitan Elevated, Chicago (preferred).....	64½	68
Metropolitan Street	113	115
Metropolitan Securities	70¼	74¾
New Orleans Railways (common).....	31	32
New Orleans Railways (preferred).....	—	80
New Orleans Railways, 4½s.....	86	86
North American	96½	96¼
North Jersey Street Railway.....	27	27
Philadelphia Company (common).....	50¾	50¾
Philadelphia Rapid Transit	26¾	26½
Philadelphia Traction	98½	99
Public Service Corporation 5 per cent notes.....	94	94
Public Service Corporation certificates.....	68	70
South Side Elevated (Chicago).....	89	91
Third Avenue	127	130
Twin City, Minneapolis (common).....	113½	117
Union Traction (Philadelphia)	62¾	62¾
West End (common)	98½	98
West End (preferred).....	114½	113½

W. I., when issued.

Metals

The "Iron Age" says the most striking news of the week is that coming from Chicago, relating to steel rails for 1907. It is stated that the total new tonnage for 1907 thus far booked foots up to 562,000 tons. A very fair amount of business was also placed with the rail mills for delivery during the current year. There has been some fair buying of foundry iron. Steel-making irons are practically swept clean up to the middle of the year. Steel billets

are somewhat easier in the Central West, and \$26 is now being done. The enormous advance in pig tin, now selling at close to 50 cents a pound, is a serious calamity in the tin plate industry, since it must cause an advance in prices and may restrict consumption. Copper metals ruled very strong at an advance of 2¼c. a pound. Lake is quoted at 18¾ and 18¾c., electrolytic 18¾ and 18¾c., castings 18¾ and 18¾c.

GRANITE CITY PROPERTIES TRANSFERRED

The control of the Alton, Granite & St. Louis Traction Company, the Alton Gas & Electric Company, the Granite City Railway lines and allied corporations in Granite City passed under the management of the East St. Louis & Suburban, with L. C. Haynes, of East St. Louis, as general manager last week. Mr. Haynes has been elected president of the Alton, Granite & St. Louis Traction Company to succeed J. F. Porter, and F. E. Allen, of St. Louis, has been elected head of the Alton Gas & Electric Company, to succeed Mr. Porter, who resigned from the companies. It is said that while a new \$14,000,000 corporation will hold the stock of the various corporations in the East Side railway, electric lighting and gas system merger, the names of the operating companies will be retained. It is announced that the Alton Gas plant will be materially extended. The change in the management of the interurban lines between East St. Louis and Alton and Mitchel and Edwardsville will mark the beginning of control of the entire East Side electric system by the Clark syndicate, of Philadelphia. R. W. Bailey, of East St. Louis, will succeed J. F. Porter at Alton in direct charge of the Alton, Granite & St. Louis Interurban Railway and the Alton street railway, electric lighting and gas plants.

FINANCING THE BALTIMORE TERMINAL COMPANY

A financing plan for the Baltimore Terminal Company, which the Bishop-Sherwin syndicate, of Cleveland, has organized for the purpose of providing terminals for the Washington, Baltimore & Annapolis Railroad, has been announced. The company will have a capital stock of \$1,500,000 and a bond issue of the same amount. One-half of the stock will go into the treasury of the United Railways & Electric Company, of Baltimore, which owns the city lines in that city, while the other half will go into the treasury of the Washington, Baltimore & Annapolis Railway Company. The Bishop-Sherwin syndicate will build the road and the bonds to pay for it will be taken care of by the United Railways & Electric Company. Franchises and everything necessary for the terminal line and station have been secured.

NEW YORK CITY RAILWAY—REPORTS FOR QUARTER AND NINE MONTHS

The income account of the New York City Railway System, in which are embraced all the surface lines in Manhattan and the Bronx, for the quarter and nine months ended March 31, 1906, compares as follows:

	1906	1905
Three months (Jan. 1 to March 31)—		
Gross receipts	\$3,969,771	\$3,639,467
Operating expenses	2,398,458	2,467,374
Net earnings	\$1,562,313	\$1,172,093
Other income.....	301,044	282,571
Total income	\$1,863,357	\$1,454,664
Charges	2,789,724	2,777,070
Deficit	\$926,367	\$1,322,406
Nine months (July 1 to March 31)—		
Gross receipts	\$12,924,256	\$13,490,268
Operating expenses	7,162,178	7,610,899
Net earnings	\$5,762,078	\$5,879,369
Other income	954,416	900,080
Total income	\$6,716,494	\$6,779,449
Charges	8,404,774	8,703,876
Deficit	\$1,688,280	\$1,924,427

AFFAIRS IN CHICAGO—NO REHEARING IN 99-YEAR CASE

The order to equip with the overhead trolley the Blue Island Avenue line, Chicago, has been referred to the committee on local transportation. This action was taken after a report had been submitted of the condition of the Blue Island Avenue viaduct, the dangerous condition of which was responsible for the action of the Council recently, when it passed an order to electrify the line. Mayor Dunne opposes equipping the line with electricity, and with regard to this said in his message to the Council:

"I appreciate and fully sympathize with the desire of the citizens residing in that part of the city for safe and speedy transit. In view of the fact that we can confidently expect an early decision on the petition for rehearing now pending in the Supreme Court of the United States, and in view of the fact that both Walter L. Fisher and Major Tolman agree that permission to trolleyize on any ninety-nine-year line would be prejudicial to the city's interests, I am of the opinion that we can safely defer action on trolleyization of the Blue Island Avenue line until the petition for rehearing has been disposed of by the Supreme Court of the United States."

The officials of the railway companies say that the proposed terms for bringing about immediate improved service as set forth in Mayor Dunne's recent letter to Chairman Werno, of the local transportation committee, are indefinite. The position of the companies is that the terms offered them depend entirely on the meaning of the words "a fair return on their investment." All in excess is to go to the city. If this means 4 per cent or 5 per cent, they do not see why they should put \$50,000,000 or \$60,000,000 into the properties simply to draw on it the interest they would have to pay for the money borrowed to do the work with. They could do better by investing their money in bonds and take little risk and incur no trouble. When "a fair return" is explained to them they will be in a position to state their position.

It has been rumored that a new franchise ordinance for a twenty-year franchise will be sought by the traction companies. The union of the companies, in a proposition to the city, depends, it is said, on the result of negotiations for peace between the Union Traction Company and the corporations underlying it. The petition of the underlying companies to annul the leases whereby they agreed to let the Union Traction Company operate their lines for 99 years will be heard, it was announced yesterday, May 17, by Judges Grosscup, Anderson and Humphrey.

The United States Supreme Court has denied the petition of the Chicago street railway companies for a rehearing of the "ninety-nine-year act."

Traction affairs in Chicago have been practically at a standstill since the decision of the "ninety-nine-year case" in favor of the city, but the denial of a rehearing opens up the way for the immediate improvement of service on the several lines. As soon as Mayor Dunne was informed of the action of the Supreme Court, he immediately made arrangements with W. W. Gurley, counsel for the Union Traction Company, for a conference to take up the question of the equipment with electricity of the North and West Side cable lines. When these are equipped with electricity the tunnels under the river can be lowered, as has been ordered by the government. Heretofore the Mayor has refused to permit these to be electrified for fear that such action would impair the city's claims in the ninety-nine-year case. The Mayor instructed Walter L. Fisher, his adviser in traction affairs, to notify Mr. Gurley that the city was ready to take up the plans of rehabilitating the lines. No time will be lost, the Mayor declared, in improving the service.

"I can see no further obstacles in the way toward rehabilitation of the street railway service," he said. "Improvements must be planned at once. There must be modernization and rehabilitation with municipalization throughout. If the underground trolley is feasible downtown, all well and good, but that is an engineering problem.

"It will be necessary now," he continued, "to have a traction expert, and he will be appointed as soon as I can find the proper man for the position."

Traction officials in general refused to discuss the subject of the refusal to grant a rehearing. President Mitten, of the Chicago City Railway, as well as W. W. Gurley, counsel for the Union Traction Company was reticent. Mr. Gurley did say, however, that he saw no reason for delay in the electrification of his company's lines. He said it would take about three months to convert the available cars of the company into trolley cars.

AN INCLINE AND NEW LINE IN BROOKLYN

With the end in view of relieving traffic on its line to Carnarsie, on Jamaica Bay, between Coney Island and Rockaway Beach, of increasing the popularity of the resort with the class of people to whom it appeals and further adding to the stability of the real estate investments in the districts affected, the Brooklyn Rapid Transit Company now has under construction an incline from its elevated structure, on Pitkin Avenue, known as the Fulton Street line, to the surface, and so to the beach. The elevated portion of the new line extends from the turn of the present King County L, at Pitkin and Snediker Avenues, diagonally across private property into Van Sinderen Avenue—formerly Vesta Avenue. Through Van Sinderen the new elevated extends almost directly south to New Lots Road. It closely parallels the tracks of the Long Island Railroad leading from East New York to Manhattan Beach and Bay Ridge, throughout this entire distance. Station stops on the elevated structures have been planned at Sutter Avenue, Livonia Avenue and New Lots Road. The station stops through the ancient village of Carnarsie have not, as yet, been definitely determined. At the water's edge an attractive terminal will be erected, and the trains will there make a direct connection with fast boats for Rockaway.

So rapid has been progress on the new road that the company promises through service by June 15. Trains will run direct for the present from the Broadway ferries in Williamsburg, through Broadway to Manhattan Junction, and thence through Snediker Avenue to the new elevated structure and to Canarsie. When a terminal has been completed at Delancey Street, Manhattan, for the elevated train service over the Williamsburg Bridge, the Canarsie trains will run through from that point. Platforms and switch points on the new line are being designed for eight-car trains, and it is expected that trains of this length will be run as soon as it is possible to get them into Manhattan.

THE MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The regular meeting of the Central Electric Railway Association will be held at the Algonquin Hotel, Dayton, Ohio, on Thursday, May 24. As this will be the last meeting of the association until September, a full attendance is earnestly requested. The nature of the subjects for discussion and the opening of the meeting for general experience should appeal to every member.

On account of its accessibility from all points, Dayton was selected as the meeting place for this month, and it was decided to have as many of the members as possible attend the meeting in their own cars, thus giving the general public a demonstration of the possibilities for long-distance travel on electric lines. Secretary Merrill has communicated with officials at Columbus, Indianapolis, Ft. Wayne, Toledo, Detroit and Cleveland, asking them to bring parties in special cars from these points.

H. P. Clegg, president of the Dayton & Troy system of electric railways, will have the entire arrangement of the special cars. By communicating with him all arrangements will be made for cars. Everybody interested in electric railway work is cordially invited to attend. The programme is as follows:

10:30 a. m.—Business meeting.

11:00 a. m.—"Y. M. C. A. Work," by E. L. Hamilton, secretary, Chicago, Ill.

11:30 a. m.—"Best Methods for Stimulating Summer Riding," by J. W. Brown, superintendent transportation West Pennsylvania Railways Company.

2:00 p. m.—"Fire Insurance at Cost," by Henry N. Staats, manager Mutual Insurance Company, of Cleveland, Ohio.

2:30 p. m.—"Axles for Interurban Cars." Discussion opened by Mr. Replogle, expert for the Cambria Steel Company.

3:30 p. m.—Open discussion by all interested parties present on the following subjects:

1.—"Lost Articles—Disposition of the Same—Found on Cars and in Waiting Rooms."

2.—"Sealing Loaded Milk Cans."

3.—"What is the Proper Method of Inspection for Low Armature Bearings?"

4.—"What Style of Trolley Car do you Recommend? What are Points of Advantage of the Clinch, Semi-clinch or Soldered?"

5.—"What is the Best Method of Handling Employees' Transportation?"

6.—"What is the Best Method of Computing Car Mileage and Car Hours in Detail?"

THE ELECTRIC PROPERTIES COMPANY

The Electric Properties Company, incorporated May 10 under the laws of the State of New York with a capital of \$6,000,000 preferred and \$6,000,000 common stock, has been organized to acquire, finance and develop properties in which electricity plays the principal part, such as power, electric traction and electric lighting enterprises, and to invest and deal in and to guarantee the securities of corporations operating such properties. It will also conduct through Westinghouse, Church, Kerr & Company (all of whose capital stock is owned by the new company) a general engineering and constructing business.

The purposes of the company, as mentioned above, will be mainly financial. It is not intended to make any changes in the organization or personnel of Westinghouse, Church, Kerr & Company, whose operations have been highly successful, and they will continue to be conducted under the efficient administration of Walter C. Kerr, president.

While the Electric Properties Company will avail itself of the engineering and construction organization of Westinghouse, Church, Kerr & Company, it will also use other engineering organizations or independent consulting engineers as circumstances may require. One of the objects of the new company will be to co-operate with vested interests, such as railways and other public service companies, in the development of properties for their account, and either temporarily or permanently assist in financing such properties.

John F. Wallace, formerly chief engineer of the Panama Canal, has been selected as president of the new corporation, and two vice-presidents will be elected at the first meeting of the board of directors. The following gentlemen constitute the directorate, all of whom will be actively interested in the conduct of the business of the company: Charles H. Allen, vice-president, Morton Trust Company, of New York; Paul D. Cravath, Cravath, Henderson & De Gersdorff, of New York; H. D. Giddings, of New York; N. W. Halsey, N. W. Halsey & Company, of New York; George C. Smith, vice-president, Security Investment Company, of Pittsburg; John A. Spoor, president, Union Stock Yard & Transit Company and president, Chicago Junction Railway Company, of Chicago; Moses Taylor, Kean, Van Cortlandt & Company, of New York; E. G. Tillotson, president, Cleveland Trust Company, of Cleveland; F. D. Underwood, president, Erie Railroad, of New York; R. B. Van Cortlandt, Kean, Van Cortlandt & Company, of New York; John F. Wallace, president, Electric Properties Company, of New York; George Westinghouse, president, Westinghouse Electric & Manufacturing Company, of Pittsburg. The headquarters of the company will be at 111 Broadway, New York.

SUMMER SCHEDULES ON B. R. T.

The Brooklyn Rapid Transit Company's summer schedule on all lines was put into effect Saturday, May 12. Perhaps the largest improvement in the passenger express service to Coney Island, Sea Beach, Manhattan Beach and the other well-known recreation places will be brought about by the addition of 100 open elevated cars to the present summer equipment. These cars have a seating capacity of sixty-two passengers with the seats arranged crosswise on either side of the center aisle.

The surface service has also been largely augmented by the addition of 250 of the new surface cars, previously described in the STREET RAILWAY JOURNAL, which have a seating capacity of forty-eight passengers each. These additions to the rolling stock of both the elevated and surface trolley lines constitute an increase of from 20 per cent to 25 per cent in the company's summer equipment of cars.

On the Sea Beach line, new and improved switching facilities are being installed. An improvement is being made in the terminal of the line which runs to Sheepshead Bay. Formerly this line came to an end at some little distance from the entrance to the race track, and by reason of this passengers were compelled to walk through the woods and across the Long Island Railroad tracks before they came to the race course. Arrangements have now been made whereby the company can make use of these same railroad tracks, which previously were an obstruction to its passengers, as a direct extension of its own line of rails, so that it will be possible for them to run their trains clear through to the very entrance to the course.

IMPORTANT MASSACHUSETTS BILL TO BE RECOMMENDED FOR PASSAGE

The bill which provides that electric railroads in Massachusetts may be constructed when in the discretion of the Railroad Commissioners public convenience and necessity require them, and that such lines shall have all the duties, rights and privileges of railroad corporations, including the right to take by eminent domain, which is now in the hands of the joint committee on railroads and street railways of the State Legislature, is likely to be reported favorably this week. This bill is the outgrowth of petitions for charters to build electric lines with the right of eminent domain, made to the Legislature a year ago by parties said to represent Stone & Webster interests, who have a line running to the Blue Hill district; the Kidder, Peabody-Boston Elevated interests, and the Shaw interest, owning the Boston & Worcester Electric Companies.

At present electric lines can take private property only to avoid some difficulty of construction or operation, such as a heavy grade or sharp curve, but under the proposed bill they can cut through fields and woods, and put in operation high-speed electric trains, carrying freight and baggage, stopping at stated points only, to which passengers and freight from outlying districts would be carried by the ordinary trolley feeders.

BOSTON TUNNEL BIDS OPENED

Bids were opened by the Boston Transit Commission May 8 for the work of constructing the ninth section of the Washington Street tunnel, running from Hanover Street to Haymarket Square. There is a big difference between the two smallest bids, but among the figures presented by contractors who have built parts of the Boston tunnel and subway system the figuring is close. Following are the contractors who figured on the new sections, and the amounts for which they offer to do the work:

Cranford Company	\$253,865
Bruno, Salomon & Pettiti.....	268,650
Degnon Contracting Company.....	277,870
Jones & Meehan.....	258,000
Charles R. Gow Company.....	234,950
Patrick McGovern	236,150
Metropolitan Contracting Company.....	249,975
Coleman Brothers	236,360
W. H. Keyes & Company.....	265,050
Hugh Nawn Contracting Company.....	237,900
J. J. Coughlan Constructing Company.....	198,275
Fred S. & A. D. Gore Corporation.....	253,040
Seeley-Taylor Company	270,550

The Commission has taken the bids under consideration, and has not announced its award.

ANOTHER SYSTEM GOES TO SCHOEPF SYNDICATE

It is stated that the Schoepf syndicate has practically completed negotiations for adding two more important lines to its already extensive system in Ohio and Indiana. The properties are the Dayton & Northern Traction Company, extending from Dayton to Greenville, Ohio, and the Dayton & Muncie Traction Company, extending from Greenville to Muncie, Ind. These roads were built by the late Dr. J. E. Lowes, and were largely controlled by his estate. The system embraces about 90 miles of high-speed road, the Dayton & Northern being capitalized at \$650,000 and the Dayton & Muncie at \$800,000. The negotiations are being conducted by W. Kesley Schoepf and Randall Morgan, of Philadelphia. It is expected this deal will be closed in a few days, in which event it will give the Schoepf syndicate the first physical connection between its lines in Indiana and Ohio, and it will render possible through travel from Eastern Ohio to the western part of Indiana over the lines controlled wholly by this syndicate. It is also understood that the syndicate is again negotiating for the purchase of the Dayton & Western Traction Company, which is owned by Valentine Winters, of Dayton, and which the syndicate has heretofore been unable to acquire, owing to the high price asked for it. The line extends from Dayton to Richmond, Ind., and is in the direct route from Dayton to Indianapolis. The syndicate owns the Indianapolis & Eastern, which connects with the Dayton & Western.

LOS ANGELES-PACIFIC IMPROVEMENTS

Enlargement of the Vineyard power station of the Los Angeles-Pacific Railway has begun, with a view not only to installing sufficient machinery to double the capacity of the plant, but to be followed immediately thereafter by a building that will quadruple the present total power, and will cost, when completed, nearly \$1,000,000. The doubling of capacity will be finished in time for the summer season, and the installation of two other units will be complete within a year, and will cost at least \$700,000, according to statements by E. P. Clark recently. Other work now being done, or in contemplation, is the completion of the new branches started last year, preparation for extensions, work at Santa Monica and improving the terminals at all points. The Hill Street tunnel proposition is not the least of the projects on the list of improvements and general work, for which the company recently sold \$12,000,000 worth of bonds.

FIRST NATIONAL CONVENTION OF INTERURBAN TRAINMEN

The Order of Interurban Trainmen held its first national convention at Lorain, Ohio, last week. The association was formed about two years ago by employees of the Lake Shore Electric Railway, and it now has membership representing trainmen on roads in Ohio, Indiana and Illinois. The organization is patterned after the Order of Locomotive Engineers, and its members aim to co-operate with operating officials. One of the important features of the convention was the establishment of a beneficial and insurance department. W. P. Rutledge, of Lorain, was elected grand master, and C. L. Root, of Rocky River, secretary and treasurer.

A. I. E. E. ELECTION

At the annual business meeting of the American Institute of Electrical Engineers, held in New York May 15, the following officers were elected: President, Dr. Samuel Sheldon, of Brooklyn; vice-presidents, A. H. Armstrong, Schenectady; H. H. Humphrey, St. Louis, and Frank G. Baum, San Francisco; managers, Paul Spencer, Philadelphia; Paul M. Lincoln, Pittsburg; John J. Carty, New York, and A. M. Stone, Atlanta; treasurer, George A. Hamilton; secretary, Ralph W. Pope. The total vote polled and counted was 2183.

IMPORTANT FRANCHISE DECISION AFFECTING BROOKLYN COMPANY

A decision has been handed down by the Court of Appeals which deals with an application on the part of the Brooklyn Rapid Transit Company to lay tracks on Saratoga Avenue, between Broadway and Fulton Street, on which it was claimed the company had a franchise. In 1893, the Board of Aldermen granted franchises to the company for a large number of streets in Brooklyn. During the last administration application was made to the then Commissioner of Public Works Breckenridge for a permit to lay tracks on Saratoga Avenue, under the franchise granted in 1893. The permit was refused. The court decision upholds this refusal.

TRANSIT APPROPRIATION IN NEW YORK

The Board of Estimate, of New York, on Friday, May 11, approved the request of J. W. Stevenson, the bridge commissioner, for an additional appropriation of \$1,250,000 for the construction of the subway terminal connections with the Williamsburg Bridge in Manhattan, elevated connections in Brooklyn and the alterations of the approaches at the Manhattan end of the bridge. Mr. Stevenson said that this appropriation, together with the \$750,000 previously allowed, provided for the completion of the approaches and connections at both ends of the bridge. The present work at the Manhattan end, he said, would provide much improved facilities for increased trolley service over the bridge during the summer.

CONTRACT FOR BUILDING SECOND SECTION OF PHILADELPHIA SUBWAY

The Millard Constructing Company, on Tuesday, May 15, was awarded the contract for building the eastern section of the Market Street subway in Philadelphia. The contract also includes the laying of two immense sewers, one on each side of Market Street, between the City Hall and Front Street, where connection will be made with an outlet now under construction. The award was announced by President Parsons, of the Rapid Transit Company. He said that the contract provides for the completion of the subway section within two years. The contracting firm has already filed a bond of \$800,000 for the faithful performance of the contract, while the traction company has offered a bonus of \$175,000 if the work is completed within eighteen months.

The work of building the loop around City Hall is being pushed vigorously. The contractors have begun work on the north side of the building, and within a few weeks the section on the south side of the building will be under roof, and the eastbound tracks of the Market Street line will be transferred to that side of City Hall. It is hoped to have the subway loop around the city building in operation by September next, when the Market Street elevated road will be placed in operation.

EARNINGS OF THE PHILADELPHIA COMPANY FOR THE YEAR ENDED MARCH 31

The net earnings of the Philadelphia Company for the year ended March 31, show \$2,720,012 for the year, an increase of \$161,819, or approximately 6.3 per cent over the previous year. During the fiscal year the company appropriated for betterments and improvements the sum of \$993,143. Adding to the indicated surplus after charges of \$2,348,137 this \$993,143 for improvements and betterments, the earning power of the property is shown to be \$3,341,280, sufficient to pay the preferred dividend of \$294,679 and the common dividend of \$1,800,000, and leave a surplus of \$1,246,601. However, the surplus actually shown over the dividends was \$253,458, due to the fact, as pointed out above, that \$993,143 was appropriated out of income for extraordinary betterments.

The Pittsburg Railways Company, which is a subsidiary of the Philadelphia Company, increased its gross earnings in the last fiscal year by approximately \$1,000,000 and net by about \$570,000. Notwithstanding this considerable increase in net the Philadelphia Company in its report appears to show no increase in dividends from this source. For the year ended March 31, 1906, dividends on stocks owned amounted to \$1,518,689, an increase of only \$34,408 over the preceding year, and this increase does not appear to have been derived from the railroad earnings. In other words, the increased surplus earnings of the subsidiary for the year were not disbursed in the form of dividends.

Among the changes in the directorate which took place at the annual meeting was the substitution of R. Y. Cook, of the Guarantee Trust of Philadelphia, for Mr. Earle, who has become a member of the directorate of the United Railway Investment Company of San Francisco. Otherwise the old board was re-elected with the addition of B. S. Guinness, who represents the new interests in the company.

The combined income of the Consolidated Gas Company, of Pittsburg, the Allegheny County Light Company, Equitable Gas Company, Braddock Gas & Light Company, and Pittsburg Railways Company for the year ended March 31, 1906, compares as follows:

	1906	1905
Gross receipts	\$11,970,542	\$10,969,575
Expenses and taxes	6,874,470	6,448,120
Net earnings	\$5,096,072	\$4,521,455
Other income	157,024	168,192
Total income	\$5,253,096	\$4,689,647
Deductions	2,558,184	2,376,224
Balance	\$2,694,912	\$2,313,423
Fixed charges	2,086,103	1,992,800
Balance	\$608,808	\$320,623
Dividend on preferred stock.....	114,591	137,925
Surplus	\$494,217	\$182,698

THE ABNER DOBLE COMPANY'S PLANS

During the recent San Francisco fire, the Abner Doble Company suffered the loss by fire of its offices and shops, but is already resuming business on a larger scale than ever before. Temporary offices have been opened at 2611 Broadway, San Francisco, where the business of the company is being conducted for the present. There also is a branch office in Oakland, at 668 Broadway. The company is building large, new permanent shops and warehouses at Seventh and South Streets, in the Potrero district, where it will have the most completely equipped works on the Pacific Coast. Part of the company's manufacturing establishment is already running full force, and within a very few weeks the entire plant will be in complete operation. Unfortunately, the company lost in the fire some of its correspondence and drawings. In order to check up the files and make the records complete, the company is anxious to have clients send as soon as possible copies of all recent correspondence that refers to work which has not been closed up, and would also like to have copies of all drawings and blue prints sent to clients and sent by clients to the company before the fire. The company's organization is intact, and it is now ready to take orders and carry on the business as before. Every effort to help the company to complete its files will assist it materially and will be very greatly appreciated.

LARGE BRAKE ORDER

The Westinghouse Traction Brake Company recently closed a large contract with the Boston Elevated Railway for air brake equipment for forty-five elevated cars and fifty surface cars. The brake specified for these cars comprises the latest improvements in automatic air. The elevated cars are to be equipped with the Westinghouse "AMT" electropneumatic system, the electric equipment of which provides for the highest refinement in application and graduation of the release of the brakes, and at the same time secures absolutely instantaneous and uniform results on each vehicle in the train, no matter what the length of the train might be. The pneumatic side of the equipment is left intact, is complete and in reserve at all times for immediate use. The suitability of this system to the conditions prevailing on the Boston Elevated Railway has been practically demonstrated during a period of nearly two years.

The type of equipment decided on for the fifty surface cars is what is known as the Westinghouse "AMT" pneumatic, which is similar in all respects to the equipment adopted for the elevated cars, with the exception that the electric attachments are omitted. In this case, however, the trains will not consist of more than two cars, and consequently there is not the necessity for that refinement in operation that the electric features provide. Many of the important improvements to the Westinghouse automatic brake are contained in the "AMT" all-pneumatic equipment, such as graduated release, quick recharge of auxiliary reservoir, single train line, adding the flexibility of the straight air brake without the least disturbance of the thoroughly tested and highly satisfactory features of the Westinghouse automatic air brake.

ORDER FOR GENERAL ELECTRIC SINGLE-PHASE APPARATUS

The Anderson Traction Company, of Anderson, S. C., will soon operate a 10-mile suburban extension by the General Electric Company's alternating-current single-phase system, in connection with the present local direct-current trolley road. This is the second contract which has been received by the General Electric Company from this territory for single-phase railway apparatus within the past two months. For the present the new road will run between Anderson and Belton, but will eventually be extended to Greenville, a total distance of 35 miles.

The cars for the extension will be equipped so as to operate on either the present direct current city lines or on the new single-phase extension. For this purpose each is furnished with four 75-hp single-phase motors, adapted for operation on both alternating and direct current and fitted with the same controlling apparatus. Outside the city limits the trolley potential will be 3300 volts, but within the city the cars will operate on the ordinary 550-volt direct-current trolley. The cars will also be

equipped with the General Electric air brake system adapted to operate on either direct or alternating current. Power for the operation of the single-phase extension will be obtained from the Savannah River Power Company.

STREET RAILWAY PATENTS

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

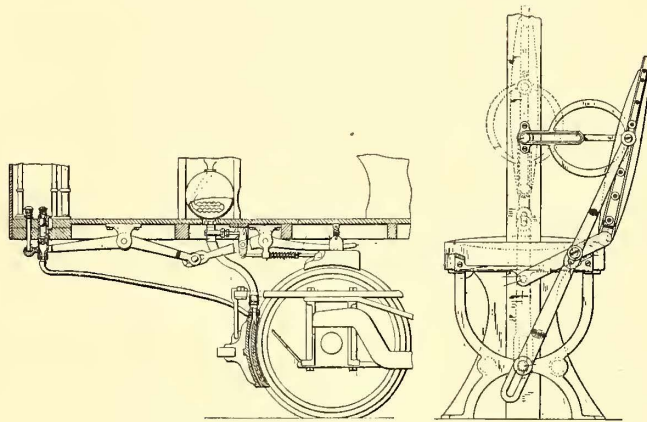
UNITED STATES PATENTS ISSUED MAY 8, 1906

819,736. Body Bolster; Samuel M. Curwen, Haverford, Pa. App. filed July 11, 1905. Comprises upper and lower longitudinal members having an intermediate strut to which are secured hangers adapted to be in turn secured to the car floor sills.

819,757. Car Seat; William H. Heulings, Jr., Philadelphia, Pa. App. filed Oct. 26, 1904. Details of a "walk-over" car seat.

819,762. Track Sander and Brake-Shoe; Eugene E. Keefe, Bellows Falls, Vt. App. filed Oct. 11, 1905. A brake-shoe having a grooved face and provided with a passage leading from said groove, and means for feeding sand through said passage.

819,808. Electric Block Signal for Railways; Walter E. Sands, Brooklyn, N. Y. App. filed March 18, 1905. A pleasure railway block signal system comprising a special conductor or trolley divided into sections and a brush or shoe depending from the cars which makes contact therewith to close certain signal circuits within the car.



PATENTS NOS. 819,762 AND 819,757

819,967. Fender Especially Adapted for Street Railway Cars; Matthew S. Aisbitt, Los Angeles, Cal. App. filed Oct. 12, 1905. Comprises a fender having a rounded, inclined nose of the "cow-catcher" type adapted to push obstructions from the track.

820,005. Fender for Street Cars; Anton L. Mazzanovich, New York, N. Y. App. filed Nov. 17, 1905. Details of construction of a fender adapted to pick up a person encountered and automatically fold to safely hold the person therein.

820,090. Mine-Gate; Newton K. Bowman, North Lawrence, Ohio. App. filed March 10, 1905. A mine-gate adapted to be folded up by means of suitable mechanical connections actuated by an approaching car and a bridge located upon one side of the gate in electrical connection with the trolley line and adapted to be tripped and swung across the path of the gate and make electrical connection with the trolley line on the opposite side of the gate.

820,117. Car Fender; Ernest A. Johnson, Brooklyn, N. Y. App. filed Jan. 11, 1905. Relates to a fender held normally in an inclined position and automatically released and permitted to drop into a substantially horizontal position when any heavy body falls therein.

820,143. Railway Signaling and Safety System and Apparatus; Georges M. Schreiber, Roubaix, France. App. filed Nov. 15, 1904. Means are provided for automatically blowing the whistle of a locomotive in case it passes a danger signal.

820,186. Device for Covering and Protecting Charged Rails; Gustave Egenolf, New York, N. Y. App. filed Nov. 25, 1904.

Comprises a V-shaped housing hinged on a vertical support so that the housing may be thrown back to permit inspection of the rail.

820,204. Car Fender; Joachim C. Jorgensen, Washington, D. C. App. filed Aug. 16, 1905. By the pressing of treadle the brake-shaft is thrown into gear with the means for depressing the fender which is accomplished by a quarter turn of the brake-shaft.

820,260. Electrical Switch Indicator; William A. Rideout, Sr., Oshkosh, Wis. App. filed Dec. 11, 1905. A circuit is closed through a magnet for each movement of the switch point, the magnet being effective to throw a semaphore arm or exhibit signal lamps at a station in the path of the train.

820,280. Trolley Stand; Warren W. Annable, Grand Rapids, Mich. App. filed Jan. 31, 1905. A wire is stretched from the trolley harp to a lever incorporated with the stand, in advance of the pole, so that when the wheel leaves the conductor and the wire strikes a guy-wire, the lever will be tripped and the upward spring tension on the pole relieved.

820,281. Taxometer or Fare Indicator; Gustav Baum, Breslau, Germany. App. filed Aug. 3, 1905. A fare indicator in which the adding or counting mechanism does not start working until the vehicle with which the apparatus is connected has traversed a distance corresponding to the minimum standard fare to be charged, or until an equivalent amount of time has been consumed by waiting after the vehicle has been hired.

820,317. Car Fender; Jearum A. Sage, Stryker, Ohio. App. filed March 31, 1905. Details of construction of a car fender so attached to the car truck as to follow curves in the track.

PERSONAL MENTION

MR. H. F. MERKER has been appointed engineer of maintenance of way for the St. Louis, Alton & Granite City Traction Company, with headquarters at Alton, Ill.

MR. T. B. REDMOND has resigned as general manager and purchasing agent of the Moline, East Moline & Watertown Railway Company, of Moline, Ill., to become associated with interests elsewhere.

MR. CHARLES A. HOBEIN, formerly in the engineering department of the United Railways of St. Louis, has identified himself with the East St. Louis & Suburban Railway Company as assistant electrical superintendent.

MR. J. B. WEEKS has resigned as general manager of the Spokane Traction Company, and has accepted the position of general manager of the Pacific Traction Company, with offices in the Provident Building, Tacoma, Wash.

MR. EDWARD H. RICHARDS, recently a division superintendent on the Southeastern Street Railway system at Middleboro, Mass., has been appointed assistant general manager of the Old Colony Street Railway, with headquarters at Quincy.

MR. CHARLES E. LENHART, master mechanic of the United Traction Company and Oley Valley Railroad Company, of Reading, Pa., has resigned to become master mechanic of an extensive electric railway under construction between Buffalo, N. Y., and Erie, Pa. His office is at Ellicott Square, Buffalo, N. Y.

MR. HENRY DOCKER JACKSON, of Boston, Mass., has opened offices at 4 State Street, that city, as consulting electrical engineer. Mr. Jackson will devote his time to the special subjects of electrolysis and power station economy. He has for a number of years lectured at the Massachusetts Institute of Technology on the subject of electrolysis, having extensive practical experience in the investigation of electrolytic action. In addition he has given expert testimony in a number of important law suits involving this subject.

MR. GRAHAM SMITH, formerly in charge of Westinghouse exposition and convention publicity as the New York Westinghouse press representative, and recently engaged in advertising work under his own name, is about to undertake a journalistic

tour of several months abroad. On his return he will assume the direction of the Eastern advertising interests of several prominent corporations of the Middle West and West, with an office in the Flatiron Building, New York, and will make a specialty of the preparation of industrial books of the higher class.

MR. C. W. ROE has been appointed depot master of the Flatbush car house of the Brooklyn Rapid Transit Company. Mr. Roe, who is a young man, began railroading at the bottom in Detroit. Later he was connected with Messrs. Dupont and Grant in the management of the St. Louis Transit Company, but before the fair in St. Louis he left that city and entered the service of the Public Service Corporation of New Jersey. Here he served under General Superintendent Stanley for about two years as superintendent of Newark city lines and the Newark-Paterson line.

MR. A. GABOURY has been appointed assistant superintendent of the Montreal Street Railway system. This is a new position, which has just been created, and Mr. Gaboury is the first to occupy the office. Mr. L. Trudeau, the superintendent, has been confined to his home through illness, and Mr. Gaboury will perform the duties of superintendent until that official resumes work. The position will be maintained, and in the future Mr. Gaboury will retain the title of assistant superintendent. For the present he will have charge of all operations over the system. Mr. Gaboury has been in the employ of the Montreal Street Railway since 1892, when the electric system was inaugurated. He has worked his way from the ranks, having been conductor and motorman in the company. After leaving the cars he obtained an office position, afterwards becoming inspector and then depot master. Later he was appointed claim agent, which position he held at the time of his promotion.

MR. JOHN M. BRAMLETTE, general manager of the Philadelphia & Western Railroad, of which Mr. George K. Kobusch, of St. Louis, is president, and which is building an electric railway from Sixty-Third and Market Streets, Philadelphia, parallel with the main line of the Pennsylvania Railroad to York, Pa., with a spur to West Chester, resigned his position on Tuesday, May 15, to become general superintendent of the Michigan United Railways Company. Mr. Bramlette became associated with the Philadelphia & Western Railroad after ten years service as general manager of the East St. Louis Railway Company, of East St. Louis, Ill. During the year he has held the position of general manager of the Philadelphia & Western he has given his attention to the details of construction, and that part of the line from Sixty-Third and Market Streets to Wayne, about one-third of the entire system, will be put into operation in a few weeks. The company with which Mr. Bramlette will be associated controls all the street railways in Lansing, Battle Creek, Kalamazoo and Jackson; in all about 200 miles of track, with numerous additional lines in project, not a few of which are well along in construction. Mr. Bramlette will make his home at Kalamazoo. He will have an office there as well as the office at the general offices of the company at Lansing, Mich.

MR. DAVID YOUNG, JR., late superintendent of the United Railroads, of San Francisco, has entered upon his duties as general manager of the York Street Railway Company, of York, Pa. Mr. Young succeeds as general manager Mr. A. H. Hayward, who recently was elected vice-president of the York Street Railway Company at a meeting of its new directorate. Mr. Young is originally from Newark, N. J., where he gained his first street railway experience. He was connected with the North Jersey Street Railway Company. He has been on the Pacific Coast for a number of years, and was connected with the Mountain Cable Company before he became the superintendent of the United Railroads of San Francisco. In speaking of his experiences in San Francisco, Mr. Young said: "Six days after the quake we made an inspection. On the seventh day, at 11 a. m., the first car was moved over the lines. I had on board with me Mayor Schmitz, the supervisor of the roads, city officials and members of the press. For three days we handled all passengers and baggage free. For six days fares were collected from the men. Women and children were carried free. The receipts for the six days, which amounted to \$25,000, were donated to the relief fund. In addition, the company gave \$75,000 to the fund. Lodgings were provided in the car houses for 2000 homeless people. The cars were turned over to the homeless and became their temporary dwellings. The company brought in six boatloads of food from Portland. This was the first food to arrive in the stricken city. Supplies of clothing were provided by the company for its employees and others."