

# Electric Railway Journal

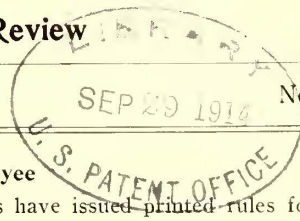
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### Standardizing the Employee

Street railway companies have issued printed rules for their car-operating forces since the early days of horse railroading, but during the last few years special efforts have also been made to standardize the duties of all employees engaged in specific work on railway properties. Such a policy should not tend toward a reduction of intelligent service any more than such a result would follow the use of a manual of tactics in the army. The preparation of codes of rules for different kinds of employees has been carried to a greater extent perhaps on the lines of the Metropolitan Street Railway of New York than in any other city. Abstracts of several of these have been published in these columns and this week we print the rules for the guidance of the employees of the maintenance of way department. The company has found it advisable to print the rules in Italian as well as in English. The use of standards of this kind must benefit the service and the company.

### Owl-Cars and Double Fares

A helpful hint for impoverished electric railways is contained in a cable dispatch from Paris saying that the municipal council of that city has decided to operate a tramcar service after midnight, charging a double fare. In this country the owl-car service takes its place among the public benefits which the grateful companies bestow upon the communities. It ranks with the long-abused free transfer, the sprinkling of streets, the frequent paving and repaving of highways and other costly public advantages. As one of the concessions which sweeten the franchises it is notoriously a promoter of a deficit. While the railways are endeavoring to overcome the effect of higher costs for labor and materials by lessening the illegal use of transfers, restricting various municipal exactions and raising fares where possible, they should consider the reformative idea upon which the canny members of the French municipal council have acted.

### Committee on Heavy Electric Traction

The appointment by the Engineering Association of a committee on heavy electric traction broadens the field of usefulness of the association and should invite active co-operation in the affairs of the association by all steam roads which are operating or contemplate operating electric divisions. The American Railway Association and the American Railway Engineering & Maintenance of Way Association both have appointed committees on heavy electric traction within the last two years. These committees have confined their investigations to date to the subject of clearances for overhead and third-rail conductors which has also been assigned for consideration to the new committee of the Engineering Association. The three committees working together should in time bring about stand-

ardization of this important detail of electrical equipment, since they represent the three departments of a railroad which are most vitally interested. The Engineering Association committee also has had assigned to it the subject of general maintenance of heavy electrical equipment. No committee of any association has before undertaken the study of this broad question. The maintenance of heavy interurban equipment with multiple-unit control and of motor-car subway or suburban trains demands different patterns and methods from those required in the maintenance of the lighter apparatus used on street cars. Electric locomotives also involve many other new problems in the solution of which the experience gained in the operation and maintenance of heavy car equipments should be helpful. This association is to be congratulated on the personnel of the new committee, of which Mr. Doyle, of the Interborough, is chairman.

### The Street Railway and the Cost of Living

An exhaustive study of the causes of increased cost of living has just been completed by a special legislative commission in Massachusetts, whose findings will make a pamphlet of nearly 1000 pages when published. It is interesting to note that public utilities are conspicuously absent from the list of contributory causes of the rising price of labor and materials, manufactured products and professional service which has given birth to so much discussion in the past decade. As a matter of fact an inquiry was sent by the Cost of Living Commission to the Board of Gas & Electric Light Commissioners of Massachusetts, asking to what extent increases in the charges made for artificial illumination had been responsible for the growth of the family budget. To this inquiry the board sent a complete tabulation of the maximum net price charged for gas and electricity in all the cities of the commonwealth in 1890 and 1910, and in practically every case the most sweeping reductions appeared. In general, the cost of each service per thousand feet or per kw-hour has fallen off 50 per cent. It is well known that telephone rates have also decreased by large amounts in the same period. With the street railway, the same condition prevails. With practically a stationary fare in urban service, extensions of the transfer system, improved standards of equipment and service, and lengthened mileage have decreased enormously the cost of transportation to the public. We believe it would be an excellent plan if a legislative commission, or other competent public body would make an authoritative report on the increased cost of living to the railways so as to make clear the plain facts of the constantly decreasing margin between receipts and expenditures which exists in many cities. Such action would seem to be well within the purview of the State public utility bodies.

### Over-Refinement in Power Calculations

One of the best hall-marks of the expert in any branch of engineering applications is the sense of proportion which governs his reasoning and conclusions when illustrated or expressed in figures. The inexperienced man fears to cut off his decimal points until his results tend to become absurd. The specialist unconsciously broadens a discussion of a familiar topic and leaves off all but round numbers in a large portion of his commercial reports. In considering the cost of production per kw-hour the tenth of a cent and perhaps the hundredth in extreme cases means something; but beyond the latter it is

not worth while to spend much time, even though a saving of a thousandth of a cent per unit means an appreciable economy at the bus bar. A plant generating 5,000,000 kw-hours at a cost of 1 cent each throughout a yearly period spends nearly \$1,000 a week on its production. A saving of one-hundredth of a cent per unit means \$500 in the year, and is well worth seeking, but to carry out the figures to another place is largely a waste of effort. A railway plant recently sold 183,000 kw-hours to a distributing organization at a cost of \$4,140, or 2.26 cents per kw-hour. The latter company reported that the unit cost was \$0.0226163. On a sale of 183,000 kw-hours a difference of one-hundredth of a cent means only \$18.30 more or less in the total—an amount large enough to be taken into account, but trifling from the engineering standpoint. The use of the seventh decimal place in this instance was simply ridiculous, since a change of one unit there changed the total by less than 2 cents. Tabulations of power cost, coal consumption, etc., should be pruned of all such over-refinements by engineers who are anxious to have their figures receive the consideration which they ought to deserve. The habit of carrying out such calculations to the limits of one's pencil point only invites distrust by those who possess the ability to examine results from a common-sense point of view.

### PLATFORM ACCIDENTS AND TYPES OF PREPAYMENT CARS

On the continent of Europe the man who boards a moving car is likely to be arrested, taken before a magistrate and fined for his recklessness. In the United States, however, the practice of boarding a car before it has stopped or after it has started has almost become one of the most cherished privileges of citizenship. Until recently no American street railway company, with the exception of the Twin City Rapid Transit Company, had been able to introduce any method of seriously reducing this dangerous practice. The use of the Minneapolis gate did not seem generally feasible because the public had been accustomed for so long to absolutely free exits and entrances. It was not until the successful advent of the prepayment car that street railway companies found they had been too diffident of their ability to alter the riding habits of their patrons. It is fortunate that the radical principle of fare prepayment should have been associated with such striking betterments in the cars themselves that the public quickly learned to appreciate the merits of the new method.

Contrary to the expectations of many, the value of the prepayment car does not lie wholly, or even principally, in its ability to increase the number of fares collected. Experience has shown that it is far more valuable because of its safety. Whether a few fares are missed per trip is of less importance, both financially and in other ways, than the liability of frequent, though minor, platform accidents. Although many designs of the prepayment car are in service, all are superior to their predecessors in this problem of accident prevention. However, when the different styles are compared it will be found that they vary considerably in platform, door, vestibule and step arrangements. It is most interesting to find that, taken on the whole, the later prepayment cars have been simplified and are therefore less costly than the pioneer patterns.

It will be recalled that platform length was one of the great questions when prepayment cars first were proposed. It was

thought that the platform should be large enough to hold 20 or more people, and the first cars were built with 9-ft. platforms carried on extra heavy framing to prevent sagging. There were many cities, of course, where a 9-ft. overhang was out of the question, but the success of the prepayment idea was so striking that some bold spirits ventured to try a platform 7 ft. 6 in. long. By enforcing a rule against passengers remaining on the rear platform, other companies have since found it perfectly feasible to operate prepayment cars with 6-ft. platforms. No standard length can be ordained for all conditions, but the fact remains that a long platform is not essential to the successful operation of prepayment cars. The one important difference developed in this connection is that on the longer platforms, where passengers are allowed to stand and smoke, a person who boards the car and suddenly loses his balance by a quick start, will be thrown against the bodies of others, but as the latter are braced against the vestibule no harm is done. On the short platform car, however, the passenger is thrown directly against the vestibule framing, controller or brake shaft. This trouble can be overcome if the conductor exercise care in giving the starting signal and the passenger grasps the dividing rail, if necessary.

Some of the first prepayment cars were provided with a swinging entrance door and an exit door sliding into a center bulkhead. The entrance door proved rather annoying in summer when the motorman's open vestibule sash allowed drafts of air to swing the door. In later designs the end body doors were of the double sliding type and practically no difficulty was experienced in getting passengers to use the proper entrances and exits, as indicated by a bulkhead post or even merely by a platform railing. In still another design, body end doors were omitted because the vestibule doors are open only when the car is receiving or discharging passengers.

The design of vestibule doors and platform step has a most important influence on boarding and alighting accidents. On some cars, the vestibule doors on the conductor's platform remain open with the step always horizontal. On such cars there is little to prevent a reckless person from jumping on or off the car while it is in motion. Such practice is even more dangerous if the step and grab-handles are left exposed when the doors are closed. A better plan is to place the grab-handles inside the vestibule and so to interconnect both door and step that no one can secure a hold when the car is in motion. Even when the steps are arranged to disappear when the door is closed, it is necessary to provide for certain contingencies. Thus, if the step slides under the car or folds against the riser, there is a chance that someone will try to board the car at the very instant that the position of the step is being changed. Accidents resulting from this practice can be made impossible only by delaying the movement of the door until that of the step is completed and by delaying that of the step until no passengers are standing on it.

In still another pattern of prepayment car, the vestibule doors are replaced by gates which are controlled directly by the conductor. When these gates are closed they rest against the riser, thereby leaving the greater part of the step width available for a footing while the wire netting of the gates gives a good purchase for the fingers. Even as they are now these gates have helped to minimize platform troubles, but they would probably be more effective if they were flush with the edge of the step when closed.

## THE BURDEN PASSES TO THE COMMUTER

Large increases in the commutation rates of railroads serving the suburbs of New York City, which have either been announced definitely or are in prospect, hold a significant lesson for electric railways. They touch the pocketbooks of the passengers who, riding daily between their homes and places of business, constitute a class of traffic which corresponds most nearly to the traffic of electric railways. The advances are, of course, the direct results of the higher wages paid to railroad employees. The import of the steam railroad wage advance and the need of resultant changes in rates can be read in the estimate that the total increase in wages in 1910 will be at the rate of \$100,000,000 per annum for the entire country. This estimate does not take into account the large advances by electric railways.

The first of the companies to announce its new rates, the New York, New Haven & Hartford Railroad, has other reasonable grounds, if it cares to advance them, for asking higher rates. Its use of the Grand Central Terminal, owned by the New York Central & Hudson River Railroad, for many years has imposed a charge which reduces sharply the revenue from its commuter traffic. This fact, however, is no new basis for argument such as that which lies in the enormous outlay of capital required in electrification of the line between New York City and Stamford, Conn., an improvement that added greatly to the capital cost of the property in the commuter's zone. The electric service has not been in operation so long that passengers forget the inferior steam facilities, with the smoky and dangerous Park Avenue tunnel, which it succeeded. But the rapidity with which the announcement of increase in wages is followed by that of increase in rates places this cause and effect in such juxtaposition that the two must be remembered together.

Other companies have not yet announced their detail plans for increases in rates. The New York Central & Hudson River Railroad will raise commutation rates and the Long Island Railroad will add a flat price when it begins to operate its trains into the new Pennsylvania terminal on Manhattan Island.

For comparative purposes and as an illustration of the rates which are to be effective between New York and one community about 13½ miles distant on the New York, New Haven & Hartford Railroad, it may be stated that, beginning on June 1, the new tickets will average as follows: Monthly tickets, 11¼ cents a ride, or 0.8 cent a mile; 50-trip family ticket, 25 cents a ride, or 1.8 cents a mile; single fare, 35 cents, or 2.6 cents a mile. The fare between New York City and this suburb for a passenger traveling by the subway and the surface car is 10 cents, but the time required is much longer. The increases in commutation fares on the New Haven road range from about 20 to 40 per cent, but the average is said to be about 20 per cent.

It is idle to pretend that the railways can meet all manner of increases in costs of labor and material and continue to subsist without recouping from some source sufficient revenue to restore the margin between income and outgo. The burden of increased costs, unless lightened by freedom from heavy taxation or other governmental exactions, will necessarily fall upon the traffic, through the medium of higher rates or, if these are impossible, of more economical service.

## SPECIAL APPLIANCES AT THE CHELSEA SHOPS OF THE BOSTON & NORTHERN STREET RAILWAY COMPANY

One of the principal centers of rolling stock maintenance on the system of the Boston & Northern Street Railway Company is the Washington Avenue shop at Chelsea, Mass. For many years car repairs have been carried on at this point, and, in general design the shop illustrates little of unusual interest, having developed gradually to its present extent and not according to a predetermined plan of expansion. The working facilities of the shop, however, include a number of labor-saving devices and special equipments which have added much to the efficiency of the installation.

On a system as large as the Boston & Northern, which embraces the care of about 1300 cars, the ordering of materials and supplies from different car houses is an important consideration. It is desirable to keep stocks of material at local points down as much as is consistent with reliable service. Correct ordering of parts and supplies needed is an important part of such work. To facilitate the accurate ordering of material, the company supplies each car-house foreman with a book of photographs of all standard material and equipment details, a page of which is shown in Fig. 1. Each piece of apparatus or important supply part is numbered, and the book contains an index of the numbers by which the parts may be ordered. Thus, in Fig. 1, piece "BN-10" represents a half-elliptic spring hanger, and "P-18" a journal box. The car-house foreman, in ordering, may simply specify these numbers. On the combined Boston & Northern and Old Colony systems some 75 of these books are in service. In order to obtain photographs of parts without shadows, a special arrangement of the camera is made, as shown in Fig. 2, at the Chelsea shop. The parts to be photographed are placed upon a white canvas-covered board 6 ft. long by 4 ft. wide, and the camera is mounted upon a frame with its lens about 10 ft. above the dis-

and platform for the use of the photographer. The camera is attached to the frame by a 1/4-in. screw fastened to a horse-shoe standard, and adjustments for focussing are easily made.

At the Chelsea shop the company has had in operation for

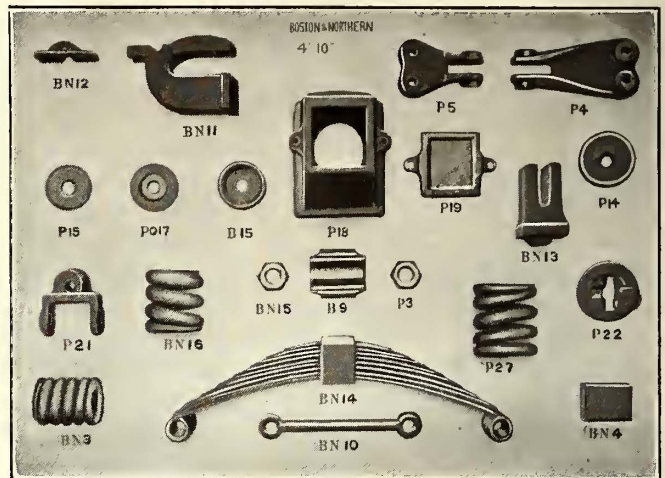


Fig. 1—Boston & Northern Shops—Equipment Parts

about two years a plant for the impregnation of motor field coils, supplied by the J. P. Devine Company, Buffalo, N. Y. It can treat about 35 field coils in 24 hours. The company uses No. 2 impregnating compound, from the Standard Varnish

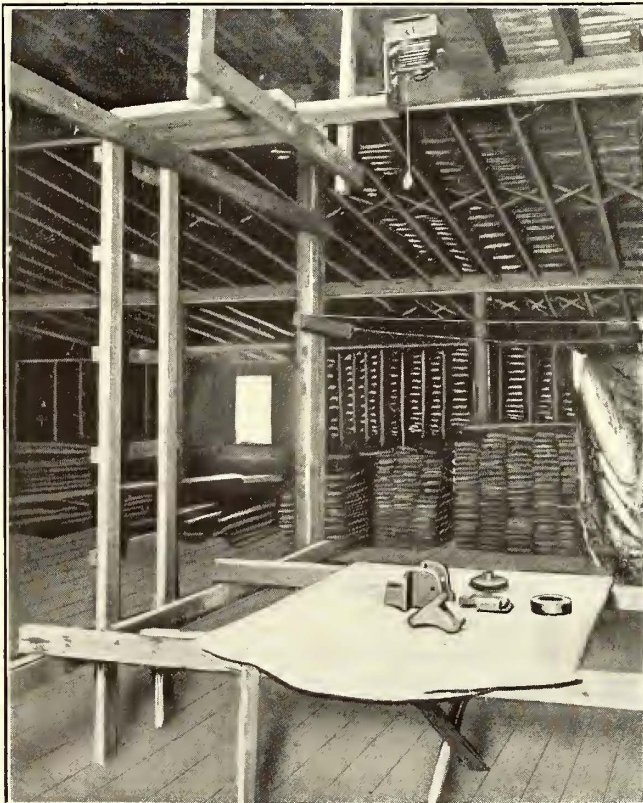


Fig. 2—Boston & Northern Shops—Method of Photographing Equipment Parts

play board. The object to be photographed being placed on a horizontal plane, no shadow is cast, and behind and above the camera a skylight affords ample illumination. The frame holding the camera consists of 2-in. x 4-in. stock, with a ladder

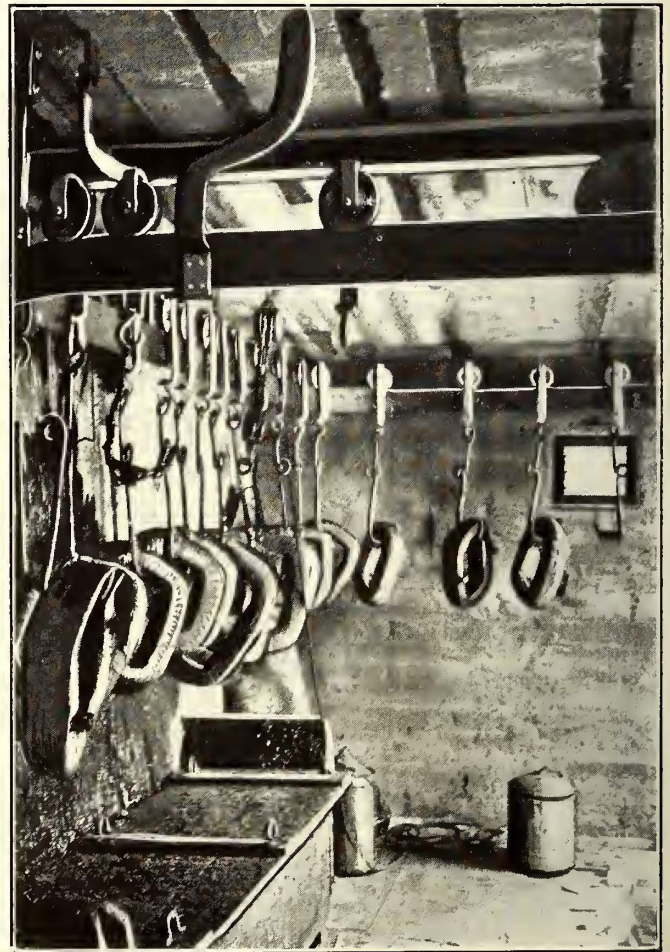


Fig. 3—Boston & Northern Shops—Dipping Room for Field Coils

Works. The plant consists of a 250-gal. vacuum chamber and a melting tank of the same size, with piping, steam boiler, vacuum pump and a driving motor. In the process of impregnation the fields are first put into the vacuum chamber and

heated for 16 hours; the compound is then liquefied in the melting tank, and a vacuum of 27 in. applied to draw it over into the vacuum chamber. Air is then applied at a pressure of 80 lb. per square inch for three hours, after which the compound is driven back into the melting tank. The coils are allowed to drip for three-quarters of an hour, and then are removed from the chamber. The stripping tape is taken off the

Fig. 3 illustrates a dipping room for field coils at Chelsea. It is constructed of concrete, reinforced by gas pipe in the walls, the roof being reinforced with old T-rails. The dipping room is about 14 ft. square, and is equipped with a 60-gal. compound tank and a trolley runway for the handling and temporary storage of coils. The compound used is the Massachusetts Chemical Company's No. 50 insulating compound. The room

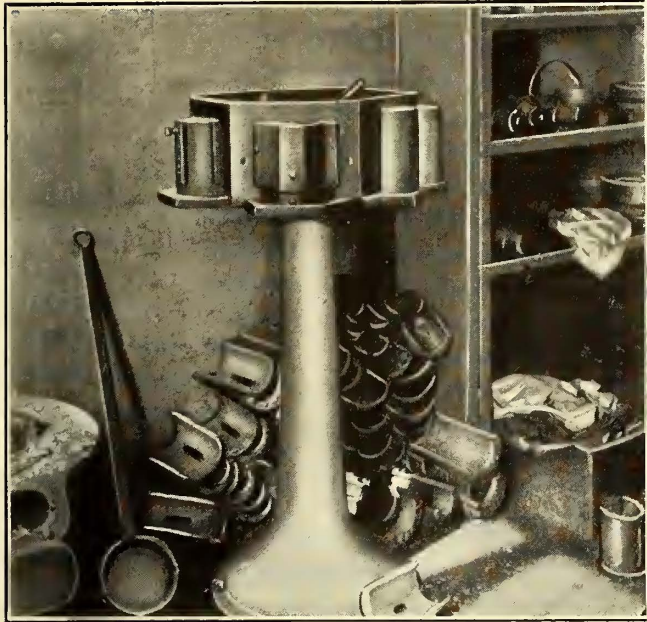


Fig. 5—Boston & Northern Shops—Babbitting Device for Three Pairs of Sleeves

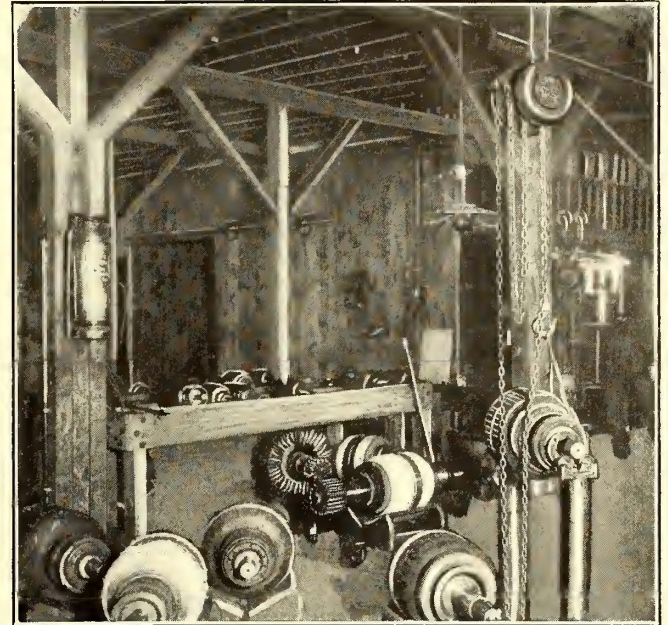


Fig. 6—Boston & Northern Shops—Automatic Truck Standards and Hoisting Equipment

coils, cleaning the coil surface, while one of two layers of tape are left on. The boiler supplying the steam pressure necessary is connected with the vacuum chamber, in which are coils for steam heating. The vacuum pump is operated by an electric motor, together with a paddle in the melting tank. When the plant is in operation one man handles the boiler and

is lighted by five 16-cp incandescent lamps wired in conduit, and is ventilated by wall outlets of the register type. The trolley runway is 4-in. high by 1/2-in. thick, and the wheel carriers for the coils are each 4 in. in diameter and 1 in. wide.

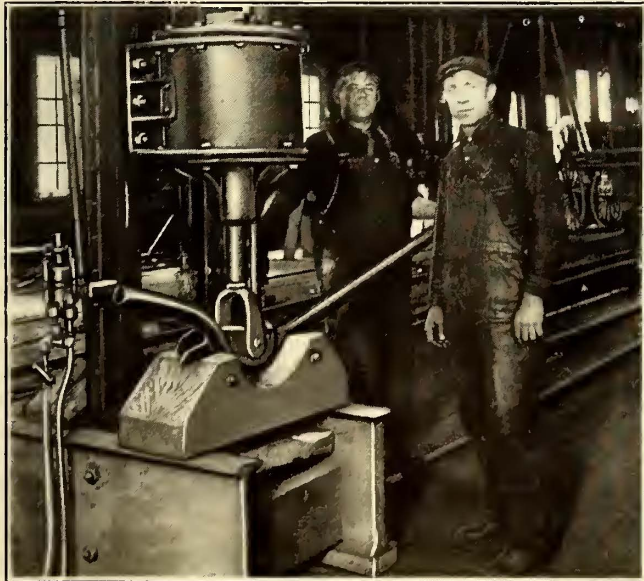


Fig. 7—Boston & Northern Shops—Pipe Bender

two strip the coils after treatment. The exhaustion of the air in the chamber and the introduction of the hot impregnating compound under subsequent pressure provide a treatment for the coils which other companies than the Boston & Northern have adopted. The Chelsea plant has handled a large amount of work for foreign street railways with successful results. The cost of impregnation is found to be approximately \$1 per coil.

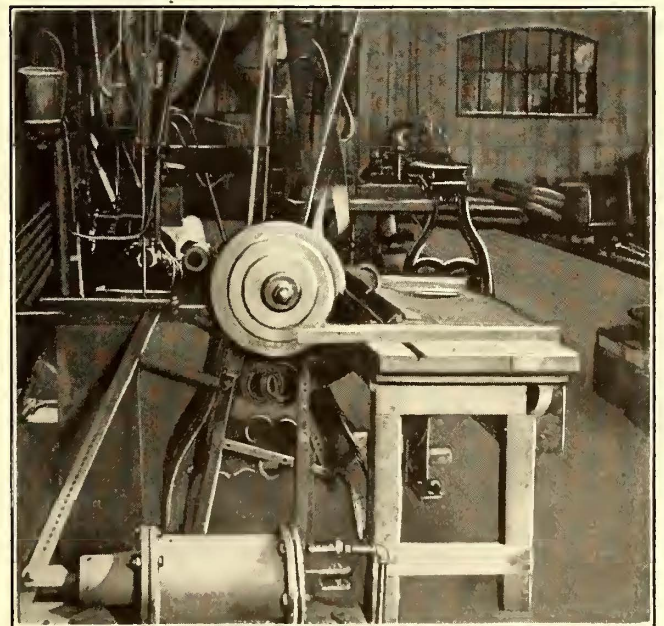


Fig. 8—Boston & Northern Shops—Conduit Cutter

Angle irons attached to the wheels are provided with hooks in their lower ends, to which are hung looped angles for the carrying of the individual coils. Each hanger is provided with a middle eye by which the coil can be raised and lowered from the dipping tanks by means of a small block and tackle traveling horizontally across the top of the tank. The wheels and hangers are of 1/4-in. galvanized iron. About 75 coils per hour can be dipped and dried in the room.

The drawing Fig. 4 presents details of an oven and dipping room in service at Chelsea in connection with the field and armature coil heating and dipping. The field section, which is typical, is a room about 13 ft. long by 16 ft. wide, is built with reinforced concrete walls. The interesting feature is the floor and heating construction, the floor being made of sectional iron grating with steam pipes beneath for providing the requisite drying service. In the field-coil oven are over 400 ft. of 1¼-in. steam piping. The floor grating is installed 12 in. above the bottom of the room in 15 sections. The grating is laid on old rails cemented into the walls. Four ventilators are installed in the walls of the oven. A similar oven, about 6 ft. wide and 16 ft. long, is installed for armature service. A feature of the construction of these ovens is the ability to control the heat by the sectionalizing of the steam coils, which are provided with valves below the floor level. The location of the coils below the floor gives a maximum area for coil storage and permits easy cleaning and alteration.

The babbitting device illustrated in Fig. 5 has proved to be a great convenience in these shops. It consists of a hexagonal

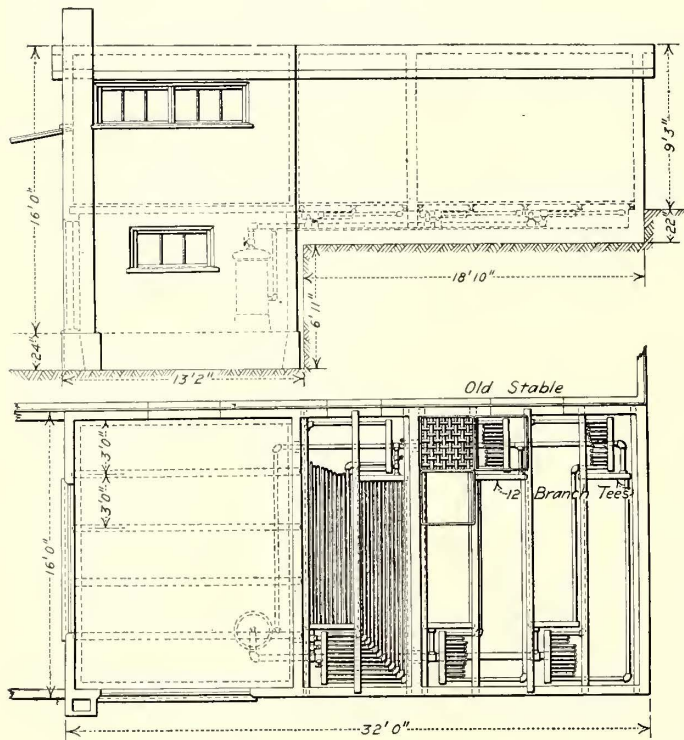


Fig. 4—Boston & Northern Shops—Oven and Dipping Room

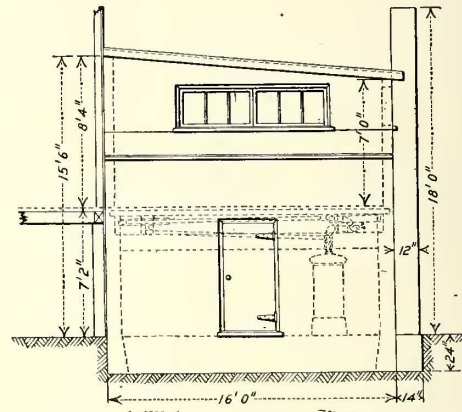
box mounted on a heavy cast-iron standard, with faces and shelves on the outside by which two pair of axle sleeves and one set of armature sleeves can be poured at once. The shelves are 10 in. long and 3½ in. wide. In using the device a core is attached to a face, and on the outside of this a cap or mold is placed, leaving a space between which is filled with babbitt from a ladle heated in a stove close by. A typical core, sleeve and mold are shown in the illustration. The device is compact, easily operated and economical on account of its capacity. The height of the shelf is 7 in.

These shops are liberally provided with telfer equipment for the rapid handling of armatures, and Fig. 6 shows an armature standard, telfer and wheeled armature truck as used on the premises. The distances from one portion of these shops to the other are considerable on account of their lengthwise development. Special care has been taken, therefore, to avoid muscular labor in transportation, other than the comparatively easy work of handling armatures for short distances on wheeled trucks.

In the erection of certain cars at Chelsea the bending of pipe conduit assumed formidable proportions until the device

shown in Fig. 7 was constructed. This consists of a large brake cylinder operated at a pressure of about 90 lb. per square inch, and fitted at its end with a yoke carrying a wooden block. The latter is forced against the conduit, driving it into a form block or mold of oak below. The pressure applied is about 8 tons, and pipes which are bent are filled with sand on bends of 45 deg. or over. The air supply reaches the cylinder through a 1-in. hose. The control of the pressure is effected by a brake valve at the side of the steel columns which carry the cylinder. The cylinder is adjustable for height on the columns by bolts passing through the web. The receiving block rests on two 18-in. girders. On each side of the steel columns shown in the illustration is a bending outfit, the controlling valve for the second equipment being shown in the foreground. The block which carries the conduit is provided with two ½-in. bolts to prevent splitting under pressure. Conduit 1½ in. in diameter can easily be handled by these devices. Two men usually are required for the most rapid work.

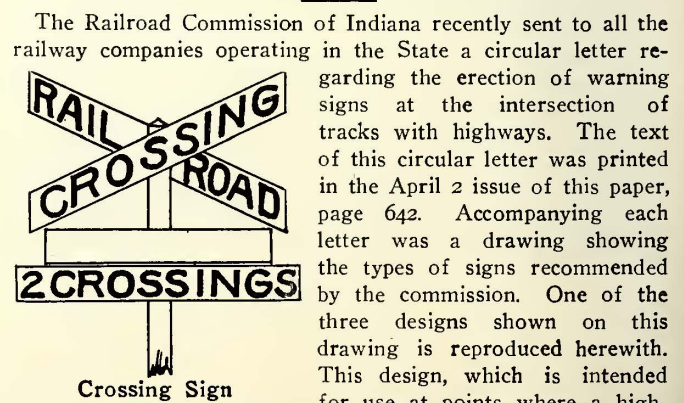
Fig. 8 shows a cutting-off machine for use in conduit work. It is motor-driven and consists essentially of a table carrying



a trough in which the conduit is laid, an emery wheel and an old saw with the teeth worn off, and a finger which throws the conduit against the disk when the machine is operated, the movement being effected by an air-brake cylinder and appropriate levers. The table top is forced toward the disk by the levers in connection with the application of air to the brake cylinder. Conduit up to 1 in. in diameter can be cut off in a few seconds by this device.

All conduit is filled with sand for the larger bends by means of a hopper elevated above the floor, under which the pipe can be set and easily controlled by a hand lever. This method superseded filling by hand.

**RAILROAD CROSSING SIGNS RECOMMENDED BY THE INDIANA RAILROAD COMMISSION**



The Railroad Commission of Indiana recently sent to all the railway companies operating in the State a circular letter regarding the erection of warning signs at the intersection of tracks with highways. The text of this circular letter was printed in the April 2 issue of this paper, page 642. Accompanying each letter was a drawing showing the types of signs recommended by the commission. One of the three designs shown on this drawing is reproduced herewith. This design, which is intended for use at points where a highway crosses two parallel lines of tracks close together, has the words, "2 Crossings" painted on a horizontal board below the crossed boards. The single crossing sign is similar to the one illustrated, but with the horizontal board omitted.

## GAS ENGINES IN CHARLOTTE, N. C.

Through the kindness of E. D. Latta, Jr., general manager of the Charlotte (N. C.) Electric Railway, Light & Power Company, the following illustrated particulars are available on this company's gas-engine installation. The excellent results secured with the latter were mentioned in an editorial entitled "The Gas Engine in Railway and Lighting Service" and printed in the *ELECTRIC RAILWAY JOURNAL* of April 9.

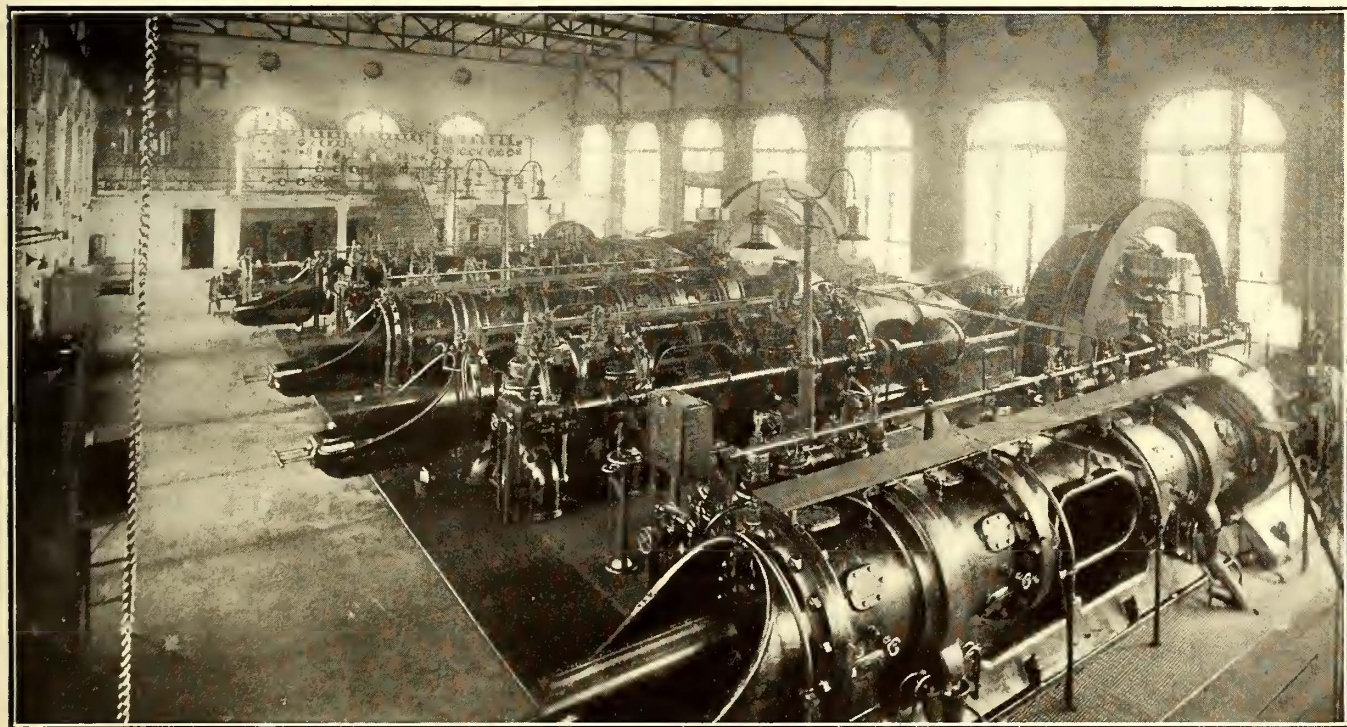
The engine house is a brick structure designed for three 80-hp gas engines, but the present equipment consists of two Snow units of the horizontal twin-tandem, double-acting, four-stroke cycle type, each being direct and rigidly connected to a 540-kw, three-phase, 60-cycle, 2300-volt alternator. The exciter equipment consists of a 60-hp single tandem gas engine direct-connected to a 40-kw d.c. generator. In addition to this apparatus there is an induction motor-driven exciter set of the same capacity as the gas-engine exciter set; a 300-kw and a 500-kw rotary converter, and the usual switchboard equipment.

The Loomis-Pettibone producer apparatus consists of two 1000-hp twin generator down-draft producers, having a continuous overload capacity of 50 per cent. Each unit consists of two 9-ft. generators, 16 ft. high, connected at the bottom by

the crankshaft and run at half speed. Intake and exhaust valves are located on the top and bottom, respectively, of a compartment bolted to the side of the cylinder which acts as a mixing chamber at one time and explosion chamber at another part of the cycle.

The governors are of the Jahns type, in which the centrifugal force of the weights revolving in a horizontal plane is resisted by the direct pressure of coiled springs, the weights turning on rollers in a constant oil bath. The governing is done with a uniform mixture, and the amount admitted to each cylinder is controlled by the governor through the cut-off valve gear. Each cylinder has its own mixing chamber and mixing valve to regulate the proportion of gas and air, so a disturbance, such as a back-fire, does not foul the gas going to other cylinders. This feature is a great advantage when close regulation is desired. A plunger in the face of the flywheel works in and out and radially against a coiled spring. In case of excessive speed of the flywheel, centrifugal force drives the plunger out beyond its normal position and opens a switch in the igniter circuit, thus shutting down the engine and preventing racing in case the governor belt breaks or the governor otherwise loses control of the engine.

The problem of piston packing has been solved in a fairly



General View of the Gas Engine Station in Charlotte, N. C.

openings containing water-cooled gate valves to an economizer or vertical boiler of 100-hp rating. From the top of the boilers a 16-in. pipe leads to the bottom of the wet scrubber and from the top of the wet scrubber to the exhauster, or through a by-pass around the exhauster to the dry scrubber. A 60,000-cu. ft. holder receives the gas from the producers and delivers it to the engines.

### DETAILS OF THE GAS ENGINES

The gas-engine cylinders are 24 in. bore by 36 in. stroke; the flywheels are 16 ft. in diameter and weigh 34,000 lb. The entire engine occupies a floor space of 18 ft. x 44 ft., and together with the alternator weighs 500,000 lb. All parts of the engine that come in contact with the hot gases are water-jacketed. The jacket water empties from the separate pipes into open funnels to enable the operator to determine the temperature of the engine parts.

The ignition is low-tension make-and-break, with two igniters to each end of each cylinder. The ignition current requires about 10 volts. The poppet valves are actuated by bell-cranks which are lifted by cams on the camshafts, which are geared to

satisfactory manner by the use of metallic packing in cases. The packing cases each contain five rings of special cast iron made in segments, with overlapping joints, the segments being held against the piston rod by a garter spring drawn around the circumference. The packing case is bolted to the cylinder head by a flange, between which and the cylinder head is a ground joint. About once a month each packing case is removed and supplied with clean packing. The packing removed is cleaned and put aside for re-use.

The main bearings are lubricated by an oil-flushing system operated by turbine pumps, attached to the engine, which carries the oil from the engine through a filter to an elevated tank from whence it returns by gravity. The cylinders are lubricated by multiple pumps positively driven from the camshaft, the plungers of these pumps being so timed as to inject oil on the piston at the end of each power stroke. Two air tanks, each 5 ft. in diameter and 10 ft. long, in the basement, are kept charged with air at 150 lb. pressure for starting the engine. Air is admitted to each cylinder at the beginning of its power stroke.

During the summer months about 15 gal. of water, at an in-

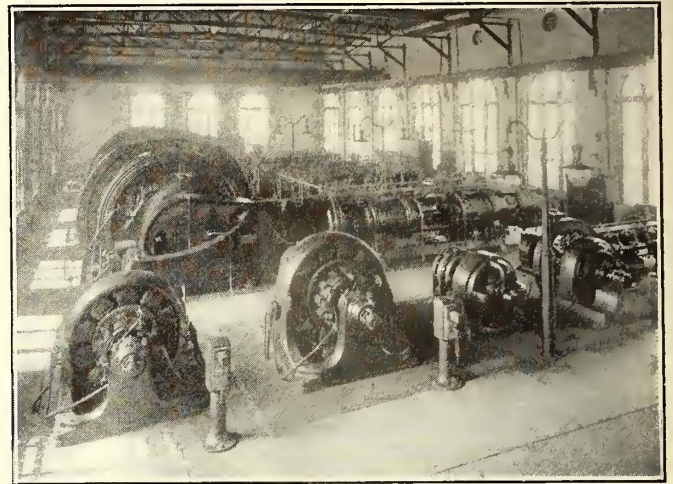
itial temperature of 80 deg. Fahr., are required per hp-hour for cooling, the temperature of the discharge being about 120 deg. During the winter months 10 gal. of water per hp-hour at 60 deg. are enough, and the water is discharged at about 100 deg. The difference in the amount of water required in summer and winter seems due to the fact that the heat lost by radiation is much greater in winter. The discharge jacket water flows by gravity to a hot well of the cooling system, from which it is drawn by an electrically driven centrifugal pump of 50,000-gal per hour capacity, against 15-lb. pressure, and forced through sprays into a basin which has a cold well in the middle. From the cold well the water is taken by a two-stage turbine pump of 15,000-gal. per hour capacity against 30-lb. pressure, and returned to the engine. These pumps are driven by the same motor. As the capacity of the single-stage or hot-well pump is three times as great as that of the cold-well pump, an excess of water is sprayed into the basin over that taken out of the cold well; this excess water overflows and returns to the hot well, where it is again pumped through the sprays. In this way all the water passes through the sprays three times to each time it is used in the engine. Ample cooling is obtained as the water in the cold well is reduced to a temperature slightly below that of the atmosphere. The loss in water by evaporation to attain this cooling is about 10 per cent.

The engines, which are rated at 810 b.h.p., have frequently carried a load of 700 kw, which is equal to 1010 b.h.p. or nearly 25 per cent overload for a considerable length of time, and a momentary load of 800 kw, or 42 per cent overload, without reducing the speed to a point that caused trouble. The load of 700 kw, although it does not reduce the speed materially, gradually heats up the engine so that after a few hours' operation pre-ignitions occur. The high pressure in the cylinder also strains the packing and causes gas to flow through.

#### PRODUCER OPERATION

In starting a producer the generators are charged to a depth of 5 ft. with 72-hour coke, requiring about 6000 lb. to each generator, or a total of 12,000 lb. The exhaustor is then started and the coke ignited. The gas made during the first 40 minutes is too inferior to be used, and it is, therefore, blown out through the purge stack and wasted. As the coke in the generators burns and becomes hot, coal is charged at the top in small quantities and at frequent intervals. When the fuel bed has attained a sufficiently high temperature, the purge stack is closed and the gas admitted to the holder. Steam is introduced

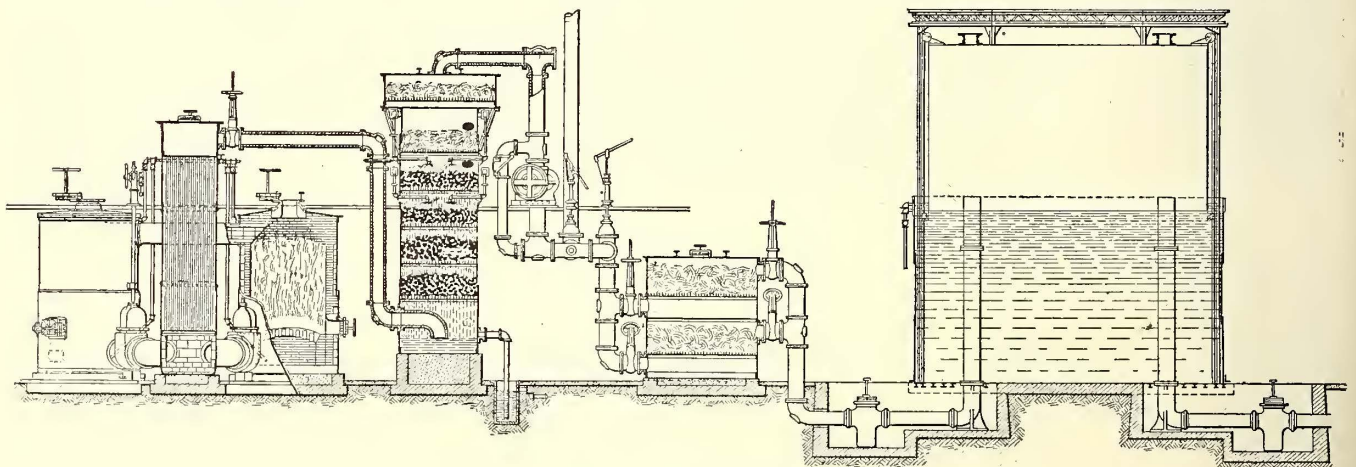
of the gas is given off there and serves to make steam, which is used in the generators and for running the exhaustor. From the top of the economizer the gas passes, at a reduced temperature, to the bottom of the wet scrubber, where it is water sealed. Passing up through the wet scrubber, the gas works its way through several layers of water-sprayed coke. During the passage of the gas through the coke and water most of its dust and lampblack is removed and its temperature is reduced



Rotaries and Exciter Sets in the Charlotte Station

to that of the atmosphere. In the top of the wet scrubber a thick layer of excelsior removes part of the moisture and most of the remaining lampblack. From the wet scrubber, the gas goes through the exhaustor, then to the dry scrubber, where two more layers of excelsior dry it thoroughly, thence it passes as a clean, dry, cool gas to the holder. The use of a large holder (60,000 cu. ft.) is of great value in operation, because it takes up the variations in load and allows the producer to be operated evenly; also, if the gas varies in quality over short intervals, which is unavoidable, the gases above and below the mean value are thoroughly mixed and a gas of uniform quality is supplied to the engines.

Ford, Bacon & Davis, of New York, consulting engineers for the United Railroads of San Francisco, announce that a suc-



Cross Section of Charlotte Gas Producer

at the top of the charging doors and, together with the air, is drawn in by the exhaustor and passes down through the generator to form a mixed gas. The carbon of the incandescent fuel combines with atmospheric oxygen and steam, forming carbonic oxide gas and free hydrogen, the principal valuable constituents of producer gas.

The hot gas leaves the generators at a temperature of about 1200 deg. C. and passes out through a brick-lined nozzle and water-cooled gate valve into the lower brick-lined compartment of the vertical economizer. A large part of the sensible heat

successful trial of the 150-mile, 100,000-volt transmission from the Stanislaus power station to San Francisco was made during the past week. In about a month regular service to the substations of the United Railroads of San Francisco will be instituted. The substations of the United Railroads of San Francisco were formerly equipped with 25-cycle rotary converters, but these have now been exchanged for 60-cycle motor-generators, on account of the change from 25-cycle distribution from steam stations to a combined 60-cycle steam and water-power supply.



**TRACK STANDARDS AND GENERAL RULES—DEPARTMENT OF MAINTENANCE OF WAY—METROPOLITAN STREET RAILWAY COMPANY**

An account was published last week outlining the general organization of the maintenance of way department of the Metropolitan Street Railway Company of New York and describing some of the work carried on by that department. During the last two and one-half years the company has done a great deal in the way of standardizing the equipment and methods used in the department of maintenance of way and some of the results secured are described below.

**STANDARDIZATION OF RAILS**

The breakage of many rails on the Metropolitan system during 1906 and 1907 demonstrated the necessity of making a change in the chemical composition of the rails, with the object of securing a rail which would stand the wear and tear better and, at the same time, be less brittle. The chief trouble encountered was that the web at the end of the rail would split for a distance varying from 2 in. to 10 ft. In approximately half the instances of this trouble, a piece was broken out from the end of the rail, varying from 2 in. to 12 in. in length.

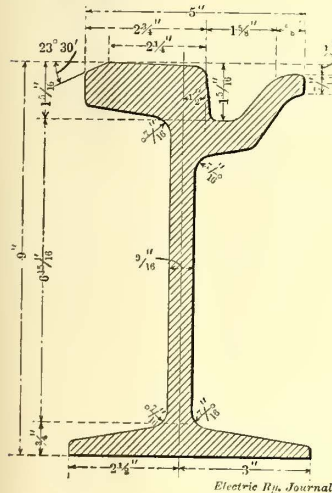
The chemical composition formerly prescribed for Metropolitan rails was as follows:

- Carbon, not less than 0.45 or more than 0.55 per cent.
- Phosphorus, not over 0.10 and to average below 0.09 per cent.
- Sulphur, not to exceed 0.07 per cent.
- Silicon, to be 0.10 per cent.

The remainder of the composition was left to the judgment of the maker.

The new specifications for rail provide for an increase of carbon, a decrease of phosphorus and call for not less than 0.8 or more than 1.1 per cent manganese.

The weight of the rail has also been gradually increased. The standard Metropolitan rail is 9 in. high and its weight was changed, first, from 107 lb. to 115 lb. per yd. and finally, to 123 lb. per yd. On those lines where the cars were formerly operated by cable, a 7-in. rail was originally installed and as the yokes were designed for this height of rail it has been used when the track has been relaid, but its chemical composition is the same as for the standard 9-in. rail.



**Standard 9-in. Rail**

The following are the Metropolitan tram-rail specifications:

**SPECIFICATIONS FOR 9-IN. OPEN-HEARTH STEEL GIRDER RAILS**

**Chemical Composition:**

Test borings selected by the inspector from rail rolled from each heat to conform to the following chemical analyses:

Element.	Lower Limit.	Desired.	Upper Limit.
Carbon .....	.65	.75	.80
Manganese .....	.80	.90	1.10
Silicon .....	...	...	.20
Phosphorus .....	...	...	.04
Sulphur .....	...	...	.08

**Process of Manufacture:**

1. Ingots shall be kept in a vertical position until ready to be rolled or until metal in the interior has solidified.
2. No "bled" ingots shall be used.
3. There shall be sheared from the end of the bloom formed from the top of the ingot sufficient discard to insure sound rails.
4. In reheating, care shall be taken to avoid burning the steel and under no circumstances shall a cinder heat be used.

A cinder heat shall be considered as one in which the scale on the sides of the ingot becomes fluid.

5. The initial temperature, number of passes and speed of train shall be so regulated that, on leaving the rolls at the final pass, the temperature of the rail shall not exceed 1900 deg. Fahrenheit.

Bars shall not be held for the purpose of reducing their temperature, nor shall any artificial means of cooling them be used between the leading and finishing passes, nor after they leave the finishing pass.

**Mechanical Requirements:**

1. The name of the maker, the weight and type of the rail and the month and year of manufacture shall be rolled in raised letters and figures on the side of the web, and the number of the heat shall be plainly stamped on each rail where it will not be subsequently covered by the splice bar. A letter shall be stamped on the web to indicate the portion of the ingot from which the rail was rolled.

2. The section of the rail shall conform to templates prepared by the manufacturer in accordance with the Metropolitan Street Railway Company Drawing No. 21375. There shall be no variation from template on the splice-bar fit. A variation from the template in height of 1/32 in. over or 1/64 in. under will be allowed.

The bottom of the base shall be flat and perpendicular to the axis of the web. A variation in the width of the base of not to exceed 1/8 in. over or under the dimensions given on the drawing will be allowed. The dimensions of the head of the rail shall agree with those shown on the drawing.

The width of the tram shall not vary more than 1/8 in. above or below the dimensions given on the drawing.

3. The weight of the rails shall be maintained as nearly as possible to 123 lb. per yd. A variation of one-half of one per cent, as applied to the entire order, will be allowed.

4. The standard length of rails shall be 59 ft. 11 7/8 in. at 60 deg. Fahrenheit. Ten per cent of the entire order may be of less lengths in multiples of 15 ft. No rail, however, shall be shorter than 29 ft. 11 7/8 in. Lengths shorter than 59 ft. 11 7/8 in. shall be shipped in pairs. A variation from the above specified length of 1/8 in. shall be allowed.

Rails must be sawed smooth and true squared. All burrs removed. A variation from true square sawing not to exceed 1-22 in. will be allowed.

5. Rails must be free from all injurious mechanical defects and flaws.

6. Rail shall be smooth on head, straight in line and surface and without any twists, waves or kinks, particular attention being given to having the ends free from kinks or drop.

Hot straightening shall be carefully done so that gagging in the cold presses will be reduced to a minimum. Any rail coming to the straightening presses showing any sharp kinks or greater camber than that indicated by a middle ordinate of 4 in. in 33 ft. will be at once marked as No. 2 rail and only accepted as such. The distance between the supports of rails in the straightening presses shall be not less than 40 in. Cold straightening shall not be sufficient to leave distinct marks of gagging on head.

7. Splice bar holes shall be drilled accurately in accordance with Metropolitan Street Railway Company's Drawing No. 21375.

The rod holes shall be punched in accordance with Metropolitan Street Railway Company's Drawing No. 21375.

**Drop Test:**

One drop test shall be made on a piece of rail from each heat, such piece to be not less than 4 ft. and not more than 6 ft. long. This piece shall be cut from the rail bar next to either end of the top rail, as selected by the inspector. This test piece shall be placed head upwards on solid supports, 5 in. radius, 3 ft. between centers, and subjected to an impact test from a weight of 2000 lb., falling freely 18 ft. The striking face of this weight shall have a radius of 5 in. The testing machine used in making this test shall conform to the standard of the American Society for Testing Materials.

The temperature of test pieces when tested shall not be less than 60 deg. Fahrenheit nor greater than 120 deg. Fahrenheit.

Any piece which under the impact of the first blow either breaks or shows a deflection in excess of that indicated by a middle ordinate of  $1\frac{3}{4}$  in. in 3 ft. shall be considered as having failed to pass for No. 1 rail. After the first blow test pieces shall be tested to destruction.

If, upon receiving the first blow, a test piece breaks, the rail from which it was cut shall be rejected and two more pieces selected by the inspector from the same heat shall be tested. If neither of these pieces breaks, all rails of the heat will be accepted as No. 1 or No. 2, according as the deflection after the first blow is less or more, respectively, than the prescribed limit. If either of these two additional test pieces fails, all rails from that heat will be rejected.

If, however, the first test piece shows a physical defect, the top rail from each ingot of that heat will be rejected and a second test shall then be made of a test piece selected by the inspector from the top end of any second rail of the same heat. If this second test piece break, the remainder of the rails of that heat shall also be rejected. If this second test piece does not break, the remainder of the rails of that heat will be accepted as either No. 1 or No. 2, according as deflection is less or more, respectively, than the prescribed limit.

#### Inspection:

1. Rails which by reason of surface imperfections are not classed as No. 1 rails may be accepted by the Inspector as No. 2, if in his judgment the imperfections are of such a character as not to impair the strength or usefulness of the rails.

2. Rails improperly drilled or straightened or from which the burrs have not been properly removed, shall be rejected, but may be accepted after being properly finished.

3. No. 2 rails to the extent of not to exceed 10 per cent of the entire order will be accepted. All rails accepted as No. 2 rails must have the ends painted white. All classes of rails must be kept separate from each other in the pile, and, in shipping, each class must be kept by itself.

4. Rails will be accepted and billed according to actual weight, subject to the limitation of Clause No. 5, under Mechanical Requirements.

5. All rails must be loaded in the presence of the Inspector.

6. Makers shall furnish the Inspectors with complete chemical analysis for each melt and with samples for checking each analysis.

The Inspectors representing The Metropolitan Street Railway Company shall have free entry to the works of the manufacturer at all times while the contract is being filled.

The manufacturer shall supply to the Inspectors all reasonable and requisite facilities for inspection and tests without charge.

The Inspector may reject unsatisfactory material at any time before shipment.

All tests excepting check analyses shall be made at the place of manufacture prior to shipment at the expense of the Manufacturer.

In the event of a dispute arising between the Inspector and the Manufacturer as to the interpretation of these specifications, or the character or quality of the rails to be supplied thereunder, the matter shall be submitted to the Engineer of the Receivers of the Metropolitan Street Railway Company, whose decision shall be conclusive and binding upon the parties.

All proposals shall be made on the basis of rates per gross ton delivered f. o. b., within free lighterage limits, New York City.

Approved by Standardization Committee, July 28, 1909.

#### STANDARD RAIL SECTION

The modified design calls for an increase in the thickness of the flange and in the web, which is now 9/16-in. thick. At the same time the groove of the rail was deepened by 3/16 in. By these modifications it is believed that the rail will be materially strengthened and its life considerably increased, particularly as there will be an opportunity for longer wear on the surface of

the rail before the wheel flanges will ride upon the bottom of the groove. The accompanying drawing shows a section of the new rail in question. The length of rail life is particularly important in New York because of the great expense of rail renewal due to the large amount of asphalt which must be disturbed in renewing rails and the frequent interruptions to work from passing cars and the congestion of vehicles and pedestrians. Moreover there is always the possibility of an accident with resulting damage payment and interruptions to the service. Consequently the desirable ratio between the first cost and length of life of rails differs in New York from that in many other cities.

#### RAIL JOINTS

The question of rail joints on the Metropolitan system has been an important one and the company has conducted an extended series of experiments for the purpose of determining the character of joint best suited to the local conditions existing on the system. In 1905 375 joints, other than electric weld, were welded on a line where the motive power was being changed from horse traction to the conduit electric system. An observation of these joints, extending over a period of 2½ years, indicated that during the first year 3½ per cent of the joints broke and that afterwards 2.1 per cent additional joints were fractured, making a total breakage of 5.6 per cent during 2½ years. These joints were welded while the road was being reconstructed and while no car operation was taking place over the track.

On Lexington Avenue a total of 1216 joints were welded at various times from November, 1906, to August, 1908. During the welding process cars were operated over the track on a 20-minute headway. The total number of breakages during the first year was 141, or 11.6 per cent of the total number of joints welded. After the first year the percentage of breakage was about 8.3 per cent, making a total of 19.9 per cent breakage during the period of observation, which averaged about 2 years, 9 months per joint.

This experience seems to point to the fact that, when it is practicable to suspend car operation during the welding process, the life of the joint is substantially lengthened. The travel on the line which was reconstructed is very much heavier than that on the line where the welding was done while car operation was uninterrupted. In the latter case the rail was the 7-in. type, weighing 110 lb. per yard, whereas, in the former case, the rail was 9-in. type, weighing 109 lb. per yard.

On the assumption that car operation is to be continued during the process of rail renewal and that the breakages on the welded joints will average during the life of the rail about 20 per cent, the following figures show the relative estimated cost of maintenance per joint per annum on streets paved with asphalt as compared with streets paved with granite, on supposition that the rail is renewed once in 10 years.

ESTIMATED COST OF MAINTENANCE PER JOINT PER ANNUM.		
	Seven-inch rail.	Nine-inch rail.
<i>Street Paved with Asphalt:</i>		
Welded joints .....	\$1.18	\$1.32
Continuous joints .....	.76	.88
Angle-bar joints .....	1.14	1.32
<i>Street Paved with Granite Block:</i>		
Welded joints .....	.74	.88
Continuous joints .....	.36	.48
Angle-bar joints .....	.54	.72

When track was relaid on Amsterdam Avenue last year, 125 pairs of Atlas truss joints were installed for the purpose of subjecting this joint to a thorough test and ascertaining its relative merits as compared with other joints, but it is too early as yet to give any definite figures in this connection.

The study which was made of the joint situation embraced a comprehensive investigation of the types of joints used, the method of procedure followed and the local conditions prevailing in a number of other large cities. The result of this investigation, taken in connection with a knowledge of the requirements which obtain on Manhattan Island, appears to point conclusively to the superiority of the Continuous joint over the welded joint used, taking all features of the subject into consideration.

On account of the comparatively heavy initial cost involved in the use of electrically welded joints or, as an alternative, the suspension of car operation for a longer period than is practicable in New York City, that system was not employed.

#### ALLOYS

An experiment is now being made with approximately 40 tons of rail treated with ferro-titanium alloy, partly to secure freedom from slag and blowholes, and partly, also, to harden the rail and increase its life. The rail so treated was laid last fall and, consequently, the time which has elapsed has been too short to obtain any conclusive data as to the advantages of the use of this alloy.

#### CAST MANGANESE STEEL

An outer rail of this character was installed on three curves on Broadway. These rails were of necessity cast; consequently they were not of absolutely perfect section and did not fit the yokes upon which they were placed as well as would have been the case had the rails been rolled. Observations made from time to time indicated that the manganese rail was showing less wear than was the case with either Bessemer or open hearth rails which were being subjected to test under the same conditions. While this experiment demonstrated the wearing qualities of the manganese rail to be unquestionably superior to either Bessemer or open-hearth rail the difficulties introduced into the situation by the fact that the manganese rail must be cast instead of rolled appears to render it less desirable than the open-hearth rail, taking into consideration the very great difference in cost between the two types of rails.

#### OFFICE PROCEDURE

A reorganization of the clerical force has been effected and the work classified in a manner to produce more satisfactory results than had previously obtained. A cost system has been placed in effect whereby it is possible to tell the cost of work performed on any given job to date, and maintenance records are being compiled with regard to the life of special work, track, etc.

Approved methods have been adopted in connection with the files, and regulations for the guidance of the employees of the maintenance of way department have been compiled and printed in book form and a copy is given to each employee who signs a receipt for it. There is an Italian edition of this book which is given to employees of that nationality, of whom there are a great many in this department. The rules are reproduced in the following paragraphs:

#### GENERAL RULES OF THE MAINTENANCE OF WAY DEPARTMENT

1. Knowledge of Rules.—Employees are required to be familiar with the rules and with every special order issued. The bulletin board to be examined daily by the supervisors for special orders, such orders to be transmitted by the supervisors to employees under them. Employment by the company binds the employee to comply with the rules and regulations, and ignorance thereof will not be accepted as an excuse for negligence or omission of duty. If in doubt as to the exact meaning of any rule or special order, application must be made to the proper authority for information and instruction.

In addition to these rules, special orders will be issued from time to time; such orders, when issued by proper authority, whether in conflict with these rules or not, must be obeyed while in force.

2. Report for Duty.—Regular employees must report for duty five minutes before starting time; if not, they will not be allowed to start work for one hour after starting time.

3. Sick Reports.—Every employee reporting sick or excused must report for work within one week thereafter, or send to the engineer maintenance of way a sufficient reason for longer absence; otherwise his place will be filled.

4. Habits and Personal Conduct.—The following acts are prohibited:

Drinking intoxicating liquors of any kind while on duty.

Entering any place where the same is sold as a beverage while on duty, except in case of necessity.

Constant frequenting of drinking places.

Carrying intoxicating drinks about the person while on duty.

Carrying intoxicating drinks on the company's premises at any time.

Indulging to excess in intoxicating liquors at any time.

Gambling in any form, including the laying of bets and playing raffles, while upon the premises of the company.

Smoking tobacco while on duty.

Smoking tobacco while off duty in any part of the company's buildings, except in the conductors' or motormen's room.

Reading books or newspapers while on duty.

5. Talking to Motorman.—Employees, while riding on the front platforms of cars, must not talk to motorman.

6. Reporting Defects.—Supervisors and foremen will report to the office of the engineer maintenance of way immediately by telephone any defects in track which require immediate attention.

7. Reports to Be Full and Complete.—A full report of every accident, no matter how trivial, to which any employee may be a witness, or which may be brought to his attention, must be made by such employee to the office of the engineer maintenance of way.

8. Give Information to Proper Persons.—No employee shall, under any circumstances, give any information whatever concerning any accident, delay, blockade or mishap of any kind to any person except to a properly authorized representative of the company.

9. Responsibility for Damages.—Employees will be held responsible for any damages caused by their neglect or carelessness or by disobedience of rules.

10. Hearing by Engineer Maintenance of Way.—A hearing will be given by the engineer maintenance of way to every employee who desires to complain. Reports or suggestions for the betterment of the service will always receive consideration.

11. Persons Allowed to Ride on Front Platforms.—Employees of engineering departments with badges displayed and wearing soiled clothing may ride on front platform of closed cars, but no more than two will be permitted to so ride at one time, unless cars are on long headway.

12. Leaves of Absence.—Leaves of absence will be granted only on account of illness, or for rest or recreation. No employee will be excused from duty to engage in other occupation or business, nor will his position be held open while so engaged.

13. Assignment of Wages.—Employees are forbidden to give an order on the company, or assign their wages. They will be paid on the regular pay day, except in cases of dismissal. Those who wish to remain in the service of the company must pay their lawful debts.

14. Lost Articles.—Employees must turn into the office of the engineer maintenance of way any articles which they may find while on duty, with a full report in the matter.

15. Transportation of Employees.—Employees with badge displayed, or wearing working clothing (if not soiled) with badge in sight, will be allowed to ride free to and from work upon any of the cars of this company. Such employees must ride inside of the cars when there is room, but must not occupy a seat while other passengers stand, nor must they converse with men in charge of the car. Not more than two such employees will be allowed to ride on any one car, except during the early morning or late at night when cars are on long headway, and in such event not enough employees to crowd the car will be allowed to board same. Employees of the engineering departments wearing soiled clothing will not be allowed on the rear platform or inside of closed cars, but may ride on the front platform thereof, as provided by Rule 11. On open cars such employees may ride only upon the rear platform.

16. Employees must not touch the channel rail or cables, or attach leads to the channel rail for lighting purposes, unless they have on proper rubber gloves.

17. Do not clean handholes with iron-handled shovels, unless the handles are insulated.

18. Do not clean out feeder manholes with iron shovels.
19. In cleaning out feeder manholes, use great care not to injure the cables, as injury to a cable is likely to cause not only damage to the cable but injury to employee.
20. Never stand between tracks on a curve when cars are passing each other.
21. Employees, when working on track, must be very careful to keep watch for approaching cars; in stepping out of the way of a car, look closely to see that it is not followed closely by a second car, and when stepping from one track to another, in order to get out of the way of a car, be sure that there is not a car coming on the other track.
22. Do not lift a handhole cover when an approaching car is within 50 ft. of the same.
23. In carrying rails, pieces of special work or heavy timber, where several men have hold of the same piece, do not let go of the same until instructed so to do by the foreman in charge.
24. In working underneath the track, be careful to keep out of the way of plows of cars. Never work with your back toward approaching cars.
25. When using striking hammers, especially at crossings, see that pedestrians or other employees are not in the way of the hammer, so as to be struck upon return from blow.
26. Employees will personally examine all tools of all descriptions used to see that they are in proper condition for use and do not use a tool that is defective. When using picks or hammers, be sure that the hammer or pick handle is properly fastened.
27. Foremen must not allow the loading of rails or long pieces of timber or iron upon carts or short trucks.
28. No employees, except motormen or carhouse men, must, under any circumstances, handle the electrical apparatus on cars, either in carhouses or on the road. Neither must they handle the electrical apparatus on transfer tables in carhouses.
29. Under no circumstances must employees leave a cut or manhole open anywhere, without properly guarding or protecting it.
30. When working on the street, employees must get up out of the cut to allow each car to pass, unless in a place which they know to be safe.
31. Do not use bull points within 6 in. of any duct, cable or channel rail.
32. When working in buildings, employees must not drop tools from one floor to another; either pass them down, lower them down with a rope or carry them down.
33. When handling, piling or storing away material, employees must perform the work in a neat, careful and proper manner. When piling material, build the pile up carefully so that there will be no danger of its falling and injuring yourselves or others.
34. When working in a carhouse, employees must see that all rubbish, refuse, etc., is removed each night before quitting work.
35. When working on a scaffold, employees must personally see that the scaffold is safe before going on it, and under no circumstances must they perform work on a scaffold unless they feel that it is perfectly safe.
36. Employees must exercise great care in the use of oils, paints, gasoline, varnishes and other explosive and inflammable liquids, and in order that neither yourselves nor others may be injured, you must see that these liquids are kept in oil house provided for the purpose, when not actually in use.
37. All tools, when not actually in use, must be kept in the tool box provided for the purpose, but employees must not keep any old clothes, caps, overalls, etc., in any tool box.
38. The above rules are not to be considered as necessarily final in their scope, as they will be changed from time to time as circumstances may demand, and employees must keep themselves posted regarding new rules or changes in the above rules as mentioned in paragraph 1.
39. Employees who are engaged in the performance of duties in and about the buildings of the company must be familiar

with the regulations contained in the pamphlet entitled: "Description of Certain Precautions Against Fires." These regulations must at all times be obeyed.

#### NEXT ARTICLE

In the next article on the Metropolitan system an account will be given of the electrical engineering department of the company.

### REBUILDING INTERURBAN CARS AT INDIANAPOLIS

Six 53-ft. interurban passenger cars of the Terre Haute, Indianapolis & Eastern Traction Company, are now being rebuilt and lengthened to 61 ft. 6 in. in the Indianapolis Traction & Terminal Company's repair shops. This reconstruction work also includes the standardization of the principal parts of the cars with a view to making the rebuilt equipments conform to the construction standards of the present type of large interurban car used on this company's interurban lines. An entirely new underframe largely composed of steel is being constructed for each car and the old underframes are being discarded.

When a car is made ready for reconstruction the body is lifted from the underframe and supported on horses while the new underframe is being built and placed below the car body. The underframes for the rebuilt cars include as main members four I-beam center and intermediate sills and two channel-section side sills. All the details of the underframing, including the conduit layout, were carefully prepared in advance of this work and presented on blueprints so that the detail parts of the work on the different cars all will be standard. The use of the standard design permits all the holes to be bored for the conduit before the sills and blocking are assembled. This work is done when the pieces are mortised because then considerable expense can be saved by boring with power-driven machines.

A standard layout for the electrical conduit and other pipe used under the cars has been made. The various classes of piping work are segregated in the open sections between the sills. All motor and control conduits are confined to the middle section between the two center sills. All the air pipes are placed in the two sections on one side of the center. On the other side of the center the intermediate section is used for the miscellaneous pipes and conduit. This classification and arrangement of the piping leaves one outside section of the underframe free for the reception of a row of turnbuckles, one of which is placed in the truss rod under each cross sill. The underframing is floored over with two thicknesses, the lower boards being laid crosswise of the car.

After the completion of one of the underframes as here outlined the body, which in the meantime has been held on horses, is lowered onto it and the new body extension is built at the front end where a baggage compartment about 13 ft. long is provided.

Each of the rebuilt cars will be mounted on two Standard Motor Truck Company's C-80 trucks. Four Westinghouse 121-A 90-hp motors will be used under each car. These will be controlled by Westinghouse unit-switch apparatus with master controllers at both ends of the cars. Westinghouse AMM schedule airbrakes are being installed. The braking equipment also will include Peacock hand brakes and two slack adjusters on each car. One of these will be the Price automatic adjuster, which has done good service on this road for a year. The other adjuster will be of the American type and this is being installed so that an adjuster always will be available even if at any time the Standard trucks are transferred when making repairs or changing wheels. The adjusters are set so that only one operates normally.

In reinstalling the hot water heating equipment in these car bodies the four lines of pipe on each side of the car are being replaced with three lines of larger pipe. The use of the larger pipe offers two advantages; better radiation is had with less retardation of the flow of water, and a space of about 3 in. is gained under the lower pipe so that the floor may easily be kept clean.

## A TRAFFIC STUDY IN THE CHICAGO BUSINESS DISTRICT

A supplemental report on transportation subways for the business district of Chicago has just been released to the public. The report contains valuable data on the traffic of the elevated and surface lines of Chicago as well as suggestions for subway structures to accommodate underground operation of the cars of the street and elevated railways. The first subway report prepared by the Bureau of Engineering of the Department of Public Works was abstracted in the *ELECTRIC RAILWAY JOURNAL* of March 27, 1909, page 562, and an announcement of the completion of the collection of data for the supplemental report from which the following abstract is made was noted in the paper for June 19, 1909, page 1138. The supplemental report has not been published for lack of funds. In the letter from the city engineer transmitting the present supplementary report to the Commissioner of Public Works, credit for its preparation is given to R. C. St. John, assistant engineer, under whose immediate direction data were collected and compiled. Extracts of this report which are thought to be of interest to students of city passenger transportation follow.

### STREET TRAFFIC CONGESTION

It is apparent to even the casual observer that there is a steady and rapid increase in the vehicular traffic within the business district which, even under the most admirable surveillance, must retard the movement of surface cars. With the increase in vehicular traffic there is also an increase in the number of people who must use the surface cars. These two increases are from the same cause—an increase in business due principally to increase in population. The result is that the greater the number of surface cars that are required to carry the increasing number of people the greater the obstruction and delay to their movement. If the vehicular and car traffic all moved in one general direction the delays would not be serious; but when at street intersections it moves in all ways it becomes a serious problem.

To illustrate the amount of vehicular and car traffic that passes across State Street, diagrams were prepared and tables presented in the report showing the traffic in 12 hours for each cross street intersection from Washington Street to Harrison Street. The summary for State and Madison Streets is shown in Table I and shows the direction and class of vehicle and car movement from 7 a. m. to 7 p. m., as counted on April 15, 1909.

TABLE I—SUMMARY OF VEHICLE TRAFFIC AT STATE AND MADISON STREETS FOR APRIL 15, 1909, 7 A. M. to 7 P. M.

Direction of traffic.	Street cars.	Number of		Totals.
		pass. vehicles.	Goods vehicles.	
North .....	980	535	1,570	3,085
South .....	969	592	1,678	3,239
East .....	0	159	412	571
West .....	0	179	380	559
North to East.....	0	77	114	191
North to West.....	925	94	315	1,334
South to East.....	2	69	228	299
South to West.....	0	77	184	261
East to North.....	0	144	251	395
East to South.....	0	86	198	284
West to North.....	0	47	162	209
West to South.....	0	59	94	153

No surface cars pass across State Street in the congested district, therefore the maximum obstruction to surface car movements, which is occasioned by other traffic, does not appear. The report presents a diagram showing the length of flow of traffic in alternate directions at an important intersection indicating the east and west traffic across State Street, which necessarily interrupts the progress of street cars, to be greater than the north and south traffic accompanying the movement of street cars.

An engraving shows the congestion occasioned by a 5-minute obstruction to traffic at the intersection of Randolph and Dearborn Streets in the loop district and at the intersection of two double-track street-car lines. Delays to surface traffic by reason of the river bridges being opened are serious. To illustrate the difference between the movement of surface cars within the congested district and the movement outside of that district, three curves are presented, one showing the rate

of speed within the subway zone, 9.21 ft. per second, another for the first mile outside (11.48 ft. per second), and another for the second mile outside of the subway zone (16.24 ft. per second).

The conclusions regarding congestion of traffic are as follows:

(1) The density of traffic congestion is constantly increasing and extending over longer periods both morning and evening. The result is that the time required to go to and from work is increasing, so that the working day is lengthened.

(2) Not only is the rapid growth of the city leading to this undesirable result, but as the congestion in the streets in the business district increases the interruption to surface traffic is leading to a smaller capacity for carrying passengers on surface lines. The present actual maximum traffic per hour on surface lines entering the business district is but 62 per cent of what it was estimated to be seven years ago, notwithstanding that extensive improvements have since been made, and that the total annual surface-line traffic has increased 30 per cent.

(3) The capacity of the elevated lines as it relates to traffic into and out of the business district is limited to the capacity of the elevated loop. The capacity of the elevated loop has been reached and can be only slightly increased by physical changes and revised methods of operation. Stub terminals, while adding to the capacity of the elevated lines, serve only those patrons whose destinations are nearby.

(4) The existing main lines of transportation have reached their ultimate practicable capacity for carrying passengers.

(5) The increase of 100 per cent in the carrying capacity of existing local transportation facilities would still leave a period of congestion in the morning and evening traffic.

### PROVISION FOR FUTURE TRAFFIC

The interests of future transportation requirements, therefore, demand that any scheme projected for subways should conserve the use of every possible outlet from the South Side, north of Twelfth Street, and further contemplate that those streets on the north and west divisions in which subways originating on the south side do not pass should be conserved for terminals to be established in these localities in the future.

The first subway, therefore, to be constructed for the present and near future should not needlessly sacrifice any of the limited number of possible outlets. It would seem that a general arrangement of subways utilizing all outlets and all streets and avenues on the South Side, north of Twelfth Street, should be designed. The arrangement, however, should be one that will provide the greatest capacity for traffic that can be obtained and should at the same time be so designed that it may be constructed in parts or sections as the traffic needs would warrant. The section first to be constructed would, of course, be that which would meet the present traffic demands and give the greatest convenience at the least possible cost.

### UNDERGROUND FACILITIES

The question as to whether or not the subway structure should include space for the accommodation of subsurface utilities is one of several other momentous questions that must be decided in the near future.

### CONTRIBUTORY POPULATION

Increased transportation facilities have in a great measure assisted in the rapid increase in population outside the first and second mile zones. It will be possible after a thorough study has been made of the past drifts and settlements of population to estimate the future population of each mile zone and this study would be of value in determining the location of further transportation lines.

### TRAFFIC DATA

The supplemental report includes a set of curves showing a comparison of the annual traffic, surface, elevated and subway, of the cities of Chicago and New York during periods of equal population and also showing the rides per capita and rides per annum for the different years. The essential data

to be obtained from these curves have been interpolated and put in Table II:

TABLE II—ESTIMATED POPULATION, RIDES PER ANNUM AND RIDES PER CAPITA OF CHICAGO AND NEW YORK.

Year.	Population.	Number of rides per annum.	Rides per capita.
1910:			
Chicago .....	2,500,000	607,671,000	243
New York.....	4,600,000	1,425,000,000	307
1915:			
Chicago .....	3,000,000	803,454,000	267
New York.....	5,200,000	1,750,000,000	337
1920:			
Chicago .....	3,425,000	1,024,991,000	299
New York.....	5,800,000	2,090,000,000	362
1925:			
Chicago .....	3,900,000	1,272,257,000	327
New York.....	6,400,000	2,475,000,000	387
1930:			
Chicago .....	4,400,000	1,530,353,000	348
New York.....	7,000,000	2,900,000,000	414
1935:			
Chicago .....	4,900,000	1,866,216,000	381
New York.....	7,600,000	3,360,000,000	443
1940:			
Chicago .....	5,450,000	2,210,208,000	406
New York.....	8,200,000	3,880,000,000	474

It will be noted that Chicago traffic is considerably greater for the same population than that of New York, which should be the case as local transportation 20 years ago when the popu-

cago Avenue. The total traffic during the 24 hours of the elevated lines is shown in Table III. Table IV shows the maximum traffic on the same day for different intervals.

TABLE III—NUMBER OF PASSENGERS ON ELEVATED LINES IN AND OUT OF BUSINESS CENTER, FEB. 18, 1909.

	Inbound.	Outbound.
Metropolitan .....	61,986	57,415
Northwestern .....	54,247	50,606
South Side.....	51,478	47,207
Oak Park.....	20,421	19,662
Total.....	188,042	174,890

TABLE IV—MAXIMUM NUMBER OF PASSENGERS ON ELEVATED LINES, FEB. 18, 1909.

	Inbound		Outbound	
	Maximum periods of ¼ hour.	1 hour.	Maximum periods of ¼ hour.	1 hour.
Metropolitan .....	7,739	25,667	8,062	23,056
Northwestern .....	5,486	17,090	5,245	17,270
South Side.....	3,961	12,657	4,685	15,137
Oak Park.....	2,280	6,663	2,546	7,312
Total.....	19,466	62,077	20,538	62,784

TRAFFIC PEAKS

The inbound period of heavy traffic was from 6:30 a. m. until 9:45 a. m., and the maximum quarter-hour traffic was be-



Chicago Street Traffic—A Five-Minute Interruption to Surface Traffic at Dearborn and Randolph Streets

lation of New York City was approximately the same as that of Chicago to-day was far less efficient than at present.

ELEVATED LINES TRAFFIC

To simplify the study of the elevated lines traffic the city can preferably be divided into four divisions as follows: North division bounded by the lake, the north city limits, north branch of the Chicago River and the subway zone; northwest division, bounded by the north branch of the Chicago River, city limits, Madison Street and the subway zone; southwest division, bounded by the subway zone, Madison Street, city limits and the south branch of the Chicago River; the south division is all that section of the city south of the subway zone and the south branch of the Chicago River.

It cannot be claimed that the principal elevated line of each division handles only the traffic for its own division; the northwestern Elevated Railway alone serves the north division and a small part of the northwest division; the Oak Park Elevated and the Metropolitan Elevated serve the northwest division; the Metropolitan Elevated alone serves the southwest division, and the South Side Elevated alone serves the south division. On Feb. 18, 1909, observations during 24 hours were made of the elevated lines traffic in and out of the business zone or district bounded by Twelfth Street, Halsted Street and Chi-

tween 7:45 a. m. and 8:00 a. m. The inbound traffic from 9:45 a. m. until 8:00 p. m. was about constant, except between 6:00 p. m. and 7:30 p. m., during which time it fell, to increase again at 7:30 p. m. by reason of the inbound theater patrons.

The outbound period of heavy traffic was from 4:00 p. m. until 7:00 p. m., and the maximum quarter-hour was between 5:45 p. m. and 6:00 p. m. The outbound traffic from 7:00 a. m. until 4:00 p. m. continued light in comparison with the inbound traffic for the same period but was fairly constant. The outbound traffic after 7:00 p. m. was steady and of fair average volume with a temporary increase after the theaters were closed.

The problem of the elevated traffic, as it relates to subways, is the handling of the maximum periods of heavy traffic.

TRAIN MOVEMENT

The observations also included train movement, and the number of passengers standing and seated, as shown in Tables V, VI and VII.

Table VII illustrates the inconvenience that the traveling public has to endure. Although it may not be practicable to provide all passengers with seats, yet the number of passengers who must either stand or wait an unreasonable time for a train that can furnish seats is excessive.

Economical operation will in future probably divert the traffic of the Metropolitan in the northwest division over the Oak Park line by means of a connection between the two lines in the vicinity of Lake Street and Ashland Boulevard.

TABLE V—NUMBER OF ELEVATED TRAINS IN 24 HOURS, FEB. 18, 1909.

Lines.	Inbound.	Outbound.
Northwestern	552	562
Oak Park	238	239
Metropolitan	823	822
South Side	574	578
Total	2,187	2,201

TABLE VI—NUMBER OF ELEVATED TRAINS DURING THE MAXIMUM HOUR, FEB. 18, 1909.

Lines.	Inbound.	Outbound.
Northwestern	48	41
Oak Park	30	29
Metropolitan	92	77
South Side	56	49
Entire City	215	194

TABLE VII—NUMBER OF PASSENGERS NOT SEATED, FEB. 18, 1909.

	Standing in 24 hours, both directions.	Maximum standing during one hour.
Metropolitan	15,225	6,258
Northwestern	19,706	7,551
South Side	9,480	3,900
Oak Park	3,960	1,895
Total	48,371	19,664

THE SURFACE LINES TRAFFIC

To simplify the study of the surface lines traffic the city should be divided into four grand divisions, similar to those for the elevated traffic study.

On March 18, 1909, observations of the surface lines traffic were taken for 24 hours at the boundaries of the subway zone, namely, Twelfth Street, Halsted Street and Chicago Avenue. The surface lines traffic is shown in Tables VIII and IX.

TABLE VIII—NUMBER OF PASSENGERS ON SURFACE LINES WITHIN SUBWAY ZONE, MARCH 18, 1909.

	Inbound.	Outbound.
North division	54,401	58,014
Northwest division	60,177	71,087
Southwest division	37,236	48,235
South division	92,387	103,458
Total all divisions	244,201	280,794

TABLE IX—MAXIMUM NUMBER OF PASSENGERS ON SURFACE LINES, MARCH 18, 1909.

	Inbound		Outbound	
	Maximum periods of ¼ hour.	1 hour.	¼ hour.	1 hour.
North division	2,989	10,390	4,026	15,215
Northwest division	4,150	12,893	5,468	18,834
Southwest division	2,533	8,831	3,958	14,018
South division	5,359	17,410	6,689	23,644
Entire city	14,870	50,074	19,443	69,919

The inbound period of heavy traffic was from 7:00 a. m. until 9:00 a. m., and the maximum quarter-hour traffic between 7:45 a. m. and 8:00 a. m. The inbound traffic from 9:00 a. m. until 9:00 p. m. was almost constant, except between 5:30 p. m. and 7:00 p. m., during which time it fell, to increase again at 7:45 p. m. by reason of inbound theater patrons. The outbound period of heavy traffic was from 5:00 p. m. until 6:30 p. m., and the maximum quarter-hour from 5:45 p. m. until 6:00 p. m. The outbound traffic from 8:00 a. m. until 5:00 p. m. continued light in comparison with the inbound traffic for the same period, but was fairly constant. The outbound traffic after 6:30 p. m. was steady and of fair average volume, with the natural temporary increases after the theaters closed.

The problem of the surface lines traffic, like the elevated lines traffic, as it relates to subways, is the handling of the maximum periods of heavy traffic.

SURFACE CAR MOVEMENT

The observations also included car movement during 24 hours, during the maximum hour inbound and outbound, and also the number of passengers standing and seated, as given in Tables X, XI and XII.

Table XII shows the inconvenience to which the surface lines passengers have to submit, and, although it may not be practicable to provide all passengers with seats, yet the number of passengers who must either stand or wait an unreasonable time for seats is excessive.

CHECK ON OBSERVATIONS

Feb. 18 and March 18, when the elevated and surface lines traffic observations were taken, were normal days and the accuracy of the observations was as near perfect as could be de-

TABLE X—NUMBER OF SURFACE CARS IN 24 HOURS, MARCH 18, 1909.

	Inbound.	Outbound.
North division	2,987	3,026
Northwest division	2,848	2,855
Southwest division	2,506	2,577
South division	3,674	3,694
Total	12,015	12,152

TABLE XI—NUMBER OF SURFACE CARS DURING THE MAXIMUM HOUR, MARCH 18, 1909.

	Inbound.	Outbound.
North division	184	197
Northwest division	203	216
Southwest division	188	204
South division	334	342
Total	909	959

TABLE XII—NUMBER OF PASSENGERS NOT SEATED, MARCH 18, 1909.

	Number standing in 24 hours, both directions.	Maximum number standing during one hour.
North division	20,192	8,256
Northwest division	27,070	10,483
Southwest division	13,859	7,060
South division	27,369	9,727
Total	88,490	35,526

sired. The total actual elevated lines traffic outbound on Feb. 18 of the four different lines from the loop stations and other stations within the business district was obtained from the elevated companies and checked surprisingly close with the figures of the observations. It is not possible to obtain traffic figures from the surface lines of such value as the outbound traffic on the elevated lines for the purposes of checking the observations. The figures obtained, however, indicate accuracy. The observations should at least equal in accuracy that of the elevated lines, as the task was less difficult.

It may perhaps be observed that the total outbound traffic of the elevated lines does not balance that of the inbound traffic during 24 hours. A similar difference will be found in the traffic of the surface lines. Weather conditions and the habit of many to ride one way and walk the other will naturally tend to disturb the balance of traffic in opposite directions.

OPERATION DATA

A further study of the movement of the elevated and surface lines traffic shows that the method of operation is to dispatch into the business district or subway zone as many trains and cars as possible during the rush periods, regardless of their movement when within the district or zone.

The average headways of the surface cars passing the subway zone boundaries on several of the lines during maximum traffic periods on March 18 are shown in Table XIII

TABLE XIII—AVERAGE HEADWAYS OF SURFACE CARS WHEN CROSSING SUBWAY ZONE BOUNDARIES.

	Inbound		Outbound	
	Maximum periods of ¼ hour.	1 hour.	¼ hour.	1 hour.
Madison	50 sec.	54 sec.	43 sec.	48 sec.
North Clark	69 "	62 "	28 "	37 "
Wabash	28 "	29 "	30 "	26 "
State	26 "	28 "	31 "	30 "
Clark	35 "	39 "	33 "	38 "

The average headways of trains of the four elevated lines passing the subway zone boundaries during maximum traffic periods of Feb. 18 are shown in Table XIV.

TABLE XIV—AVERAGE HEADWAYS OF ELEVATED TRAINS WHEN CROSSING SUBWAY ZONE BOUNDARIES.

	Inbound		Outbound	
	Maximum periods of ¼ hour.	1 hour.	¼ hour.	1 hour.
Metropolitan	82 sec.	78 sec.	78 sec.	93 sec.
Oak Park	90 "	120 "	100 "	124 "
Northwestern	69 "	75 "	90 "	88 "
South Side	60 "	64 "	69 "	73 "

The surface congestion within the subway zone and the incapacity of the elevated loop so retard the movement of the surface cars and elevated trains that no matter how large may be the number of cars and trains the traffic cannot be handled

expeditiously. In fact, if fewer cars were placed in service by the surface lines, or at least if the headway of the cars on the main surface lines was increased, particularly the headway of cars entering the subway zone or business district to handle the outbound maximum traffic, better results would be obtained.

#### TRAFFIC TO BE HANDLED BY SUBWAYS

Subways in Chicago will be required to handle expeditiously the elevated and surface lines traffic that flows into and out of the business or subway zone. There may be other traffic to be handled, but it will be of such small magnitude in comparison with the main traffic that it may be neglected.

With information in regard to the traffic of each elevated line in the past, it is not difficult to establish a relation between the traffic entering the subway zone of each line and its total traffic. This relation, when applied to the total traffic of all elevated lines and the percentages of the total traffic that each line handles, will give an estimate of the annual future traffic of each line in and out of the subway zone.

As the traffic moving into the subway zone or district is not the same as that moving out of the district, the maximum daily traffic (into or out of) in one direction may be obtained. With the relation of the maximum hourly traffic to the total traffic in the same direction, the future maximum hourly traffic should be as shown in Table XV.

TABLE XV—PROBABLE FUTURE HOURLY ELEVATED RAILWAY TRAFFIC.

	Metropolitan.	Oak Park.	South Side.	Northwestern.
1910 .....	35,787	11,128	23,240	23,757
1920 .....	71,473	24,241	46,422	47,545
1930 .....	119,767	40,720	77,775	78,469
1940 .....	182,842	62,012	118,736	121,374

The maximum hourly traffic or the maximum actual traffic for one hour is less than the traffic for one hour at the rate of the maximum traffic of a 15-minute period. As the capacity of subways should be such as would sustain the maximum traffic of a 15-minute period for one hour or more, the maximum hourly traffic of both the elevated and surface lines determined for the future is based on the maximum traffic for a 15-minute period.

#### SURFACE LINES TRAFFIC

Similarly to the elevated lines traffic the relation between an average daily traffic in 1908 and the total traffic for each division may be obtained, and applying this relation to the future annual traffic, spread over the divisions in the same proportions as in 1908, there is found an average daily haul for future years. The relation between the outbound traffic of March 18 and the total traffic of the same day will, when applied to the average daily haul of the future, give an average daily outbound subway haul. The relation between the outbound traffic and the maximum hour of March 18, applied to these figures, will give a maximum hour for the future. (See Table XVI.)

TABLE XVI—PROBABLE FUTURE HOURLY SURFACE RAILWAY TRAFFIC.

	North.	Northwest.	Southwest.	South.
1910 .....	14,574	31,313	15,245	25,966
1920 .....	22,679	33,167	25,724	40,407
1930 .....	32,395	47,245	33,793	57,559
1940 .....	43,982	64,321	46,008	78,362

We have found the volume of traffic—elevated and surface—that flows over the subway zone boundaries and the sums of these traffic show the capacity of the subways that will be required in the future to handle all the surface and elevated traffic that will pass into and out of the business or subway zone, except that part of the elevated traffic that will pass through the stub terminals.

#### TRANSPORTATION PROBLEM

The problems to be considered to provide efficient transportation facilities for the present and for a reasonable future period are, transportation, operation and location.

The traffic of the rush periods is the serious problem of all surface, elevated and subway lines and it is to this traffic particularly that attention must be given. A system of subways with proper equipment and operated efficiently that can handle

the traffic during the rush periods, can without question handle the traffic during the balance of the 24 hours.

The proportion of traffic handled during the rush periods in Chicago varies. In most cities it has been found that the traffic of the heaviest hour is generally one-sixth of the total traffic of one day in that direction, or 16 per cent. The congestion in this city is much greater. It is found for the elevated roads, that the percentage of the heaviest hourly traffic inbound to the total outbound traffic for 24 hours is 33 per cent and for the outbound traffic 36 per cent. For the surface lines traffic it is found that the percentage of the heaviest hourly traffic inbound to the total inbound traffic for 24 hours is 20 per cent and for the outbound traffic is 25 per cent. The high percentage of the heavy traffic hours of Chicago for both the elevated and surface lines, in comparison with that of other cities, emphasizes the greater magnitude of the transportation problem.

The only solution of the transportation problem is to provide means for handling this immense traffic. The congestion would be less if the business hours could be arranged so that some classes of business would open and close earlier and other classes would open and close later than at present. This acute congestion would in this way be considerably relieved and the problem simplified. Such an arrangement can hardly be expected, however, and as already stated, means for handling the traffic during the rush periods must be provided.

#### OPERATION

It is believed that subways should first be constructed entirely within the subway zone with a total capacity sufficient to handle all the elevated and surface lines traffic that will flow over the subway zone borders for several years in the future, and that when the volume of traffic has reached the capacity of these subways, then additional subways should be constructed within the subway zone, but extending beyond its present assumed borders to points to be then determined; and when these additional subways operated in connection with the first ones have reached their capacity, then to construct more subways within the present assumed subway zone, and to points beyond those previously constructed.

It is believed that subway terminals should be located at or near the subway zone boundaries; that there should be one for each of the traffic divisions, and that besides being at first perhaps only outlets for the elevated and surface lines they should finally or as traffic would warrant, be terminals for the storage of the extra equipment that handles the traffic of the morning inbound rush period until it is required to handle the outbound traffic of the evening rush period. The saving of empty car mileage would warrant the construction of these terminals the cost of which, in comparison to the cost of the subways, should not deter their construction.

### COMMITTEE ON HEAVY ELECTRIC TRACTION OF THE ENGINEERING ASSOCIATION

The committee on heavy electric traction of the American Street & Interurban Railway Engineering Association, of which J. S. Doyle, superintendent of equipment of the Interborough Rapid Transit Company is chairman, is now complete with the following membership: Chairman, W. S. Murray, electrical engineer, New York, New Haven & Hartford Railroad Company; New Haven, Conn.; Edwin B. Katté, chief engineer of electric traction, New York Central & Hudson River Railroad Company, New York; E. R. Hill, assistant to chief engineer, Pennsylvania Tunnel & Terminal Railway Company, New York; J. H. Davis, electrical engineer, Baltimore & Ohio Railroad Company, Baltimore, Md.

At a meeting of the committee, held Friday, April 29, it was agreed that this committee would deal with the question of standardizing clearances for overhead and surface conductors in addition to the work which had already been allotted to this committee by the executive committee of the association, viz.: Specifications for heat-treated steel axles, and general maintenance of heavy electrical equipment.



**RATE OF RETURN ON ELECTRIC RAILWAYS\***

BY C. N. DUFFY, COMPTROLLER, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

The rate of return on electric railways of the United States, compiled from census bulletin data by William J. Clark, and presented in his paper at the recent mid-year meeting of the American Street & Interurban Railway Association in New York, was as follows:

	1907.	1902.	Dec. Dec.	Per cent.
Average percentage of net income to capital stock.	1.60	2.00	.40	20
Average return upon bonded indebtedness.....	4.26	3.39	.13	3

The causes which have brought about these decreases in the rates of return on investment are increased investment and operating costs, due to the enormous increase in cost of labor and materials: for instance, ties, 72 per cent; bridge timber, 80 per cent; fuel, 38 per cent; steel rails, 47 per cent; increased expenditures for damages and legal expenses; use of larger and heavier cars, resulting in increased maintenance costs and power consumption from 1.98 kw-hours per car-mile in 1902 to 2.94 kw-hours in 1907, an increase of 0.96 kw-hour, 48 per cent; increased number of passengers carried on free transfers, 22.25 per cent of fare passengers in 1902, as compared with 26.80 per cent in 1907, increase 4.55 per cent, equivalent to 20 per cent (the percentage of fare passengers carried on transfers on the Milwaukee city system, in the year 1909, was 34.80, which is 8 per cent more than the average of all the electric railways of the United States in the year 1907, equivalent to 30 per cent more transfer passengers carried); increased cost of labor, over 60 per cent of the total operating expenses, the average annual wages per wage earner increasing from \$600.62 in 1902 to \$658.33 in 1907, an increase of \$57.71, approximately 10 per cent.

The possibility of reducing operating costs of electric railways may as well be dismissed from consideration, in view of the fact that the limit of economy in the management of the properties, consistent with safe and efficient operation, has been practically reached and that the costs of labor and material continue to advance.

The conditions of the business as disclosed by the figures in the census bulletin previously referred to cannot continue, and it may be necessary to do some or all of the following:

- Abolish free transfers.
- Inaugurate zone system of fares.
- Increase the rate of fare.
- Reduce or abolish taxes. Taxes of the Milwaukee Electric Railway & Light Company in 13 years increased 446 per cent; operating revenues increased 208 per cent.
- Municipal ownership and operation, deficits to be made good by the taxpayers.

The Milwaukee Electric Railway & Light Company on May 1, 1910, voluntarily increases the rate of pay of its conductors and motormen 2 cents per hour for the first, second, third and fourth-year men, and 1 cent per hour for the fifth-year men; the rates being from 22 to 26 cents per hour. This follows an increase of 1 cent per hour made voluntarily on Sept. 1, 1909, and increases the rate of pay within 10 years over 40 per cent, while the average rate of fare per passenger in the same period has decreased over 20 per cent.

A detailed table showing disposition of revenue per passenger is published on this page.

This table shows that from the average revenue per passenger (including transfers), of the Milwaukee city railway system for the year 1909, of 3.17 cents, there remained only 0.07 cent, 2.32 per cent, after taking care of operating expenses, taxes, interest on bonds, dividends on stock and depreciation to the extent only of approximately 50 per cent of the average depreciation sustained by the railway property for the 10 years ending Dec. 31, 1906.

If the full measure of depreciation had been taken care of on the books, it would require 0.24 cent more than the 3.17 cents received, or 3.34 cents; therefore, the average cost in

\* Abstract of address delivered before Community Club, Milwaukee, Wis., on April 22, 1910.

Milwaukee, for the year 1909, of carrying each of the 109,248,041 passengers carried during that period, was 3.34 cents.

The rate of return of the Milwaukee Electric Railway & Light Company on its railway investment, as shown by the

	Amount Cents.	Per-cent of Total.
Way and structures.....	.12	3.67
Equipment .....	.17	5.21
Power .....	.27	8.54
Wages of conductors and motormen.....	.57	17.93
Miscellaneous transportation expenses.....	.18	5.72
Injuries and damages .....	.12	3.92
General expenses .....	.16	5.10
Depreciation (as per books).....	.31	9.86
Taxes .....	.22	6.89
Interest on bonds.....	.39	12.36
Preferred stock dividends, 6 per cent.....	.20	6.16
Common stock dividends, 6 per cent.....	.39	12.32
Surplus .....	.07	2.32
<b>Total .....</b>	<b>3.17</b>	<b>100.00</b>
Surplus (as per books).....	.07	
Depreciation (not taken on books).....	.31	
*Deficit .....	.24	
*Exclusive of interest on working capital, providing for extraordinary contingencies or amortization of investment.		

testimony in the recent 3-cent fare hearing before the Railroad Commission of Wisconsin, varied from 4.37 per cent to 5.92 per cent, dependent upon the basis taken as to what constituted the cash investment in the railway property.

The average dividends paid on the common stock of the company, invested in its combined railway and lighting business, averaged, for a period of 13 years, 1897 to 1910, 3.23 per cent.

This means that with all the risks of the business assumed and carried, the rate of return has been practically only what is allowed by banks as interest on savings deposits, or to put it in another way, a little more than half farm mortgage interest without the usual security of two for one in farm lands.

The longest ride possible in Milwaukee in 1890, for 5 cents, was approximately four miles, 1¼ cents per mile; the ride, under horse-car conditions, consumed about 40 minutes.

The longest ride possible in Milwaukee in 1910 for 4 cents is over 12 miles, ⅓ of 1 cent per mile; the ride, under electric-car conditions is made in about 80 minutes.

The length of ride in Milwaukee in 20 years for one fare has increased 200 per cent, the time consumed in the increased ride is only one-half of this, 100 per cent, and the rate of fare per mile has decreased nearly 75 per cent, or in other words, a passenger pays per mile in 1910, for an electric-car ride, about one-fourth of what was paid for a horse-car ride in 1890.

The average rides per capita per annum on the Milwaukee city railway system in 1909 were, taking the population as 350,000, 231.

The saving of 1 cent on each ride in 1909, on the basis of a 4-cent fare, as compared with 5 cents in 1890, would be equivalent, for the entire population, to \$808,500, or nearly 4 per cent on the company's capitalization invested in the city railway system.

Assuming that 70,000 of the 350,000 population of Milwaukee are heads of families, on the basis of a ratio of 5 to 1, and that each one of these heads of families saved in time in the year 1909 on the average the equivalent of one hour per week, the value of their time saved, figured at 20 cents per hour, would be equivalent to \$728,000 per annum, or over 3 per cent on the company's capitalization invested in the city railway system.

From this it will be seen that in the year 1909 the population of Milwaukee, by reason of the decreased fare and electric car operation in 1909, as compared with the old rate of fare and horse car operation in 1890, saved \$1,536,500, equivalent to approximately 7 per cent on the company's capitalization invested in the city railway system, more than twice the average annual dividend rate on the common stock of the company since its organization in the year 1897.

Some idea of the congestion in the downtown district may be had when it is stated that for a considerable portion of the time during the morning and evening rush hours, there is practically a car every 10 seconds crossing Third Street and Grand Avenue, with city cars turning into and out of Grand Avenue on one side of the street and interurban cars on the other side of the street.

The company is in accord with Mayor Seidel in his position with reference to the necessity of wide streets, a most important question in any city, particularly in Milwaukee in the downtown district.

The company carried in the year 1909 approximately 300,000 passengers a day during the 24 hours, and approximately 120,000 were transported within a period of three hours, which means 40,000 per hour, or an average of 75 passengers per car, assuming that the company had on the streets, during the rush-hour period, its entire equipment, 531 cars, and was able to move them through the streets.

The number of passengers carried per car-mile, on the average, for 24 hours operation, is less than 20 per cent of the seating capacity of the cars, or, in other words, over 80 per cent of the seating capacity of cars per car-mile, on the average, is not used.

We frequently hear much regarding the low rates of fare and successful operation of the Glasgow Corporation Tramways of Glasgow, Scotland, a municipally owned and operated electric railway, but the difference in conditions and the analysis thereof are seldom, if ever, referred to.

The average rate of fare per mile in Glasgow is approximately 0.9 cent; the average rate of fare per mile in Milwaukee per length of ride offered is approximately 0.4 cent, less than one-half that of Glasgow.

The rate of wages paid the Glasgow conductors and motormen is about one-half that paid the Milwaukee conductors and motormen.

Glasgow, with three times the population of Milwaukee, has only about 50 per cent more trackage than Milwaukee and operates only about twice as many cars as Milwaukee, but the Glasgow cars carry about three times as many revenue passengers as the Milwaukee cars.

The Glasgow cars carry approximately 45 per cent more passengers per car than the Milwaukee cars, although the carrying capacity of the Glasgow cars is only about 50 per cent of the Milwaukee cars.

### ELECTRIC BRAKING IN GLASGOW

On April 7 A. Gerrard read a paper before the British Institution of Electrical Engineers on some electric braking experiments made by the Glasgow Corporation Tramways. The first experiments were made ten years ago with British Thomson-Houston disc brakes and Westinghouse rheostatic brakes. They were soon abandoned, largely on account of the rapid depreciation of the motors. In 1901, the Newell magnetic track brake was installed. In this system, the motors generated current for the brake gripping magnets. There were also special wheel shoes and an arrangement of connecting rods and levers to permit the longitudinal movement of the track magnet simultaneously to apply these shoes to the wheels. While this installation was satisfactory from the braking standpoint, it was very hard on the motors as their potential sometimes rose as high as 1200. A shunt in parallel with the field was tried to remedy this but then the motors either would not excite at all or they would not build up quickly enough for an emergency stop. The next change was to use a solenoid for putting in the shunt automatically just as required. At first this solenoid was operated by a coil shunted across one of the armatures. This was operative but it was found that the time lag between the excitation of the machines and the closing of the shunt circuit was too great and the rise in voltage was apt to occur before the solenoid could operate. Finally a series coil was placed in the main braking circuit whereupon it was found that when the solenoid worked with 30 amp and brought in a shunt resistance of 0.2 ohm the potential did not exceed 600 volts without impairing the effect of the brake.

The present design is a double-barreled solenoid controlled together with track brake magnets of the Westinghouse 26 C and 25 B types. The vertical pull of these two magnets with different currents is given herewith.

Type of Magnet.	Exciting Current in Amperes.			
	5	10	25	50
26 C .....	2400 lb.	3250 lb.	3900 lb.	4100 lb.
25 B .....	1900 lb.	3550 lb.	4000 lb.	5150 lb.

At 30 amp solenoid No. 1 cuts in and shunts 0.2 ohm across the magnets. At 80 amp No. 2 comes to its assistance with another 0.2 ohm. With this control, the pressure never rises above 600 volts at high speed and even if the motorman passes over to the second braking point of his controller at 18 m.p.h. a shunt resistance of 0.1 ohm is in parallel with the field. Mr. Gerrard stated that the latest Westinghouse magnet has a greater effect with a current of 5 amp than the old magnet had with 50 amp, the consequence being a great reduction in the motor heating.

Several trial cars were equipped with this brake and one with the Maley brake. The latter, however, had Westinghouse 25 B track magnets and the brake rigging was very similar, the only radical difference being that the motion obtained from the movement of the magnets was utilized in pressing auxiliary track shoes on the rail instead of applying auxiliary wheel shoes. The application of the extra shoes to the rails instead of to the wheels minimizes any tendency to lock the wheels and cause skidding. The Maley brake is in regular service in Leeds and Birmingham. The following table shows the figures obtained for emergency stops with car No. 782, carrying the Maley brake and car No. 687 carrying the other brakes:

M.p.h.	Car 782			M.p.h.	Car 687		
	Stop Distance.	Max. Volts.	Max. Amp.		Stop Distance.	Max. Volts.	Max. Amp.
17	34½ ft.	875	190	17	36 ft.	475	140
18	52½ ft.	1125	165	18	52½ ft.	535	150

Mr. Gerrard said that car No. 782 was subject to heavy surging, that is, in coasting down a steep grade, the car was almost brought to a standstill every 30 to 45 ft. The current then died away and the suspension springs lifted the magnets clear of the track. Then the car would plunge forward again and the movement would be repeated. Mr. Maley, who was present at the discussion, said that such symptoms had not been noted elsewhere than at Glasgow and he was inclined to believe that the trouble was due to defective underframing and faulty handling by the motorman.

In judging the two cars mentioned, Mr. Gerrard admitted that the emergency stop of car No. 782 with the Maley brake at 17 m.p.h. was somewhat better than that of car No. 687. He called attention, however, to the fact that in the 18-m.p.h. test car No. 782 always skidded once and sometimes twice during every stop whereas car No. 687 showed no signs of skidding. At 19 m.p.h. it became impossible to record car No. 782's readings, for the first skid always took place before the instrument had time to indicate the true voltage.

On comparing the emergency stops at 18 m.p.h., it was found that car No. 687 made the better stops, the last reading, 44 ft., indicating a retardation of 8.18 ft. per second when corrected for level track. As regards car No. 782, with the Maley brake, the only test where the true voltage was reported was the first or 52½-ft. stop. This might be compared against the readings on car No. 687 for a similar stop.

Mr. Gerrard's summary of the Maley brake was as follows: "This brake, with auxiliary rail shoes and parallel shoe magnets, is a powerful one and requires comparatively little current from the motors, but the voltage rise is excessive and the skidding serious when braking at high speeds, while the surging during coasting is prohibitive. The retardation obtainable is very high but very uneven, probably due to the tendency of the track shoes to grip the rails. The excessive voltage rise might be reduced by means of the solenoid control but it seems doubtful whether skidding and uneven retardation would be prevented."

Mr. Gerrard concluded from the Glasgow trials that although rheostatic braking and even track magnet braking used to be uncommonly hard on the motors, the latter are no longer subject to any extraordinary strains because the improved devices take much less current, do not involve a heavy rise in potential and are used with such efficient track magnets.

## COMMUNICATION

### THE NECESSITY FOR REVISING BLANK FORMS

New York, May 7, 1910.

To the Editors:

Your issue of April 30 contains an editorial on "Necessity for Revising Blank Forms." The editorial makes valuable suggestions on an important subject. The stationary bills of many railway companies can be cut in half by attention to those details which you mention, and by preventing waste of the printed forms. As supplementing your article the writer outlines herein some methods followed in organizing the operations of various companies.

On the margin of each report form and in fine type I customarily place "Directions for Use." Each time the form is used the employee has before him these directions and will follow them more carefully than if furnished separately. Of course, old employees become familiar with the use of the forms and do not need them so much as new employees, but in any case it removes any ground for misunderstanding on the part of anyone. These directions are revised as each new lot is printed, if found necessary, to insure correctness in rendering of reports. These directions also state how many copies of the report shall be made and to whom each copy should be mailed, and when.

In an old established organization it may be sufficient to revise the forms once a year, but in the case of a new organization it is my practice to keep a complete set of the blank forms on my desk. As the rendered reports are received at my desk I study them carefully, see if they include all the information wanted or any unnecessary information, or if the use of the form is frequently misunderstood, or if any improvement can be made. Any improvement desirable in any form is marked on the blank within my desk, and when an order finally arrives for an additional supply of any form I then have information ready at hand to see if any changes are to be made therein. It is difficult to recall the desired changes unless record is kept in this manner.

Reports may be economically printed and yet the supply may be wasted. Many employees are prone to use report forms as scratch pads. Or an additional supply may be requested, because the previous supply has been mislaid, accumulated in unused drawers, or lost. Such waste can be prevented. On the margin of each form I have printed in fine type the quantity ordered and date. Knowing the number required each month, it is easy to calculate how long the supply should last. When the storekeeper calls for the next supply an easy mental computation determines if the last supply has lasted as long as it should have done. When the forms are being wasted the storekeeper can easily keep an informal record of the supplies issued and locate the wasteful employee, or each employee can be given a quantity to last a certain length of time, say one month. An organization can quickly be taught that no waste of printed forms will be tolerated. I think such knowledge aids them unconsciously to avoid other waste.

In choosing paper for report forms I prefer thin paper because it keeps down the size of the files and permits manifold carbon copies. In a complicated organization great benefit can sometimes be had by having the original report made in manifold and delivered directly to the appropriate departments. Such method keeps each department advised of each other's work and enables all to work more nearly in unison.

The size of the report form sheet is often made unnecessarily large and of irregular sizes, inconvenient to file. My preference is to use a sheet no larger than the standard 8½-in. x 11-in. sheet. It can be bound and filed with the greatest convenience. The 8½-in. x 11-in. sheet cuts from the standard 17-in. x 22-in. sheet without waste.

The only interurban railway forms I have not been able to reduce to the standard 8½-in. x 11-in. sheet are the time-table and some forms that originate in the accounting department. In one interurban system we started out with 90 printed forms

and reduced the number to 53, only counting once similar forms used by different companies within the system. These 53 forms are classified as to size as follows: 34 envelopes and sheets under 8½-in. x 11-in.; six sheets 8½-in. x 11-in.; seven sheets legal size, 8½-in. x 13-in.; and six sheets larger than 8½-in. x 13-in. Most of these larger sheets could have been reduced to 8½ in. x 11 in. without sacrifice. It is true that with the smaller sheet one sometimes requires to use two sheets but on the whole it is a saving to use it.

To decide the number and nature of report forms that should be printed in blank I know of no fixed rule. Most of the forms are used to collect and keep on file data in the accounting, legal or express departments. The necessity of any form can best be determined by ascertaining what real and necessary use is made of the information after reaching the office. A large number of report forms is not a proof that the system is being well managed unless the information collected is studied thoroughly, digested, and operation regulated accordingly.

THEODORE STEBBINS.

### HEARING ON FARES IN RAYNHAM, MASS.

The Massachusetts Railroad Commission gave a hearing on April 28, 1910, upon the petition of citizens of Raynham for a reduction in fare on the Old Colony Street Railway in Raynham. Bentley W. Warren, for the company, stated that the Taunton fare 5-cent limits were extended some years ago from the Taunton-Raynham boundary to the business center of Raynham to permit citizens of Raynham to enjoy a 5-cent fare to Taunton instead of a 10-cent fare, and the Taunton transfer privileges. This change accommodated most of the inhabitants of Raynham, whose interests are largely connected with Taunton. It involved, on the through line from Taunton to Brockton, a change in the 5-cent zones, so that the second zone, which had previously been in Raynham, began at the business center of Raynham and extended only to the Raynham-Bridgewater boundary. The through-fare collections then became 5 cents from the Taunton limits to the center of Raynham, 5 cents from the center of Raynham to the Raynham-Bridgewater boundary, and 5 cents after crossing the Bridgewater boundary for the third zone. To facilitate travel in Raynham passengers who boarded cars between the Taunton-Raynham boundary and Raynham Center and desired to ride to points between Raynham Center and the Raynham-Bridgewater boundary were given identification checks, so that although their ride was partly in each of the two fare zones, they paid only a single fare. This privilege was not accorded to through passengers. The company regards a passenger as a through rider if he boards a car within the Taunton 5-cent district, and desires to go beyond the Raynham-Bridgewater boundary. Such a passenger, although taking a car between the Taunton-Raynham boundary and Raynham Center, is required to pay 15 cents to go to Bridgewater, as is the case with Taunton passengers. Few people who live between the Taunton-Raynham boundary and Raynham Center desire to go to Bridgewater, and the issue in the case was whether they should be granted the benefit of the local Raynham fare to the Bridgewater boundary, so that their fare to Bridgewater would be 10 cents instead of 15 cents.

The change made several years ago was at the request and for the accommodation of the people of Raynham, and, necessitating as it did a change in fare limits, was for the general public benefit. The number of persons who might occasionally be discommoded through the change in fare limits was too small to warrant a return to the old arrangement, which made the majority of people pay 10 cents to go to Taunton. The Selectmen of Raynham stated that they did not wish the fare to Bridgewater reduced if it would deprive them of any of the benefits of the present fare arrangement to Taunton.

The decision of the commission follows:

"The allegation of the petition is a discrimination in rates. At the public hearing, however, it appeared that the complaint

related to the reasonableness of rates rather than discriminatory rates. In determining this issue, the board has made a careful study of the whole territory included within the limits of Taunton, Raynham and Bridgewater. In this territory the citizens of Raynham are, upon the whole, sustaining no unreasonable charges for transportation. A readjustment of fares in this area might possibly result in a decrease in the through rate to Bridgewater, but it by no means follows that such a readjustment could be made and preserve the present 5-cent fare to Taunton. The petition is dismissed without prejudice."

## STREET CAR TALKS IN CLEVELAND

Reference has been made previously in the *ELECTRIC RAILWAY JOURNAL* to the plan of G. M. Dahl, street railroad commissioner of Cleveland, to issue talks to the public to aid the public in understanding street railway problems better. The first of

# Street Car Talks

By Gerhard M. Dahl, Street Railroad Commissioner

No. 1.

Cleveland, Ohio, April 22, 1910.

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## Introducing "Street Car Talks"

The office of the street railroad commissioner wants to keep in touch with the car rider. The car rider wants to keep in touch with the office of the street railroad commissioner. "Street Car Talks" is intended as an aid to this mutual understanding.

### The Rear Platform

The successful operation of the pay-enter car demands that the rear platform be kept clear. Ultimately all cars will be pay-enters. For the present one rule must apply equally to pay-enters and the old type cars. The platform is at once the entrance of the car and the office of the pay-enter conductor. It is here that the car riding public transacts its business with the street car company.

Will Cleveland car riders co-operate with the office of the street railroad commissioner in keeping clear the rear platform?

Two regulations will be placed in effect May 1, both tending to a clear rear platform.

Here are the regulations:

1. Except in the case of a car loaded to its full capacity, as for instance during the rush hours, no passenger will be allowed to stand on the rear platform.
2. Smoking on the cars will be prohibited.

### "Move Forward"

A crowded platform is not necessarily an indication of a crowded car. Frequently seats and standing room are to be found within; but the crowd on the platform has blocked the entrance. The passenger boarding the car, after the platform crowd has gathered, must either swirl the crowd or fight his way through it to the entrance door. The passenger leaving the car must shove his way to the steps, as best he can.

The collection of fares by the conductor meanwhile is demoralized.

Do the car riders of Cleveland consider the regulation against standing on the rear platform worth a trial?

### No Smoking

The regulation against smoking is a necessary consequence of the regulation against standing on the rear platform. Much of the present platform crowding is due to the cigar, the pipe and the cigarette.

Cleveland cars probably should have been constructed with a view of permitting smoking on the front platform. In Chicago, where the pay-enter car is in use, the front platform is set aside as a smoker. But the front platform of the Chicago car is especially equipped with ventilating facilities. This unfortunately is not the case in Cleveland.

After all isn't quick, comfortable transportation the street car idea? Can't the cigar be enjoyed just as thoroughly before or after the ride on the street car?

### Newsboys

Newsboys were excluded from the cars April 15.

Newsboys passing through the car help to block both the rear platform and the aisle within. Other cities have ruled them off the street cars—New York, Chicago, Philadelphia.

The new rule is justified on the basis of the protection afforded by it to the boys themselves. A hundred times a day every newsboy in the city, prior to this regulation, was subjected, while climbing on and off moving cars, to a hundred dangers.

Will not the improvement in service outweigh the inconvenience of buying a newspaper before boarding a car?

### Improved Service

It is impossible at the present time to give the car riders that maximum comfort, convenience and service desirable. It will take time, effort and money to bring the tracks and cars up to a proper point of efficiency.

Details of the service, however, can and will be bettered. The new regulations are a step in this direction. Upon the co-operation given the conductors in the enforcement of these regulations by the car riders themselves will depend the success of the regulations and any improvement of the service resulting from them.

Will you help?

## RESULTS WITH GAS FIRING AT COVINGTON

Practically all the power used for industrial purposes in the group of cities across the Ohio River from Cincinnati, including Newport and Covington, is furnished by natural gas piped from West Virginia. The Cincinnati, Newport & Covington Light & Traction Company is a large user of this fuel. The company supplies the railway service for the residence and industrial district across the river from Cincinnati, and operates 100 cars. A comparison of the operating figures as now obtained, when firing with natural gas, and as formerly obtained with high-grade Kentucky nut and slack coal from the Straight Creek and Black Raven mines was used, considerably favors the use of gas as fuel.

The boiler plant of the Railway & Light Company includes 14 Sterling water-tube boilers, which deliver steam at 150 lb. pressure to the electrical generating units. The boilers are all equipped with underfeed stokers, and 10 of them are arranged for forced draft. A supply of coal is kept on hand to provide for continuity of service in case of interruption to the gas supply, which is piped a distance of 140 miles. Two of the boilers, with a total capacity of 1000 hp, are fitted with superheaters to add 150 deg. of superheat to the steam. The output of these boilers is mixed with that of the other boiler plant. The electrical output of the station is used for commercial light and power, as well as for operating the railway system. The plant is operated continuously at an average load, which is about 45 per cent of the normal daily peak load.

Before the installation of natural gas firing, the plant was operated with about 3.95 lb. to 4 lb. of coal per kw-hour. The coal used had an average heat value of 14,000 b.t.u. per pound. It should be noted that the auxiliaries are all electrically driven, except the boiler feed pumps, and that they require from 9 to 10 per cent of the total output of the station; also that during the winter about 5 per cent of the steam generated is distributed for heating and operating the nearby railway shops. The gas consumption, under conditions compared with those for coal operation, is about 28.6 cu. ft. per kw-hour. The heat value of the gas has a total average of 1140 b.t.u. per cubic foot, and the available heat units are approximately 1080 per cubic foot. The cost of the gas delivered at the station is about 11 cents per 1000 ft. When firing with gas the boiler equipment can be operated with three or four less men than when coal is used.

The gas supply mains terminate in a valve house which has been erected about 100 ft. distant from the boiler house. The valve house is a substantial brick structure, heated with steam and designed with a view to complete accessibility of the piping which it covers. Gas is received at 30 lb. pressure, and a continuous record of the pressure is obtained by the use of a Bristol recording gage. The incoming gas passes through either of two sets of reducing valves installed in duplicate in the valve house. These valves lower the pressure from 30 lb. per square inch to 8 oz. or 9 oz. per square inch. Regulation of the pressure is controlled by pilot lines from the burners at the boilers.

A number of different types of gas burners have been tried. Good results have been obtained with the Equitable burner and with a burner designed by the engineering department of the Railway & Light Company. The latter burners are made in the company's car repair shop at a cost of about \$2.75 each. They are made of standard pipe fittings and castings which require very little machine work. Twenty such burners are used in the equipment of one 500-hp boiler for gas-firing.

Eagle Rock Canyon, near Los Angeles, is being converted into a pleasure resort in the interest of the Los Angeles (Cal.) Railway at a cost of several hundred thousand dollars. Eagle Pass is about 45 minutes by electric railway from the center of Los Angeles amid picturesque mountain scenery between Pasadena and Glendale. The landscape gardening is in charge of William Heiddreich, a noted local gardener.

these talks was dated April 22, 1910, and is reproduced herewith. In this issue on page 882 will be found a reference to objections which have been made to some of the changes which Mr. Dahl has sought to institute.

### EFFECT OF COLLISION ON CAR CONSTRUCTION

The accompanying illustrations, Figs. 1, 2 and 3, show the vestibules of two 52-ft. interurban cars after a rear-end collision in which the forward car, Fig. 1, was struck in the rear by the car shown in Fig. 2. The photographs were taken in the shops after the vestibules were partially stripped of wreckage.

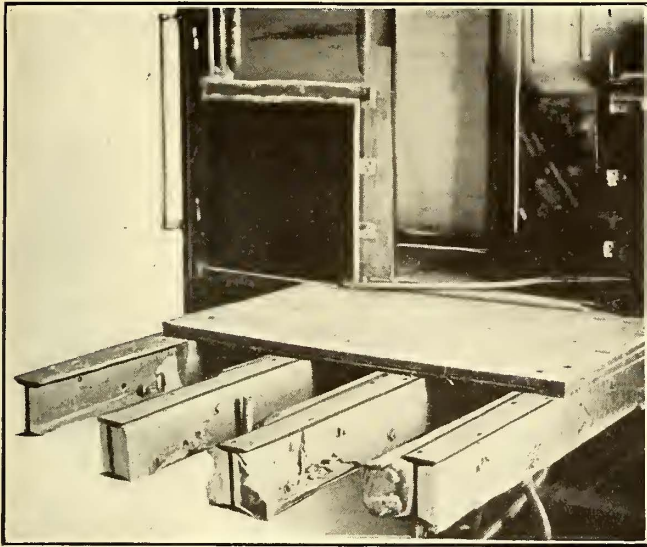


Fig. 1—Car with I-beam and Wood Filler Underframing Struck in the Rear

The I-beams on car, Fig. 1, are shown to be in perfect condition, while the same members on car, Fig. 2, from which the wood fillers were removed, are bent downward and twisted.

The center and intermediate sill construction of both cars

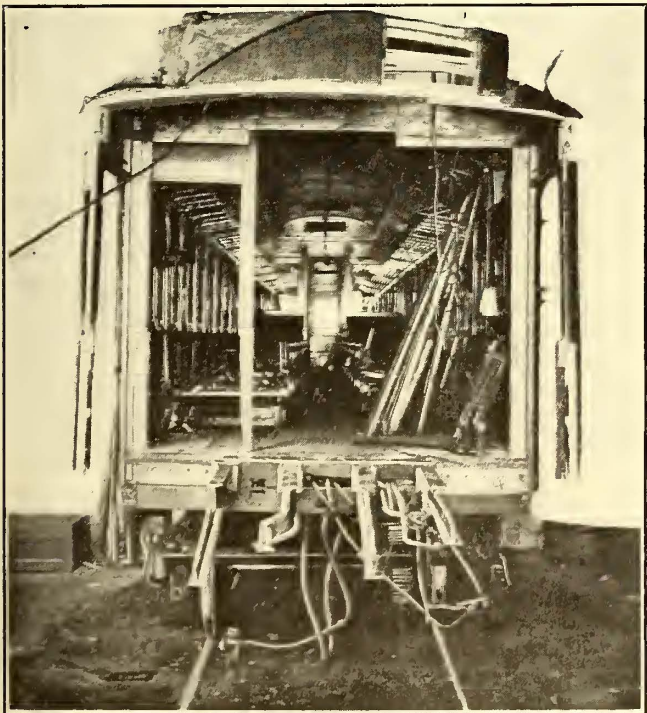


Fig. 3—View of General Damage to the Car Shown in Fig. 2

was identical, namely, of 6-in. I-beams, with yellow pine fillers continuous from bumper to bumper, with the exception that the top flange of the I-beam on car, Fig. 2, was cut away to receive crown pieces, while the crown pieces on car, Fig. 1, were gained to fit over the sills. This latter construction gave the full section of the I-beam from bumper to bumper.

The cars telescoped on striking. The bumper of the car, Fig. 1,

rode over the car, Fig. 2, so that the bumper of the car, Fig. 1, was within a few inches of the bulkhead of the other car. The cars were of the same height over the bumpers, and the company believe that they would not have telescoped if the I-beam sills had not cut away on car, Fig. 2, causing the nosing to be knocked downward and thereby allowing the other car to ride over. Two cars of the same sill construction as Fig. 1 have been in a more severe collision than the one here noted and the damage was slight, the repairs costing less than \$75.00 for both cars.

The result of the collision appears to show the advantage of a deep steel side sill plate as against a 6-in. channel used for

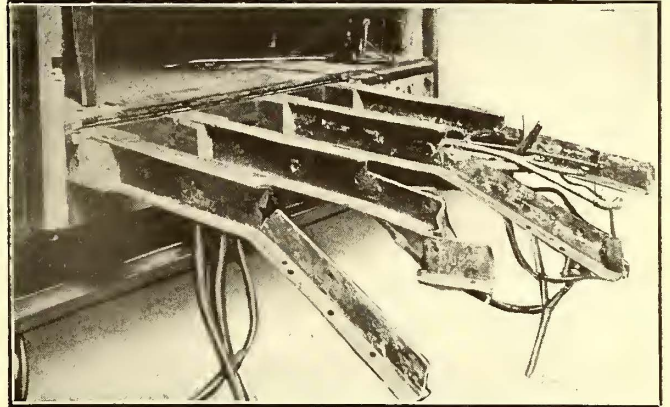


Fig. 2—Underframing of the Car Which Struck the Car Shown in Fig. 1

the same purpose. The car, Fig. 2, had steel side sill plates  $3/8 \times 30$  in., and the body of the car was intact after the collision, while car, Fig. 1, whose side sills were of 6-in. channel and wood fillers, had a 2-in. kink downward along the whole body between the queen posts. Fig. 3 is another view of the car as shown in Fig. 2.

### WESTERN ELECTRIC PENSION SYSTEM

The Western Electric Company was one of the first large corporations to adopt a pension system for employees. In March, 1906, the company set aside \$400,000 as a permanent pension fund, and later \$150,000 was added with further provision that \$150,000 might be added to the fund in subsequent years. The fund is now \$597,500. It is managed by a pension board of five officers, who are employees, appointed annually by the board of directors or executive committee. All employees who have reached the age of 60 years and have been in the company's service 20 consecutive years are eligible and are not debarred from going into other business if they accept the pension privileges. Employees who have been in service 30 years, or who have reached the age of 55 years and been 25 years in the service may be granted an allowance on recommendation of the president. Any employee who has served 10 years and through injury or sickness has been incapacitated may receive aid from the fund at the discretion of the pension board. The annual allowance for each employee retired is as follows: For each year of active service 1 per cent of the average annual pay during the 10 years next preceding retirement, with the provision that the board may base the pension upon the average annual pay of the 10 consecutive years of service during which the retired employee was paid the highest rate of wages. The pension allowance is paid monthly from the date of retirement until death and, at the discretion of the board, the allowances may be continued to widows or orphans for not more than one year. The cost of the pensions is borne entirely by the company. At present the company employs about 20,000 persons.

The municipality of Poltava, Russia, is said to be considering the advisability of constructing an electric railway there.

## PITTSBURGH TRACTION SERVICE

Having digested the report and recommendations made by Emil Swensson, expert of the Pennsylvania State Railroad Commission, concerning the complaint of the City of Pittsburgh against the Pittsburgh Railways Company, both Mayor William A. Magee, of Pittsburgh, and President James D. Callery, of the Pittsburgh Railways Company, have presented their views to the commission. The Mayor said the railway company should expend \$2,000,000 for new cars during the next six months; that the commission should compel the company to carry out all improvements in its power, and that the company should suggest to the city just what it should do to facilitate rapid transit. The Mayor grouped the recommendations under the following four heads: Increase the 80 cars already ordered to 340 cars, increase power-plant capacity, improve car-storage facilities and provide trucks and motors for 200 open cars; improvements to be made gradually, such as annual additions and replenishments to the rolling stock and improvements in management, schedule, tracks and roadway; joint improvements by the city and company, such as loops, extensions, rerouting and bridge changes; improvements wholly within the jurisdiction of the municipality, such as regulation of street traffic and widening of streets. Mayor Magee asked that the commission demand of the company a rehabilitation program, including a request for such additional franchises as may be necessary for the improvements. He also called for suggestions from the commission to the City of Pittsburgh.

In his reply to the Swensson report President Callery said that it was quite severe and in some respects it was unjust. The investigations had been made in December, January and February last, when the snowfall and other winter conditions made operation unusually difficult. Furthermore, the company, not through its own initiative, had made certain radical changes in the stopping and routing of its cars which led to great discontent among its patrons. He denied that there had been no apparent improvements in the service during the past 10 years and that the increase in the downtown trackage had been absolutely nil. Additional tracks, including loops, had been laid and the company had increased its trackage wherever it had been permitted. In 1906 a group of new franchises was before the city for approval when a change in administration took place, but since that time not a single ordinance has been passed for the relief of the congested terminal district. Mr. Callery stated that the Pittsburgh Railways Company was merely an operating corporation. There were originally about 40 independent lines, and for this reason many complications have remained to embarrass the company. As the company's system extends throughout two cities, 56 boroughs, and 32 townships, further complications of franchise and operating requirements are introduced as handicaps.

Since March 31, 1903, the operating expense had increased 37½ per cent, while the receipts had increased only 20 per cent. He felt that the company could not live under a universal transfer system. It was not a fact that the company had continued the operation of each of the original routes of the underlying companies instead of considering the system as a whole. Of 66 present routes, but one was in existence at the time of the consolidation, 47 routes having been changed and 18 routes created. In many cases it was impossible to make desirable changes because of franchise conditions. Mr. Swensson evidently lacked information about the matter of short hauls. Of the nine points mentioned in his report, eight had long been provided with short routes. Experimental short runs had been tried every year, but in most cases the short-route passengers crowded the cars on the long routes, leaving the other cars with only a few passengers. The number of cars running in the evening was 103 per cent greater than during the middle of the day, which in itself showed that an effort was made to follow the travel requirements. Even if the rights of the traveling public were paramount, some attention must also be paid to the rights of the employees. It was unwise to ask and impossible to get competent men to run

the cars during the few rush hours without paying them living wages. To pay them a full day's wages for the short time would put upon the company a burden that it was unable to bear. The repair facilities were admitted to be insufficient, but plans had been completed for additional shops.

With regard to the percentage of standing passengers in the first fare district between 5 p. m. and 6 p. m., January, 1910, Mr. Callery said that the proper figure was 40 per cent of those seated and not 75 per cent. The company had procured 100 of the new 56-seat cars, but had found that it is impossible to operate them over the desired routes because of the refusal of the municipalities to sanction the necessary track changes. The company did not have 100 worn-out single-truck cars. Not more than 50 of the cars were more than 14 years old and no railway company could afford to throw away car bodies under 20 years of age. The estimate of the 5 per cent annual increases in seating capacity had been more than provided by the company during its existence. The estimate of 10 per cent annual renewal of rolling stock was entirely too high, as 5 or 6 per cent was quite sufficient. The recommendations as to adopting steam-railroad operating methods were not applicable to an electric railway operated largely over crowded city streets.

The suggestions that short-haul passengers should not be permitted to get on the long-haul cars were impracticable, since it would be impossible to keep them off the cars, for a passenger could not be required to announce his destination upon entering. The suggestions as to limiting the load on the cars were also impracticable and would surely result in dissatisfaction if attempted. Mr. Callery requested that the traffic squad system be extended throughout the congested section.

The company had made continual additions and improvements to its power plants and was continuing to do so. It did not see the necessity of trucks and motors for 200 additional cars. The new 56-seat cars, together with the open cars, would furnish ample accommodations for the summer business. If the recommendations of Mr. Swensson were fully carried out, they would involve an expenditure of \$6,000,000, the greater portion of which would be for equipment used only during the rush hours of six days a week. This covered only about four hours a day and as the cars were practically empty in one direction the actual benefit to traffic would be but two hours a day.

Since the Pittsburgh Railways Company began operating the consolidated system, Jan. 1, 1902, it had expended for improvements and betterments \$8,073,650, and for extensions \$10,480,670. On none of the investments made since Jan. 1, 1902, had there been issued a dollar of overcapitalization or watered stock, nor had the Pittsburgh Railways Company ever paid one dollar in dividends to its stockholders. The expenditures for wages and supplies for eight years of operation aggregated \$44,447,000. Of this amount, over \$3,848,800 had been paid for taxes and street improvements. During this period, the company had paid to the holders of underlying stock and bonds \$30,187,000 as interest on old horse-car lines, later changed into cable roads and still later into electric railways. In addition, the company had paid \$2,009,000 interest on capital for improvements since 1902. In the last eight years and three months, preceding April 1, 1910, the receipts had increased only 3 per cent a year and the number of seats furnished had increased over 7 per cent a year. The extension of transfer privileges and fare limits brought the revenue per passenger down to a little over 4 cents. The operating expenses had steadily risen, while the 5-cent fare remained unchanged.

In conclusion, Mr. Callery stated if any suggestions were to be made to the city with reference to changes to permit the operation of the new cars, they ought to come from the commission or from the executive officers of the municipality. It was perhaps enough for the company to say that it was ever ready and willing to meet the traffic requirements provided the city would widen streets, increase the number of streets, change bridges and other structures as required.

On May 11 the commission considered Mr. Swensson's report and Mr. Callery's answer thereto. An early recommendation is expected.

## DERAILS IN PAVED STREETS

The accompanying illustrations show the application of the Hayes model A, size 5, derails to a paved street in Athens, Pa., where the Waverly, Sayre & Athens Traction Company's tracks cross the Lehigh Valley Railroad. One of these views shows the derail in the open position, or off the rail, while the other shows it in the closed position or on the rail.

This derail consists of only two pieces. The derail block moves up, over and down onto the rail, being guided by the



Derail in Closed Position on the Rail

pins moving in the cam grooves of the guide box. There are no cranks, bolts, nuts, cotter pins or other loose pieces and the derail is simple track material rather than a complicated mechanism. When the derail block is on the rail the vertical thrust of a wheel is taken by the rail itself. The thrust at right angles to the rail is taken by the two seats against which the lower front sides of the block rest and the block cannot leave the rail except by rising an inch above it; the weight of the wheel prevents this and the block is therefore locked on the



Derail Operated by Pipe Line from Tower

rail. The thrust parallel to the rail is carried by the side walls of the guide box directly to the ties. The block is thus held in position by the rail and by the portion of the guide box nearest the rail, the remainder of the guide box merely governing the motion to and from the rail.

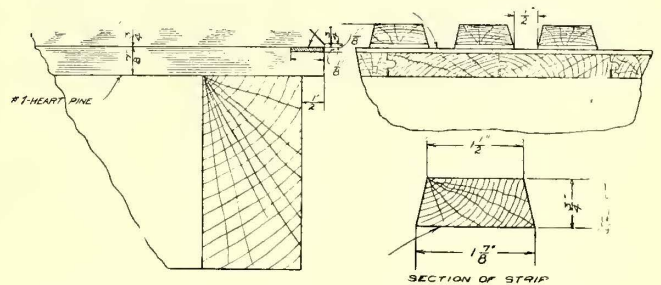
The guide box is adapted to be made a fixed part of the track. The horizontal flanges bearing on the top of the ties have six holes for bolts, lag screws or spikes. Vertical flanges beneath bear against the sides of the ties. The derail may be

operated by any mechanism which is used to throw a switch. It may also be operated by a pipe line from a main track switch stand and will work with any form of interlocking apparatus. In any case the operating rod is connected direct to one of the rear lugs by a  $\frac{7}{8}$ -in. pin. In interlocking, the other lug is used for the locking connection, the indication in locking thus being direct from the moving piece and not through any crank, offset connection or other secondary attachment. Both pieces of this derail are made of the best malleable iron. Every casting has two test coupons which are subjected to rigid inspection before the castings are used.

About 35,000 derails, made by the Hayes Track Appliance Company, Geneva, N. Y., are now in use. The Brooklyn Rapid Transit Company alone has 142 in service.

## REDUCING PLATFORM WEAR IN RICHMOND BY USING REINFORCING STRIPS

The Virginia Railway & Power Company, Richmond, Va., covers all of its car platforms with maple strips similar to those used inside the cars. To avoid replacing the entire platform when the flooring at the step is worn out, the mechanical department now inserts an iron strip flush with the pine under-



Platform Floor Stripping Over Steel Plate at Step

flooring and extending the entire width of the platform at the steps. This reinforcing strip is  $\frac{1}{8}$  in. thick and 1 in. wide. When the maple strips at the step are worn down, new ones are inserted for the necessary length, but no change whatever is made in the pine flooring below because of the protection afforded by the metal.

## TROLLEY WHEEL PRACTICE AND CASTING FORMULA AT BOSTON

The Boston Elevated Railway Company has been remarkably successful in securing low trolley maintenance by the use of a light trolley harp and wheel. The total cost of wheels, harps, poles and trolley bases was given at not over \$2,100 per year for over 40,000,000 car-miles by Paul Winsor, chief engineer of motive power and rolling stock, at the 1909 convention of the American Street & Interurban Railway Engineering Association. The company feels that to maintain perfect contact between the trolley wheel and the wire it is very desirable to make the wheel and outer end of the pole as light as possible, and on some of the heaviest equipment better service has been obtained from a 4-in. wheel than from larger wheels of the same chemical composition. The company uses a 12-ft. pole of steel, weighing about 23 lb., including the wheel. The company endeavors to obtain spring in the pole at the upper end, so as to absorb shocks and inequalities in the wire. A very light harp is used with the 4-in. wheel, and the latter is now standard practice for the entire surface system. The bushing on the 4-in. wheel is fitted with a  $\frac{1}{2}$ -in. spindle in place of the  $\frac{5}{8}$ -in. spindle used on the 5-in. wheels. The company does not consider it economical to use large wheels on suburban lines and later transfer them to its urban service. All the wheels used in Boston are made by the company after its own formula, which is as follows: Copper, 91.08 per cent; tin, 6.60 per cent; lead, 0.20 per cent; zinc, 1.95 per cent; phosphorus, 0.17 per cent.

## COLUMBUS STRIKE SETTLED

The strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio, which was declared on April 29, 1910, was settled on May 5, 1910, through the efforts of the State Board of Arbitration. The company refused to recognize or deal directly with the representatives of the union which had been organized among the men. The men claimed that an agreement with the company which was made on April 6, 1910, had been violated and they took advantage of the situation in declaring the strike to demand an increase in wages to 27 cents an hour and time and a half for overtime, with no bonuses in the form of free uniforms or dividends on their wages. The Board of Arbitration did not go into the merits of the additional demands of the men, but considered only the interpretation of the agreement of April 6, the first three sections of which were as follows:

"1. The employees of this company may come at any reasonable time for conference with the management on any matter connected with their employment by this company.

"2. There will be no discrimination against employees because of membership in any union, nor of their right to join any such union.

"3. The wages of conductors and motormen in effect April 1, 1910, will be increased by 1 cent per hour, to take effect April 8, 1910, and ½ cent per hour, to take effect Jan. 1, 1911."

Section 4 of the agreement contained the names of four men who had been discharged and who were to be reinstated.

The supplementary interpretation of the agreement of April 6 by the Board of Arbitration, which was accepted by the company and which was also accepted by the employees when presented to them by the Board of Arbitration, is as follows:

"The company agrees to the following interpretation of section 2 in the agreement of April 6, with the State Board of Arbitration:

"Men are to be free to join or not to join any organization without intimidation or discrimination and the company agrees that when engaging employees the question of unionism or non-unionism shall be eliminated.

"Relating to the four men whose replacement is in dispute under section 4 of the agreement the company agrees that those men shall receive a compensation equivalent to that of their former positions, regardless of the runs assigned to them."

## AVERAGING PERFORMANCE OF THE OHMER REGISTERS

The practice is followed monthly on Denver City Tramway, where Ohmer registers are used, of rating the efficiency of conductors in the use of Ohmer registers which are employed on that line. The plan followed is as follows: The total errors made by each conductor in registering fares on the register during the month is divided up by the number of days which that conductor worked, giving as a result the average number of errors per day. This amount is then deducted from 100, the remainder being that conductor's percentage for the month; for instance, John Smith works 30 days and makes 300 errors, which would result in an average of 10 per day, deducted from 100, would result in a percentage of 90 for John Smith for the month. These figures are then tabulated and published by the company in the *Tramway Bulletin* which is a monthly paper devoted to the interests of the company's mutual aid association. In the last issue of the bulletin there were 11 who were credited with 100 per cent and the general average was 95.09 per cent.

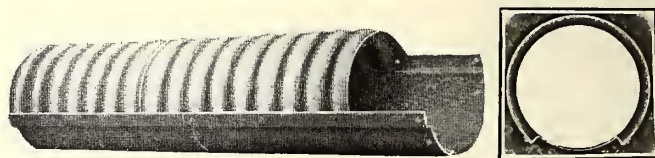
In addition to comparing the records for each man, those made on each division are averaged and there is considerable competition as to which division will make the best record. The North division won in March. The East division won in February with an average of 94.7.

An electric railway, to have a gage of 3 ft. 6 in., will shortly be built between Agua de Maiz and Los Dios Caminos, Ven-  
ezuela, by J. A. Mosquera, A. Michaud and A. Avelado.

## CORRUGATED CULVERT WITH SMOOTH BOTTOM

A rather novel form of corrugated iron culvert is being installed by the highway culvert department of the Penn Metal Ceiling & Roofing Company, Ltd., Boston, Mass. The principal feature is the smooth bottom plate which permits water to flow freely by preventing debris, such as mud, pebbles and sticks from being caught in the corrugations. In other culverts, the bottom corrugations tend to fill up with sand or mud to make a bed for the water. Smooth-bottomed pipes minimize this trouble and consequently require practically no attention after cleaning.

The method of joining the corrugated top sections with the smooth bottom plates is also of interest. The corrugated top is rolled to the required diameter and fixed tight into the



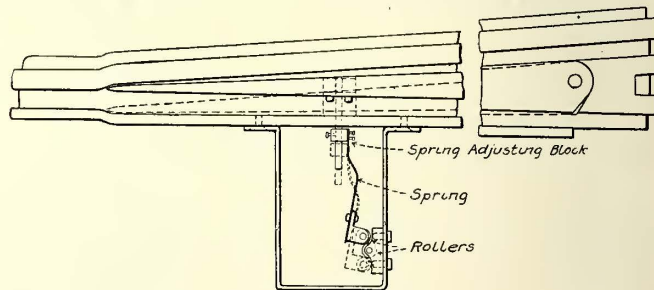
Smooth Bottom Corrugated Culvert

bottom section which has bent flanges without the liability of cracking the galvanizing and exposing the raw material to rusting. This method of joining the top and bottom sections also makes a keystone formation of the earth, minimizing strains and preventing the pipe from shifting its position.

In setting up the pipe, two bottom sections are bolted together, after which a short piece of corrugated top is added, then a full-size section of the top and so on until the desired length is obtained; the last section of the top is also a short piece. In this manner all the joints are staggered. The top pieces are joined by a lapping of one corrugation, one end being made a fraction of an inch smaller for that purpose. The bolts, which are also galvanized, all go to one side of the pipe, passing through the flange to the smooth bottom and through the corrugated top. The various portions of the culvert can be closely nested for convenient handling and can be quickly set up by ordinary section men with no other tool than a wrench.

## SWITCH LOCK USED IN HOT SPRINGS, ARK.

The accompanying sketch shows a street railway switch lock used by the Hot Springs (Ark.), Street Railway Company. This lock was devised and has been recently patented by Edward Hardin, superintendent of transportation of this company. The lock is designed to prevent the movement of the switch-point unless it is thrown by the usual motorman's bar.



Switch Lock In Position

To the standard switch tongue is attached a through-bolt carrying a small roller mounted on a heavy leaf spring. Engaging this roller is a similar roller mounted inside the iron box which contains the switch lock mechanism. Movement of the switch raises the movable roller against the pressure of its spring, when it rolls easily over the stationary roller. The spring then snaps down automatically into its second position, after the centers of the rollers have passed. The carrying spring is mounted on an adjusting block through which its tension can be varied.



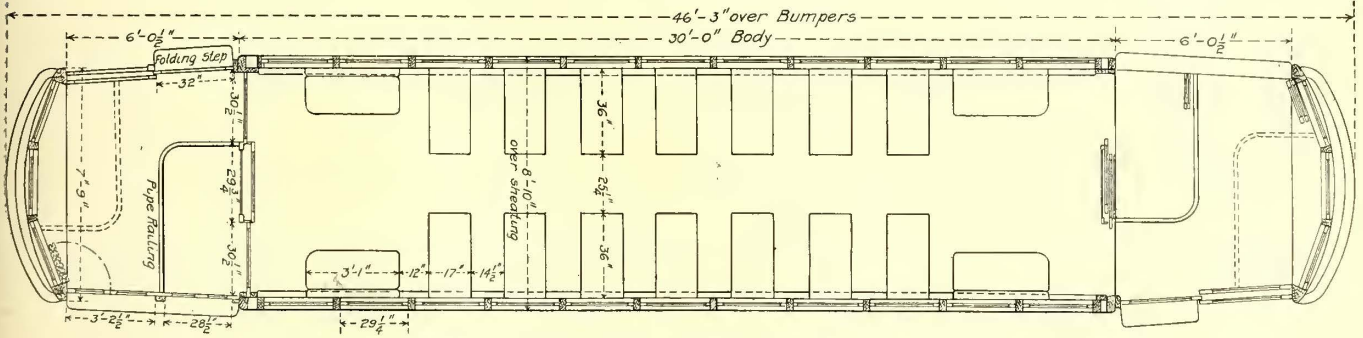
**PAY-AS-YOU-ENTER CARS FOR THE BLOOMINGTON & NORMAL RAILWAY**

The Danville (Ill.) Car Company has recently completed for the Bloomington (Ill.) & Normal Railway & Light Company six pay-as-you-enter cars under the license of the Pay-As-You-Enter corporation. As shown in the accompanying plan the type of car built is 44 ft. 11 in. long over the vestibules and 30 ft. long over the body, with an inside width of 8 ft. 1¼ in. This liberal width admits the placing of 36-in. cross-seats and an aisle of 25¼ in. between them, but to facilitate ingress and egress longitudinal seats are set in the corners. The body openings at both ends consist of two doors which slide into a

the top by 2½-in. x 2½-in. x 1½-in. angle iron and securely bolted to the side posts and side sills. There is a continuous ash foot rest on top of this angle iron.

Double sash are used for the windows. The top sash are fixed, but the lower sash drop into pockets. The sash springs are O. M. Edwards spring rollers. The window shades are of Pantasote and have Curtain Supply Company's No. 88 ring fixtures. The specialties used for the fare collection system embrace a Brill four-till fare box, a double R-5 International register and the Consolidated Car Heating Company's push-button system.

The car body is mounted in two Brill No. 27 GE-1 trucks, having a 4-ft. 6-in. wheelbase, 5-in. axles and 3 3-in. cast-iron

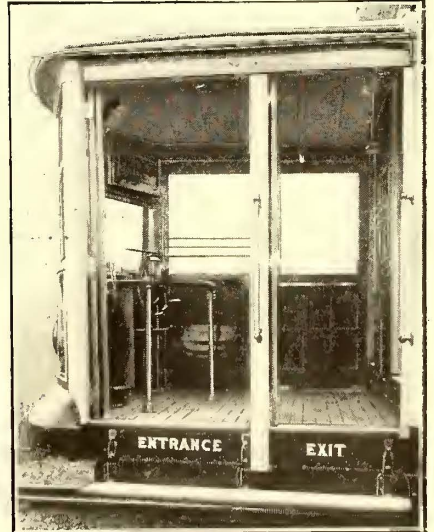
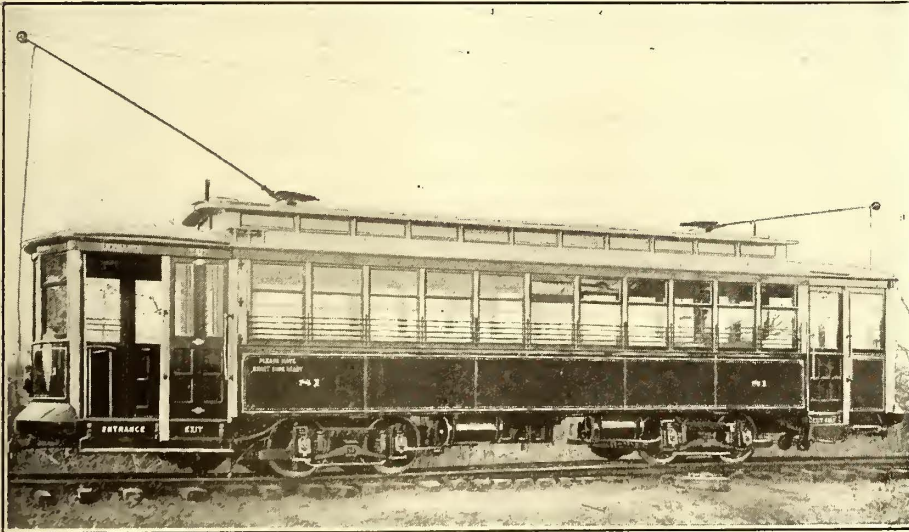


Plan of Bloomington & Normal Railway & Light Company's Pay-As-You-Enter Car

center pocket. However, the most interesting feature of this design is the vestibule and platform arrangement. It will be observed from the plan that the vestibule sliding door which is operated in connection with a folding step slides against the end of the car instead of against the vestibule. The step openings at the vestibule swinging doors are equipped with the Brill folding gates, and the vestibule steps and the platform floor at each door opening are covered with Empire safety

wheels. These trucks carry four GE-80 motors. The braking equipment includes Westinghouse air brakes, vertical ratchet hand wheels and the standard pneumatic sanders of the Illinois Traction System.

Other items which were supplied for these cars are the following: Consolidated electric heaters; United States 10-in. stationary headlights; Root track scrapers; H-B. wheel guards and Hunter destination signs. The latter are placed one in the



Pay-As-You-Enter Car for Bloomington & Normal Railway & Light Company

treads. The platform pipe railing is removable and reversible so that it can be used as a guard for the motorman to save him from jostling by passengers. This arrangement is shown in the dotted lines on the plan.

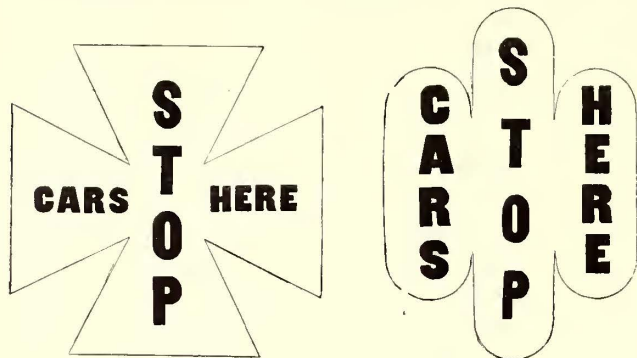
The bottom framing of each car consists of 4¾-in. x 7¾-in. long-leaf yellow pine, side sills plated with ¾-in. x 18-in. steel; 5-in. x 7¾-in. white oak end sills; 3¾-in. corner posts, and 2¼-in. side posts. The outside sheathing is No. 14 sheath steel. The bolsters consist of a 1-in. x 10-in. top plate and a 1½-in. x 10-in. bottom plate with the necessary filler castings and spools of gray iron. The 1½-in. x 2½-in. inner truss rods are carried on high struts over each bolster and terminate in wrought-iron truss anchors at each corner of the car. The truss plank consists of ¾-in. x 18-in. iron plate reinforced on

center on each side and one in the vestibule at each end of the cars. The weight of a single car, including trucks, electrical equipment and air brakes, is 51,850 lb.; the weight of the trucks is 10,900 lb; the weight of the electrical material, 12,750 lb.

The Mobile (Ala.) Light & Railroad Company uses a somewhat uncommon bulletin arrangement for conductors and motormen. Instead of pinning or pasting the various notices on a board, the bulletins are dropped into glass-fronted cabinets like a picture in a frame. Thus the paper remains clean and untorn in its place as long as the instructions require publicity. A bulletin can be readily removed by lifting the glass out of the frame.

**THE PROPOSED STANDARD CAR STOP SIGN**

R. N. Hemming, assistant superintendent and electrical engineer of the Ohio & Southern Traction Company, Columbus, Ohio, is planning to bring the subject of a standard car stop sign before the next meeting of the Central Electric Railway Association which is to be held in Toledo, Ohio, on May 25. Mr. Hemming believes that it would aid both the traveling pub-

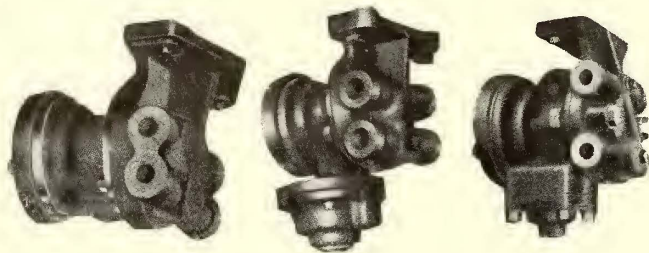


Two Suggested Car Stop Signs

lic and the electric railways to have one form of stop sign as familiar, for example, as the blue bell which has become synonymous with the long distance telephone. If this were the case, strangers in a city would avoid a great deal of trouble in seeking the stopping points and even the residents would find such signs a convenience. It should be understood that the end in view is not the standardization of stopping places, but simply of the methods for indicating them, as owing to the variety of stopping points throughout the country it is probably impracticable to have a national rule covering their location. Mr. Hemming has made up a number of differently shaped cardboard sample signs with the words "Cars Stop Here" in various positions and sizes of type. One of these, for example, is formed like an arrow 4 in. wide by 28 in. long, and another like a Victoria Cross 16 in. square. The cross and one other design are reproduced in the accompanying cuts.

**EMERGENCY AIR-BRAKE VALVES**

The National Brake & Electric Company, Milwaukee, Wis., is making three types of emergency valves to add to straight air brakes the safety features usually associated with the more complicated automatic air-brake systems. The type "A" emergency valve is for installations where two cars with straight air equipments are operated together. Should a train part, the



Emergency Valves and Brackets, Types A, B and C

valve causes the brakes to set automatically. Vent valves are provided to permit the brakes to be applied in an emergency either by the conductor or motorman. The usual straight air-brake equipment of both the motor car and the trailer is supplemented by this emergency valve and bracket, vent valves, auxiliary reservoir and extra hose, in addition to which the trailer has an auxiliary reservoir. This equipment is recommended where the cars are light and the braking cylinders of small diameter. It may be used with any standard type of 1/2-in. motorman's valve.

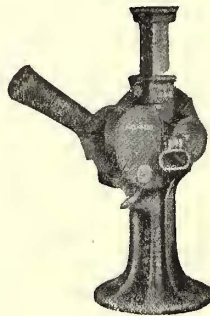
Cars with small brake cylinders may be satisfactorily con-

trolled by a combination of the straight air and the ordinary emergency equipment as the train pipe line is of sufficient area to accommodate the flow of air when the brakes are released after application. This is not true, however, of cars with large brake cylinders as the venting of air to the atmosphere through the long train pipe line requires much more time. In effect, the train pipe is obliged to discharge a greater volume of air through the same area. The type "B" emergency valve is designed to overcome this deficiency. It can only be used, however, with this company's type 3/4-in. "SV" motorman's valve. The type "B" valve is similar in construction to the type "A," differing only by the addition of a local release valve. The service application of brakes is the usual straight-air method, but when the operating handle is moved to the emergency position, the brakes are automatically applied and a maximum of brake cylinder pressure is attained instantly.

The type "C" emergency valve, which may be used with any standard 1/2-in. motorman's valve, is adapted for single cars as well as for trains of two or three cars. It adds but little to the straight-air equipment and in a short time the motorman learns to operate it as efficiently as straight air brakes. The valve is made to offer the following advantages in train operation: Highest maximum brake cylinder pressure in an emergency application; quick automatic recharge of auxiliary reservoirs after an emergency application no matter what position the operating handle may have assumed; equal pressure in all the brake cylinders of the train, regardless of piston travel unless the train parts; graduated increase or decrease of brake cylinder pressure either by the straight air or automatic methods. When the straight-air system is equipped with this emergency valve, the addition consists only of the valve itself and supporting bracket, supplemented by an auxiliary reservoir which conforms to the size of the brake cylinder.

**A 40-TON GEARED RATCHET JACK**

The Duff Manufacturing Company, Pittsburgh, Pa., maker of Barrett jacks, is selling through Fairbanks, Morse & Company, Chicago, a geared ratchet jack, known as Barrett Jack No. 400, which has a lifting capacity of 40 tons. An important feature of this jack is that when the load is being raised, the lowering mechanism is thrown out of service. When, however, the load is being lowered the lowering mechanism is thrown into place by a reversing lever on the front of the jack. When this lever is thrown downward it indicates that the lowering mechanism is in position. Hence, there are no superfluous parts to be shaken around while the jack is being operated. There is absolutely



4c-Ton Jack

no movement of the lifting pawl in the socket lever when the jack is under a load, thus eliminating the socket-lever wear which occurs in jacks having pawls pivoted in the socket. The only wearing surfaces in this jack turn in accessible bronze bearings, which may be easily renewed if necessary. Back of the lifting bar there is placed a special bronze plate which can be adjusted for any wear to keep the rack and large pinion in proper mesh at all times. The jack frame consists of a strongly ribbed base, in which the lifting bar slides. The latter is raised by a hardened steel pinion which turns on its own bearings in bronze bushings and not on a steel pin as in other geared jacks. The hub of this pinion is connected to a large gear which is revolved by a second pinion. The hub of this second pinion has a suitable ratchet mechanism for its turning by a pawl in the socket lever; a retaining pawl is also provided. This jack raises a load of 40 tons to a height of 17 in. and weighs but 275 lb.

The municipality of Pecs, Hungary, invites tenders for the construction of an electric railway in that city.

# News of Electric Railways

## Mayor of Toledo Accepts Proposal To Inspect Accounts of Company

Brand Whitlock, Mayor of Toledo, Ohio, on behalf of the Council of that city, has accepted the invitation of Albion E. Lang, president of the Toledo Railways & Light Company, to appoint a committee to examine the books of the company "in order to reach a definite knowledge of the most desirable street railway system for the city with special reference to routes, equipment and frequency of cars, and also as to the cost of operating such a system," preparatory to considering in the Council the question of granting the company an extension of its franchise. Under authority from the Council, Mr. Whitlock has appointed Carl Nau, treasurer of Cleveland under the Johnson administration, and J. B. Tanner, formerly assistant treasurer of the Municipal Traction Company, Cleveland. Messrs. Nau and Tanner are members of the firm of Nau, Tanner & Rusk. The letter of Mr. Whitlock to Mr. Lang accepting the proposal of the company was dated May 2, 1910. After referring to the suggestion of Mr. Lang that the status of the company be considered carefully before the subject of the extension of the franchises is taken up by the Council, Mr. Whitlock said:

"In reply to this suggestion and the offer here made to open your books generally to the inspection of representatives of the city, I am authorized to say that the city will avail itself of this opportunity, although in so doing it does not wish to be understood as assenting or agreeing in any way to a renewal or extension of franchises now held by the Toledo Railways & Light Company, nor to bind itself in any way to grant a new franchise or franchises to the Toledo Railways & Light Company or to any company, nor definitely to commit itself at this time to any program for the solution of the street railway problem.

"The city authorities, acting in this matter as a unit, agree with you that an investigation is necessary as preliminary to any discussion of this subject, and they desire to acquaint themselves and all the people of the city with every material fact and circumstance that relates to the whole problem of transportation in municipalities.

"I might say, too, that the city authorities desire to solve this problem in a manner just to the people of the city, and that they regard as the paramount prerequisite to any settlement that may be reached between representatives of a street railway and them, a determination of the legal relations between the city and the street railway that will recognize and establish the right of the municipality, through its authorized officials, to institute and preserve a continuing control of the service, both as to routes and schedules, including routes of interurban cars operated within the city, so as both to prevent waste and to insure a service satisfactory in character and adequate in quantity to the present and future needs of the city, and ultimately to provide for the undertaking by the city itself of the operation of street railways when it shall have been authorized by the State and its people decide so to do.

"The city, therefore, accepts so much of your company's invitation as tenders to its representatives the opportunity to examine the books and effects of the company, and it has appointed as its examiners in this respect Messrs. Nau, Tanner & Rusk, who will begin an inspection of your company's books immediately."

## Arbitration in Detroit Postponed

The hearing before the board of arbitration which was appointed to consider the appraisals of the property of the Detroit United Railway has been postponed indefinitely. Mayor Breitmeyer failed to persuade Frederick T. Barcroft, who appraised the property of the company for the committee of fifty, to reconsider his decision not to appear before the board of arbitration, and Frederick W. Walker, who was appointed to succeed Mr. Barcroft, found it impossible to appear before the committee on May 9, 1910, which had been set as the date for the first hearing. Mr. Walker and Clyde I. Webster, principal counsel for the committee of

fifty, have been going over the Barcroft appraisal in detail, and Mr. Webster has stated publicly that, up to May 9, 1910, the values placed on real estate, buildings and overhead charges had been considered, and that many differences had been found.

Following a caucus of the Republican Aldermen of Detroit on May 3, 1910, a resolution was adopted which gives the sanction of the Council to the board of arbitration as organized and instructs Corporation Counsel Hally to appear for the city in the proceedings. The proposal was lost to give the Council power to take the arbitration out of the hands of the Mayor and the committee of 50 whenever the Council should deem it advisable.

The Michigan United Railways, Lansing, Mich., has applied to the Council of Detroit for a 30-year franchise for an entrance to the center of the city from the West for its interurban lines.

## Transit Affairs in New York

The Public Service Commission gave a public hearing on May 9, 1910, on the form of contract the commission will prepare for the construction, equipment, operation and maintenance of the tri-borough subway system. Arthur J. Baldwin, of counsel for the Bradley-Gaffney-Steers Company, referred to the willingness of the company which he represented to bid to build and operate the proposed system, but added that certain changes in phraseology should be made before the subject is presented to the public and the contractors in the shape it finally will be set forth. It should be made clear that wherever it is necessary to acquire real estate the city shall acquire it, thus removing this burden from the contractor, and a period of more than five years' operation ought to be guaranteed to the contractor. The city's claim should be in the nature of a second mortgage rather than a first, as proposed, and interest should be paid first to the holders of the bonds. James A. Allen, representing the Civic Alliance and the Independence League, wanted the commission to provide a way to settle the municipal ownership question immediately and finally. He said that the present city administration is fully committed to municipal ownership.

The members of the Public Service Commission conferred on May 7, 1910, with J. F. Calderwood, vice-president and general manager of the Brooklyn Rapid Transit Company, and W. S. Menden, assistant general manager, regarding the proposition recently made by the Brooklyn Union Elevated Railroad to operate trains over the Williamsburg Bridge and through the Bridge-Loop Subway to Chambers Street. The Brooklyn Rapid Transit Company proposes a five-year lease, which would in all probability overlap upon the time when the Broadway-Lexington Avenue Subway will be in running order with its connection via the Bridge-Loop Subway for the Brooklyn branches going into the Tri-Borough route. The commission, it is said, will insist on a lease of a temporary character, which can be terminated when the Tri-Borough Subway is ready to use the bridge loop.

## Cleveland Traction Situation

The Humphrey Company has filed a petition in the Common Pleas Court for an injunction to prevent the Cleveland Railway from charging a fare of 10 cents to Euclid Beach, a lake shore resort owned by the Humphrey Company. It is charged that an agreement was entered into in 1901, whereby one fare was to be charged to the beach. The Humphrey Company claims that the Cleveland Railway was given a right-of-way in the park, and that a large sum of money was spent in improvements in view of this agreement and that a heavy loss will be suffered if a fare of 10 cents is charged. It is admitted in the petition, however, that the company claimed the right to collect two 5-cent fares for service to Euclid Beach when the agreement was made.

J. J. Stanley, president of the company, says that the track in the park will not be used after May 15. In the

answer filed by the company, it acknowledges the agreement to operate at a 5-cent fare in return for the privilege of laying tracks through the park, but states that at no time has the company claimed the exclusive right to use these tracks. A reduction in the fare to the park would mean an advance within the city, as the receipts would not be sufficient to defray the expenses and pay 6 per cent interest on the investment. The distance between the Public Square, Cleveland, and Euclid Beach is between 10 and 11 miles and the operating cost for so long a haul makes the 10-cent fare necessary. If the present fare in outlying districts was not maintained, the minimum could not be charged within the city. A reduction in the fare of visitors to the park would not be just to residents of Collinwood, near the park, who pay 10 cents.

The hearing on this matter was begun before Judge Vickery on May 6, 1910. City Solicitor Baker asked that the city be dismissed from the action on the ground that it has no interest in the suit. Attorneys for the company contended that the city should remain a party to the suit, so that it would not be liable to a violation of the Tayler grant, which requires that certain conditions be maintained relative to the outlying districts. The court did not decide the point.

The report of the Cleveland Railway for April, 1910, has not been made public, but it has been announced that the surplus from operation for April is \$24,617, as compared with \$18,880 for March. The gross earnings for April were \$475,364, as compared with \$475,749 for March.

The street railway committee of the City Council has decided to recommend the expenditure of \$250,000 for improvements, according to reports. Most of this money will probably be spent for converting the old cars into cars of the pay-as-you-enter type. It is estimated that about 230 cars could be improved by the expenditure of this amount of money.

The employees of the Cleveland Railway who are members of the union which has been organized among the men are said to have voted to demand a flat rate of 32 cents an hour for motormen and conductors after the expiration of the trial period with a 3-cent fare plus 1 cent for a transfer. At present the men receive 23 cents an hour for the first year, 25 cents for the second year and 26 cents for the third year and thereafter. The dispatchers asked for an advance in wages from \$75 to \$100 a month. This was refused, but later their pay was advanced to \$85 per month.

Trouble has been encountered in enforcing the rules made by Commissioner Dahl which prohibit smoking and standing on the rear platform, and a number of suits have been filed by men who have been ejected from the cars by conductors. R. Van Rensselaer, an architect, who refused to ride inside a car, stating to the conductor that he preferred to remain outside, and was put off the car, has instructed his attorney to bring suit for \$5,000 damages against the company to test its right to enforce a rule that specifies a certain place on the car which passengers must occupy. The company has ordered conductors to enforce the rules, using their own judgment as to the means necessary to be adopted in order to insure compliance with their instructions to passengers.

Tom L. Johnson, former Mayor of Cleveland, returned to New York on the *Mauretania* on May 5, 1910. Mr. Johnson is reported to have said: "I am in politics till I die. I went away a sick man. I am much better now, but have not recovered entirely. Before returning to Cleveland I shall stay in New York for a few days."

**Strike in Vincennes.**—The conductors and motormen on the Vincennes (Ind.) Traction Company are on strike. They demand a nine-hour day and 17 to 20 cents an hour, according to length of service.

**New York State Convention.**—The annual convention of the Street Railway Association of the State of New York is to be held this year on Tuesday and Wednesday, June 28 and 29, at Cooperstown. The headquarters of the association will be at the Otasaga Hotel. The program of the meeting has not yet been announced.

**Proposed Interurban Terminal for Kansas City, Mo.**—The Missouri & Kansas Terminal Building Company, Kansas City, Mo., has been organized by W. B. Strang, of the

Missouri & Kansas Interurban Railway and others to build a union electric railway station in Kansas City, Mo. It is proposed to connect the new station with the union station for steam railroads in Kansas City so that baggage, freight and passengers can be interchanged between the terminal of the electric railways and the terminal of the steam railroad.

**Suit to Recover for Failure to Comply with Commission's Order.**—Trial was begun on May 9, 1910, before Justice Brady and a jury in the Supreme Court of the suit brought by the Public Service Commission of the First District of New York to recover \$750,000 for failure on the part of Frederick W. Whitridge, receiver of the Third Avenue Railroad and the Union Railway, to equip the cars of these companies with wheel guards within a specified time, in accordance with an order of the commission.

**Decision Against Operation of Interurban Cars on Wells Street, Milwaukee.**—The Supreme Court of Wisconsin has decided that the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, Milwaukee, Wis., have no right to operate cars of interurban railways entering Milwaukee on Wells Street, Milwaukee. The decision was written by Justice William H. Timlin and concurred in unanimously by the other members of the court. The decision will not become a matter of record in the Circuit Court of Milwaukee County for 30 days. In the meantime the companies have the right to ask for a rehearing.

**Damage Suits Result From Surface Line Construction in Brooklyn.**—The Court of Appeals has affirmed judgments in favor of the plaintiffs in three damage suits of property owners in Union Street for injuries to their property by the construction of a surface railway by the Brooklyn Rapid Transit Company in that street. Work on the Union Street line was begun in 1901, but cars were not placed in operation until May, 1905, on account of injunction suits. Justice Stover in the Supreme Court decided that the company had no right to condemn property for the proposed line. The Court of Appeals, however, ruled that the company had condemnation rights, but that the owners of abutting property were entitled to damages.

**Subway Proposal Submitted in Philadelphia.**—The Philadelphia & Suburban Street Railway formally placed before the Councils of Philadelphia on May 6, 1910, its plans to construct a subway in Broad Street, and the matter has been referred to the street railway committee of the Councils. The offer of the company provides that the city shall receive 10 per cent of the net receipts of the company and that after July 1, 1960, the city shall have the right to purchase the road on the basis of the company's earning power, capitalized at 6 per cent. In return for 10 per cent of the net earnings applicable to dividends the company shall be exempt from payments of any license fee on cars or other equipment, structures or apparatus of any kind owned or operated.

**Important Decision in Crossing Suit in Indiana.**—The Supreme Court of Indiana has decided that an interurban electric railway, with the consent of a town, may lay its tracks along the highway and across a steam railroad and that an injunction will not lie against the interurban railway to prevent a crossing notwithstanding the fact that the steam railroad may own the fee of its right-of-way. The court said that granting the right to an interurban company to use a highway for its tracks is not an additional burden on the fee of a steam railroad which the highway crosses, and held that in view of the fact that the Muncie & Portland Traction Company laid its tracks along the highways before the Pennsylvania Railroad extended its track, the steam railroad must bear the expense of putting in the crossing.

**Little Rock Railway & Electric Company.**—The Little Rock Railway & Electric Company, Little Rock, Ark., is the subject of an interesting article in a recent issue of the *Arkansas Gazette*, which contains brief descriptions of the company's power plant and car house and an outline of the various improvements made by the company to its railway and lighting service in the last two years. Mention is also made of the personnel of the company. Several illustrations are shown of the company's power plant, Forest Park and

scenes along the route. The *Arkansas Gazette* also printed in its issue of April 13, 1910, an editorial entitled "The Car Company Does Its Part," in which the work done by the company in the interest of the public of Little Rock was discussed.

**Maryland Public Utility News.**—James M. Ambler, chairman of the Maryland Public Utilities Commission, and Philip P. Laird, one of the two associate members—the other being Walter W. Abell, who is abroad—have taken up their official work. Attorney-General Straus of Maryland and the commissioners spent several days in going over the law, Mr. Straus, who drew up the measure, explaining its provisions. Appointments have not yet been made to the positions of counsel and assistant counsel to the commission. Attorney-General Straus will probably supply the deficiency until the permanent counsel is selected. One of the first complaints made before the commission was in regard to the alleged practice of the Consolidated Gas, Electric Light & Power Company, Baltimore, Md., in occasionally demanding a meter deposit of \$5. The complainant did not object to the payment, but asked that the company be required to pay interest on the money deposited.

**Lectures at the Massachusetts Institute of Technology.**—The lectures of Prof. Harold Pender for graduate students next year at the Massachusetts Institute of Technology will extend the discussion contained in his advanced lectures of this year on high voltage alternating transmission and the utilization of power. Professor Jackson's lectures for graduate students on the organization and administration of public service companies have this year dealt particularly with questions of value of plant and the like. Next year the lectures will be directed more to the theory which underlies methods of charging for service by public service companies, with particular reference to charges for electric light and power, but with collateral consideration of railroad and tramway charges and charges for gas and the service of other public utilities. Professor Wickenden will originate a course of lectures on illumination, photometry and illuminating engineering which will become a part of the optional curriculum for undergraduate and graduate students. This year the institute will confer for the first time in its history the degree of doctor of engineering.

**Papers Before Pacific Claim Agents' Association.**—Ida P. Newel, secretary-treasurer of the Pacific Claim Agents' Association, who is connected with the Portland Railway, Light & Power Company, Portland, Ore., has made public the following list of papers to be presented at the meeting of the association in San Francisco, Cal. on May 20 and 21: "Investigating, (a) a Report, (b) a Claim," by J. H. Handlon, claim agent for the United Railroads of San Francisco; "What Should be the Relationship between the Claim and Operating Departments?" by E. J. Perrin, claim agent for the San Diego Electric Railway; "What Should be the Relationship Between the Claim and Legal Departments?" by J. N. Faulkner, attorney for the Seattle Electric Company; "What Should be the Relationship Between the Claim and Medical Departments?" by John Ferrin, claim agent for the Oakland Traction Company; "The Organization of a Claim Department," by T. A. Cole, claim agent for the Los Angeles Railway; "The Best Method of Obtaining Additional Witnesses," by H. K. Relf, claim agent for the Spokane, Portland & Seattle Railway; "The Best Way of Handling Blind Cases," by E. H. Odell, claim agent for the Tacoma Railway & Power Company.

## LEGISLATION AFFECTING ELECTRIC RAILWAYS

**Massachusetts.**—At a recent hearing Hollis French, consulting engineer, Boston, argued in favor of definite steps being taken toward the replacement of the steam locomotive by the electric locomotive in Metropolitan Boston and described electrical installations in successful operation in this country and Europe. Special stress was laid upon the danger of making rough estimates for Boston conditions on the basis of New York installation costs. The probable economies of electricity were also reviewed. On May 5 James F. Jackson, former chairman of the Massachusetts Railroad Commission, emphasized that the railroads were tardy in taking up the question at Boston with any promise of early action toward the use of electricity, and contended

that the passage of an appropriate resolve by the Legislature was the initial step necessary to accomplish electric service. Mr. Jackson presented a resolve requiring the railroads to submit the results of a study of electrification at Boston to the joint board of metropolitan improvements by Sept. 1, 1910, and which requires the latter to submit to the Legislature of 1911 the draft of an act which shall provide for the electrification of the railroads within the metropolitan district in a stated time. The proper board or boards are to be empowered to determine the manner in which the work shall be prosecuted.

**New Jersey.**—Since the Legislature adjourned Governor Fort has signed a number of bills affecting electric railways. Among them are Senate Bill 26, which amends the railroad law of 1893 by requiring that annual reports to the Legislature shall be transmitted to the Controller, who, with the Commissioner of Reports, shall designate what portion shall be printed; Senate Bill 27, which adds to the free pass list the members, secretary and inspectors of the new Public Utilities Commission; House Bill 15, which authorizes cities to contract with street railways for the transportation of garbage and ashes; House Bill 277, which makes it a misdemeanor to sell or give away a transfer issued by a street railway. These measures are in addition to the public utilities bill, published in full in the *ELECTRIC RAILWAY JOURNAL* of April 2, 1910, and the measures mentioned in the *ELECTRIC RAILWAY JOURNAL* of April 16, 1910, page 717. The Governor vetoed House Bill No. 348, designed to revive certain franchises granted by municipalities since Jan. 1, 1902, which had not been accepted. He said that the bill violated the principles established by the limited franchise act.

**New York.**—The Legislature has passed a measure providing for a determination by the Appellate Division of the amount of bonds which may be excluded from the debt limit computation of New York City and applied to rapid transit work. The bill was introduced in the Senate on April 29 by the cities committee. On May 2 the first meeting since the introduction of the bill was held. In the meantime several minor amendments had been agreed upon. Through an emergency message from Governor Hughes, the constitutional requirement was obviated which makes it necessary for a bill to remain in its final form on the desks of members for 3 days before passage. Mayor Gaynor of New York has signed the bill. Governor Hughes has signed the bill amending the public service law so as to permit the construction of the proposed experimental moving platform subway under Thirty-fourth Street, New York, N. Y., and authorize the purchase of power by a rapid transit operating company. A clause of the amendment declares that rapid transit easement shall not be considered encumbrances preventing the investment of trust funds in mortgages on the property concerned.

Two workmen's compensation bills, which were introduced by the commission on employers' liability and causes of industrial accidents, unemployment and lack of farm labor on March 21, have been reported favorably by the judiciary committees of both the Senate and Assembly. The first bill applies to a special list of extra-hazardous employments, such as railroading, structural work, electric work, etc. Without taking away any existing rights it would give to a workman injured through the negligence of the employer or any superintendent, foreman or fellow workman, or through a risk of his trade, the right to get half wages from his employer during his disability, up to 8 years. It would give to the dependents of a workman who had been killed the right to a sum from the employer equal to the employee's wages for four years, with a limit of \$3,000. The second bill applies to all employments. It provides certain moderate amendments to the existing employers' liability law, and permits employers and employees to make a contract by which the employee gives up his uncertain right to sue for damages in cases where he can prove negligence, in return for a certainty of compensation for all accidents of employment according to the same rates mentioned above, i. e., half wages for disability, three years' wages for death. On May 10, Assemblyman Parker's public service law amendments bill was further amended in the Senate so as to give the Public Service Commissions power to regulate commutation and mileage rates on railroads.

# Financial and Corporate

## New York Stock and Money Market

May 10, 1910.

The tone of the stock market improved during the past week and prices have almost recovered the losses sustained in the recent slump. Trading, however, continues to be dull and is still confined largely to professionals. The investing public is not in the market, a fact especially noticeable in the market for bonds, for which the demand is very light. The shares of the Interborough Rapid Transit Company are active, and prices, especially for the preferred stock, are stronger.

The money market is little changed. Quotations are a trifle easier than during the previous week and banks are sufficiently supplied with funds for all present needs. Rates to-day were: Call, 3 to 4 per cent; 90 days, 4 per cent.

### Other Markets

Both Philadelphia Rapid Transit and Union Traction have advanced several points, the selling pressure having been relieved.

In Boston, Massachusetts Electric and Boston Elevated prices have advanced to some extent. Other tractions are quiet.

There has been some trading in Metropolitan Elevated in the Chicago market during the week, and both issues, especially the common, are stronger in price. A few shares of Chicago Railways Series 2 have been sold at about 28 1/4.

In the Baltimore market there has been less trading in the bonds of the United Railways Company than usual, but there have been some transactions almost every day in the stock. The sales of the latter have been around 13 1/4.

Quotations of various traction securities as compared with last week follow:

	May 3.	May 10.
American Railways Company.....	445 1/4	445 1/4
Aurora, Elgin & Chicago Railroad (common).....	*57 3/4	*57 3/4
Aurora, Elgin & Chicago Railroad (preferred).....	*94 1/4	*94 1/4
Boston Elevated Railway.....	126	127 1/2
Boston & Suburban Electric Companies.....	*16	*16
Boston & Suburban Electric Companies (preferred).....	*73	*75
Boston & Worcester Electric Companies (common).....	110 1/2	110 1/2
Boston & Worcester Electric Companies (preferred).....	444	443
Brooklyn Rapid Transit Company.....	74 3/8	79 3/8
Brooklyn Rapid Transit Company, 1st pref. conv. 4s.....	82 3/4	84 3/4
Capital Traction Company, Washington.....	1132	1131
Chicago City Railway.....	1195	1195
Chicago & Oak Park Elevated Railroad (common).....	*3 1/4	*3 1/4
Chicago & Oak Park Elevated Railroad (preferred).....	*7 1/2	*7 1/2
Chicago Railways, pteptg., ctf. 1.....	1100	1099
Chicago Railways, pteptg., ctf. 2.....	129	128 3/4
Chicago Railways, pteptg., ctf. 3.....	113	113
Chicago Railways, pteptg., ctf. 4s.....	127 1/4	128
Cleveland Railways.....	*91 1/2	*91 1/2
Consolidated Traction of New Jersey.....	176	176
Consolidated Traction of New Jersey, 5 per cent bonds.....	1104 1/2	1104 1/2
Detroit United Railway.....	59 1/2	*59 1/2
General Electric Company.....	146	149
Georgia Railway & Electric Company (common).....	1115	1112
Georgia Railway & Electric Company (preferred).....	187	187
Interborough-Metropolitan Company (common).....	19 1/8	21 3/8
Interborough-Metropolitan Company (preferred).....	51	56 3/8
Interborough-Metropolitan Company (4 1/2s).....	79 3/8	*79 3/8
Kansas City Railway & Light Company (common).....	*31	32 1/8
Kansas City Railway & Light Company (preferred).....	*77 3/8	*77 3/8
Manhattan Railway.....	132	136
Massachusetts Electric Companies (common).....	16 3/8	118 1/2
Massachusetts Electric Companies (preferred).....	188	186
Metropolitan West Side, Chicago (common).....	116 1/2	117
Metropolitan West Side, Chicago (preferred).....	156	158
Metropolitan Street Railway.....	*15	*15
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	70 3/8	73 3/4
Northwestern Elevated Railroad (common).....	118	118
Northwestern Elevated Railroad (preferred).....	170	170
Philadelphia Company, Pittsburg (common).....	149 1/2	149 1/2
Philadelphia Company, Pittsburg (preferred).....	143 1/2	144
Philadelphia Rapid Transit Company.....	116 1/2	119 3/8
Philadelphia Traction Company.....	185	185 1/4
Public Service Corporation, 5 per cent col. notes.....	*96 1/2	*96 1/2
Public Service Corporation, ctf. 5.....	1103 1/2	1102 1/2
Seattle Electric Company (common).....	*115	*113 1/2
Seattle Electric Company (preferred).....	103	103
South Side Elevated Railroad (Chicago).....	*53 1/2	58 1/2
Third Avenue Railroad, New York.....	6	7
Toledo Railways & Light Company.....	9	9 3/8
Twin City Rapid Transit, Minneapolis (common).....	112 1/2	112 3/4
Union Traction Company, Philadelphia.....	144	148 1/2
United Rys. & Electric Company, Baltimore.....	*12 1/4	*12 1/4
United Rys. Inv. Co. (common).....	*37	*37
United Rys. Inv. Co. (preferred).....	*65	*65
Washington Ry. & Electric Company (common).....	137	136 1/2
Washington Ry. Electric Company (preferred).....	101	101 1/2
West End Street Railway, Boston (common).....	127 1/2	128 1/2
West End Street Railway, Boston (preferred).....	1101 1/4	1102 1/4
Westinghouse Elec. & Mfg. Company.....	62	65
Westinghouse Elec. & Mfg. Company (1st pref.).....	*125	*125

a Asked. \* Last Sale.

## Report of J. G. White & Company, Inc.

The report of J. G. White & Company, Inc., New York, N. Y., for the year ended Feb. 28, 1910, showed an increase in the surplus from \$388,406 to \$391,394. In his report President White says in part:

"It is pleasing to note that your company is acting as designing and supervising engineers for important work in Canada, amounting to several millions of dollars, receiving satisfactory fees and doing the work, as we believe, in a very efficient manner and with entire satisfaction to our clients. At present not only has your company no contracts on other than cost plus a fee basis, but none of our subsidiary or affiliated companies has any fixed price contracts.

"Your branch office, at San Francisco, established something more than a year ago, has not only been more than self-maintaining, but has assisted in securing important engineering and construction works now in progress. During the year a branch office was established at Chicago, and this has already proved to be more than self-maintaining.

"In addition to important steam railroad, steam power plant, street railway, gas and other varied work, your company is carrying out an exceptionally large number of important hydroelectric and irrigation developments. In these lines of work we now have an unusually large and experienced staff of engineers and construction men. Believing that much rich land in the United States will be reclaimed by drainage during the next decade, we have arranged to have a special engineering division for this work, equal to any in the country. Increased attention is also being given to industrial engineering. Your company has never had more desirable business in prospect than at present."

The balance sheet follows:

ASSETS.	
Good Will, Purchase of Business, etc.....	\$1,499,037.46
Uncompleted Contracts and Undertakings at Cost.....	331,160.45
Securities Owned and Syndicate Participations.....	1,765,816.19
Bills Receivable.....	54,516.09
Accounts Receivable.....	444,660.06
Interest and Dividends Accrued.....	7,361.58
Working Capital at Construction and Branch Offices (Net).....	42,604.61
Cash in Banks and in Office.....	302,181.59
	<hr/> \$4,447,347.03
LIABILITIES.	
Capital Issued:	
15,000 Shares of Common Stock.....	\$1,500,000.00
20,000 Shares of 6% Cumulative Preferred Stock.....	2,000,000.00
Bills Payable.....	400,855.00
Accounts Payable.....	125,097.88
Sundry Stockholders for Dividend on 6% Cumulative Preferred Stock, Payable May 1, 1910.....	30,000.00
Surplus or Undivided Profits.....	391,394.15
	<hr/> \$4,447,347.03

**Belton & Temple Traction Company, Belton, Tex.**—The property of the Belton & Temple Traction Company was sold under foreclosure at Waco, Tex., on May 3, 1910, by W. G. Haag, as special master, to Messrs Little and Ahrens, for \$25,000.

**Camden & Trenton Railway, Trenton, N. J.**—Chancellor Pitney, Trenton, N. J., has directed that the property of the Camden & Trenton Railway be turned over by Receiver Sadler to Frysinger Evans, Eugene A. Martin and Charles R. Rens, who purchased the property at the foreclosure sale. Messrs. Frysinger, Evans and Martin are reported to have acted in the interest of the Public Service Corporation of New Jersey.

**Consolidated Railway & Power Company, Fayetteville, N. C.**—The property of the Consolidated Railway & Power Company has been sold under foreclosure for \$67,000 to Mrs. Mary M. B. MacRae, Fayetteville, representing the estate of the late S. H. MacRae.

**Eastern Ohio Traction Company, Cleveland, Ohio.**—The eastern division of the Eastern Ohio Traction Company's lines, which extends from Lee and Wayfield roads, Cuyahoga County, Ohio, to Middlefield and Chardon, Geauga County, will be sold at public auction at the office of R. D. Beatty, the receiver of the company, Electric Building, Cleveland, Ohio, on June 10, 1910. The appraised value of the property is \$1,130,000, and no bid for less than \$750,000 will be received.

**Fairmont & Clarksburg Traction Company, Fairmont, W. Va.**—The Fairmont & Clarksburg Traction Company

has offered for sale at 76½ to residents of the towns through which it operates \$400,000 of preferred stock of the company.

**Forty-Second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.**—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad under foreclosure has been further postponed by Judge Lacombe of the United States Circuit Court from May 16, 1910, to June 6, 1910. In the petition asking for the order of the court it is set forth that bonds to the amount of \$1,460,000 secured by a mortgage of the company's property were sold under the decree of foreclosure of the property of the Third Avenue Railroad and that the plans of reorganization of that company under consideration by the Public Service Commission will take a little more time, and the best interests of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad will be conserved by the adjournment asked for.

**Hartford & Springfield Street Railway, Hartford, Conn.**—The directors of the Hartford & Springfield Street Railway have declared a semi-annual dividend of 1 per cent on the preferred stock of the company. This is the first dividend paid by the company since Nov. 1, 1907.

**Interstate Railways, Philadelphia, Pa.**—John A. Rigg, president of the Interstate Railways, has announced that the proposed issue of preferred stock by the company has been found to be impracticable because so large a proportion of the bonds is held by trustees who cannot legally accept the proposed stock in payment of interest on their securities, and that the contemplated plan of issuing the preferred stock has therefore been abandoned. The company deems it to the best interest of all parties concerned to consummate the Earle plan and the holders of bonds outstanding are recommended to deposit their bonds without further delay in order that the plan may be declared operative. The company is said to have arranged to lease the property of the Wilmington & Chester Traction Company and the Chester Traction Company to J. G. White & Company, Inc., New York, N. Y.

**North Jersey Rapid Transit Company, Paterson, N. J.**—The North Jersey Rapid Transit Company has filed at Trenton, N. J., an amendment to its articles of incorporation increasing the capital stock of the company from \$1,000,000 to \$2,000,000.

**Northern Texas Electric Company, Fort Worth, Tex.**—Estabrook & Company, Boston and New York, and Parkinson & Burr, Boston and New York, offer for subscription at 96 and interest the unsold portion of \$1,100,000 of the present issue of \$1,500,000 of collateral trust 5 per cent gold sinking fund bonds of the Northern Texas Electric Company, dated Jan. 1, 1910, and due Jan. 1, 1940, but callable as a whole or in part for sinking fund purposes only at 105 and interest on any interest date. The Commonwealth Trust Company, Boston, Mass., is trustee of the issue. The Northern Texas Electric Company owns 28,991 shares out of the issue of 29,000 shares of stock of the Northern Texas Traction Company.

**Philadelphia (Pa.) Rapid Transit Company.**—On May 5, 1910, the Common Council of Philadelphia and the Select Council authorized the Philadelphia Rapid Transit Company to borrow \$2,500,000 and to issue car trust certificates. It is stated that the company will now be able to make a car trust loan on account of the purchase of new rolling stock to cost about \$1,079,500. Bioren & Company, Philadelphia, in a circular which they issued on May 7, 1910, referred to the decline in the shares of Union Traction Company and Philadelphia Rapid Transit Company stock due to the labor troubles of the Philadelphia Rapid Transit Company, a certain persistent journalistic attack and the general decline in the stock market. They say in part: "The actual capital placed in the various street railway properties of this system during some 60 years of operation, with interest thereon when no dividends have been paid, receives an average return of but a fraction over 6 per cent. This fact is not generally known, else it would seem that attacks based on alleged large returns on invested capital would be discontinued."

**Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil.**—The Sao Paulo Tramway, Light & Power

Company reports earnings as follows for the year ended Dec. 31, 1909: Gross receipts, \$2,439,486, as compared with \$2,287,411 for 1908; operating expenses, \$846,627, as compared with \$783,051 for 1908; charges, \$371,986, as compared with \$365,468 for 1908; surplus, \$1,220,873, as compared with \$1,138,892 for 1908; dividends and construction accounts, \$1,128,867, as compared with \$1,136,538 for 1908; surplus, \$92,005, as compared with \$2,354 for 1908.

**San Francisco, Vallejo & Napa Valley Railway, Napa, Cal.**—Ralph W. Boyer, Milford, Mass., has asked that a receiver be appointed for the San Francisco, Vallejo & Napa Valley Railway. He alleges that the proceeds of an issue of bonds which were placed to extend the road from Napa to Calistoga were misused.

**Trenton & New Brunswick Railroad, Trenton, N. J.**—Irwin Shupp, Jr., and Charles Sinnickson, Philadelphia, Pa., acting for the bondholders of the Trenton & New Brunswick Railroad, purchased the property of the company on May 4, 1910, for \$200,000 at the sale conducted by Frank S. Katbenbach, Jr., acting as master in chancery.

**Union Traction Company of Kansas, Independence, Kan.**—The Board of Railroad Commissioners of Kansas has approved an issue of \$150,000 of bonds by the Union Traction Company, of Kansas, for improvements to the inter-urban railway of the company in Montgomery County. Bert Clark & Company, Chicago, Ill., offer at 96¼ and interest the unsold portion of \$150,000 of first mortgage 5 per cent bonds of the company of 1907, of which \$650,000 are outstanding.

**United Railways Investment Company, San Francisco, Cal.**—At the annual meeting of the United Railways Investment Company stockholders approved the plan to issue \$6,000,000 of 6 per cent 20-year convertible bonds, subject to redemption at 105 on any semi-annual interest date, on 60 days' notice, the bonds to be convertible at par at the option of the holder into common stock at par, after a date, to be fixed by the board, but not within two years of date of issue. The proposal to increase the capital stock from \$50,000,000 to \$56,000,000 was also approved. This increase will all be in common stock and will be reserved in the treasury of the company to be issued on demand to holders of the above-mentioned bonds in accordance with the terms imposed. A further resolution was adopted directing that full power be conferred on the board of directors to utilize a portion of the authorized but unissued preferred stock of the company at par for payment or adjustment of arrears of dividends on the outstanding preferred stock. On any shares of the preferred thus issued dividends will accrue from April 1 or Oct. 1 next ensuing from the date of issue. The directors were re-elected.

**Wilkes-Barre & Wyoming Valley Traction Company, Wilkes-Barre, Pa.**—F. M. Kirby and Abram Nesbitt have been elected directors of the Wilkes-Barre & Wyoming Valley Traction Company.

**Youngstown & Sharon Railway & Light Company, Youngstown, Ohio.**—Hearings were begun on April 27, 1910, before D. Cady Herrick, New York, N. Y., as referee, in an action against the New York Trust Company as successor to the New York Security & Trust Company, in which E. Clarence Jones seeks an accounting in behalf of the stockholders of the Mahoning Valley Railway, which has been merged with the Youngstown & Sharon Railway & Light Company.

A feature at Willow Grove Park, Philadelphia, in the summer each year is the appearance of celebrated bands and orchestras. The attractions this year include Patrick Conway's Band from May 28 to June 18; Fred A. Stock with the Theodore Thomas Orchestra of Chicago from June 19 to July 9; Victor Herbert and orchestra from July 10 to Aug. 13; and John Philip Sousa and band from Aug. 14 to Sept. 5. The Philadelphia Rapid Transit Company has issued a special folder about the musical attractions at the park in which is included a short history of the development of music in Philadelphia from Colonial days up to the present time. Portraits are reproduced of the musical conductors who will appear in the park during the summer of 1910 and of celebrities who have appeared before audiences in Philadelphia at various times.

## Traffic and Transportation

### Recent Advertising of the Twin City Rapid Transit Company

The Twin City Rapid Transit Company, Minneapolis and St. Paul, has issued two attractive advertising folders. The larger of the folders is entitled "How to See the Twin Cities, Minneapolis-St. Paul, on Electric Cars." The smaller folder is devoted to the Minnetonka Lake resorts reached by the cars and steamers of the Twin City Rapid Transit Company and allied lines. Neither of the publications contains a timetable; it has rather been the plan to present useful information about each of the many picturesque places to which service is given.

The folder, "How to See the Twin Cities," is printed in two colors, with cover designs in four colors. The front cover design is a bird's-eye view of the Twin Cities located on the Mississippi River and surrounded by the numerous lakes for which the district is famous. The back cover, also an original design, shows Minneapolis and St. Paul with arms extended to greet visitors. In the background are Minneapolis, the Mississippi River and St. Paul. Below this is a view in which a passenger car is shown standing on tracks close to a dock to which one of the Twin City steamers is approaching.

The 48 reading pages of the folder are 8 in. x 9 in. in size, and contain 69 halftone views of resorts and scenic features. In addition there are several maps which show the shore line and electric roads to prominent lake and park resorts. The center piece of the folder is a four-color bird's-eye view map, showing Lake Minnetonka on the west, Minneapolis and St. Paul near the center and White Bear Lake and Stillwater on the north and east, representing a distance from east to west of 48 miles and from north to south of 16 miles. Clearly indicated on the map by red lines is the entire trackage of 373 miles of the Twin City Rapid Transit Company. The reading matter is so grouped as to present the attractive features and data about each of the notable lakes, parks, falls, mounds and other points of interest to sightseers who may visit the Twin City district.

The folders are being distributed at hotels, stations, etc., and by mail. The excursion and tourist season begins on May 15 and ends on Oct. 15. For four weeks previous to May 15 the passenger department of the Twin City Rapid Transit Company advertised in all the daily papers of Minneapolis and St. Paul and called attention to the new folder, stating that a copy would be mailed to any address on receipt of 4 cents in stamps to cover the cost of mailing. Between 50 and 150 replies a day were received from a widespread territory. A special envelope which exhibits a modest advertisement is used to enclose the folder when it is mailed. In addition to the means of distributing the folders previously mentioned they are placed in every folder rack in the Twin Cities and are circulated by the steam railroads which reach Minneapolis and St. Paul. The preparation, publication and distribution of the publicity matter of the Twin City Rapid Transit Company are in charge of A. W. Warnock, general passenger agent of the company.

### Abandonment of Unsuccessful Line Approved by Commission

The Public Service Commission of the Second District of New York has approved the declaration of abandonment by the Port Jervis Traction Company of that part of its railway in Port Jervis known as the Kingston Avenue branch and has authorized the company to extend its line from Port Jervis to Sparrowbush.

On the question of abandonment the commission says that the railway now owned by the company has not been operated successfully either actually or financially during its entire history; that the Kingston Avenue branch has not yielded returns above operating expenses; that to restore the branch to proper operating conditions would involve the expenditure of approximately \$14,000, and that while under the manner and methods of operation in recent years the service and accommodations afforded to the public on the branch have been wholly inadequate and frequently have ceased altogether to permit the making of car repairs, and

statistics showing the patronage of the branch when in fair physical condition with good equipment and regular service were lacking in the case, nevertheless the character of the branch itself is not such as would warrant any other expectation than that the branch would, if operated, result in considerable loss of revenue and constitute a serious burden upon the finances of the company.

The commission is also of the opinion that the street railway in Port Jervis must continue to be operated with small patronage, and it is essential to the furnishing of satisfactory accommodation and good service to the public that the company be enabled in all reasonable ways to secure a sufficient amount of gross revenue.

The commission has given full weight and consideration to the interests of residents along and near the branch in the retention of the line and its restoration to a state of adequate accommodation and service, and recognizes that considerable disadvantage would be entailed upon residents by its abandonment. The commission is more strongly impressed, however, by the small amount of traffic which originates in certain parts of the city of Port Jervis, and recognizes that if Port Jervis is to have continued adequate trolley service, the operation of cars must be restricted for a considerable time at least to those portions of the city and vicinity which are likely to afford profits from operation. The commission has also taken into account the extension of the company's line to Sparrowbush for the purpose of adding to the company's revenue and affording an additional required service, and the further fact that the company cannot expect, in view of the general situation of its property and finances, to market bonds in excess of its present issue at this time except at a ruinously low price.

### New Haven Railroad Increase Commutation Over Electrified Lines

The New York, New Haven & Hartford Railroad filed with the Interstate Commerce Commission at Washington, D. C., on May 2, 1910, certain changes in the rates for transporting passengers over its lines which affect more particularly the patrons of the electrified lines of the company who commute between New York and nearby towns and villages. The new schedule will go into effect on June 1, 1910, and will abolish the gradually decreasing commutation scale and place all commutation tickets on a flat rate basis. The following comparative table has been prepared to show the present monthly commutation rate, the new rate and the distance between stations of the company out of New York as far as New Haven:

Station.	Present rate.	New rate.	Miles.
Mount Vernon .....	\$5.60	\$6.75	13.7
Pelham .....	5.85	7.05	15.0
New Rochelle.....	6.35	7.65	16.5
Larchmont .....	6.75	8.10	18.7
Mamaroneck .....	7.00	8.40	20.2
Harrison .....	7.50	9.00	22.2
Rye .....	8.00	9.60	24.0
Port Chester.....	8.25	9.90	25.7
Greenwich .....	8.50	10.20	28.2
Cos Cob.....	8.55	10.30	30.0
Riverside .....	8.65	10.40	30.2
Sound Beach.....	8.75	10.50	31.5
Stamford .....	9.00	10.80	33.5
New Canaan.....	10.30	12.40	41.2
Noroton .....	9.35	11.25	37.0
Darien .....	9.50	11.45	37.0
South Norwalk.....	10.40	12.50	41.5
Bridgeport .....	12.75	16.80	56.0
New Haven.....	16.00	22.00	73.2

Increases in the rates of fare between New York and suburban stations on the New York Central & Hudson River Railroad, the Erie Railroad, the Delaware, Lackawanna & Western Railroad and the Central Railroad of New Jersey are also said to be contemplated. The Long Island Railroad will charge commuters over its lines out of New York 95 cents more a month as soon as service is begun under the East River to the terminal of the Pennsylvania Railroad at Seventh Avenue and Thirty-third Street, New York.

A delegation of persons along the New York, New Haven & Hartford Railroad within 25 miles of New York who would be affected adversely by the increase in rates proposed by the New York, New Haven & Hartford Railroad visited Albany on May 10, 1910, to protest to Governor Hughes of New York against the increase. They said that the new rates would impose a serious burden



upon many persons who had bought homes in the suburbs under the impression that the rates in force would be permanent. Real estate values would suffer, and incalculable loss would result to the merchants in towns and villages, as development would be arrested. The Governor was asked to send a special message to the Legislature urging the enactment of an amendment to the Public Service Commissions law which would give the commissions power to consider complaints regarding commutation, family and mileage rates of fare over steam railroads.

**Long Trip by Trolley.**—A start was made on May 10, 1910, on the trip by trolley from Utica, N. Y., to Indianapolis, Louisville, Toledo, Detroit and Cleveland, which was planned by business men of Utica and vicinity. The itinerary of the trip and a map of the route to be traversed were published in the *ELECTRIC RAILWAY JOURNAL* of March 12, 1910, page 461.

**Monthly Bulletin in Indiana.**—The first monthly bulletin of the Indiana Railroad Commission will soon be issued. The purpose of the bulletin is to report changes in railway freight tariffs. The bulletin will show a number of changes in freight rates on steam railroads, but none on the interurban electric railways. The interurban railways are not required to file freight tariffs with the commission until their freight earnings equal  $33\frac{1}{3}$  of their gross earnings.

**Precautions Against Accidents in Pennsylvania.**—In response to the request of the State Railroad Commission of Pennsylvania, a majority of the electric railways in that State have informed the commission that the recent order that before a car crosses a railroad track the conductor must go forward and see that no train is approaching has been observed by many companies for years. Reports made to the commission by the electric railways show that in the first three months of 1910 there were 35 fatalities on the electric railways. In the same period 942 persons were injured on electric railways. The figures showing fatalities are higher than for the corresponding period in 1909, as 236 persons were killed on steam roads and 36 persons on the electric railways. The increase in the number of persons injured on the electric railways was 225 for the quarter ended March 31, 1910.

**Increase in Wages in Syracuse and Utica.**—The Syracuse (N. Y.) Rapid Transit Company has increased the wages of its employees as follows, effective on May 1, 1910: First 6 months,  $21\frac{1}{2}$  cents an hour; second 6 months,  $23\frac{1}{2}$  cents per hour; after 1 year,  $25\frac{1}{2}$  cents per hour. The Utica & Mohawk Valley Railway, Utica, N. Y., increases the wages of its employees as follows, effective on May 1, 1910: First 6 months,  $21\frac{1}{2}$  cents per hour; second 6 months,  $23\frac{1}{2}$  cents per hour; after 1 year,  $25\frac{1}{2}$  cents per hour; interurban work,  $27\frac{1}{2}$  cents per hour. C. Loomis Allen, who is vice-president and general manager of both companies, in announcing the increase made public a statement in which he said: "I know our men appreciate the manner in which the company has treated them. Our idea is to pay well and attract the services of a high class of men. We want to get the most efficient and careful service and we are willing to pay what it is worth. We have confidence in our men and they have confidence that we will always do as well by them as we can."

**No-Seat-No-Fare Ordinance Defeated.**—The proposal to incorporate a no-seat-no-fare clause in the proposed traffic law of Norfolk, Va., was defeated when the traffic law was considered before the ordinance committee of the Council of Norfolk. John Blair MacAfee, president of the Norfolk & Portsmouth Traction Company, was the principal speaker in opposition to the no-seat-no-fare feature of the code. Mr. MacAfee reviewed the failure that followed previous legislation which sought to enforce a no-seat-no-fare provision, and referred particularly to the recent fiasco in Trenton, of which mention was made in the *ELECTRIC RAILWAY JOURNAL* of April 23, 1910, pages 727 and 761. Section 11 of the ordinance was finally amended so as to strike out all reference to the no-seat-no-fare clause. Section 12 was amended so as to provide that cars of electric railways shall not be operated over street crossings at a speed of more than 6 m.p.h. and that the speed of cars shall not exceed 15 m.p.h. on streets south of Queen Street. Another amendment gives pedestrians the right of way over electric cars.

## Personal Mention

**Mr. Guy W. Talbot**, vice-president and general manager of the Oregon Electric Railway, Portland, Ore., has been elected president of the Portland Gas & Coke Company, Portland, Ore., and a director of the company.

**Mr. C. F. Uebelacher**, chief engineer of Ford, Bacon & Davis, has been representing the Northwestern Elevated Railroad of Chicago in the conferences in that city on the proposed modification of union elevated loops.

**Mr. Bernard Corrigan**, who retired lately as president of the Kansas City Railway & Light Company, Kansas City, Mo., was recently presented with a set of library furniture by the employees of the company as a token of their esteem.

**Mr. Robert Morrison, Jr.**, secretary of the Michigan United Railways, Jackson, Mich., for the last four years, has been elected treasurer of the company to succeed Mr. Pomeroy Ladue, resigned, and the offices of the secretary and treasurer will be combined.

**Mr. W. C. Cuntz**, general manager of the Goldschmidt Thermit Company, is one of the nine delegates appointed to represent the United States Government at the International Railway Congress in Berne, Switzerland, this summer. Mr. Cuntz sailed for Europe on May 10 to attend this congress.

**Mr. Walter I. Slichter**, who has been connected with the General Electric Company for the past 14 years, and is now electrical engineer at the Schenectady office, has been appointed professor of electrical engineering at Columbia University, from which he graduated in 1896. Mr. Slichter has been a full member of the American Institute of Electrical Engineers since 1903.

**Mr. C. R. Gowan** has been appointed general passenger agent of the Syracuse (N. Y.) Rapid Transit Company, Utica & Mohawk Valley Railway, Utica, N. Y., and the Oneida (N. Y.) Railway, to succeed Mr. Albert E. Eastman, who resigned recently as general express and passenger agent of these companies to become general manager of the Windsor, Essex & Lake Shore Rapid Transit Railway, Windsor, Ont.

**Mr. F. W. Watts** has been appointed general express agent of Syracuse (N. Y.) Rapid Transit Company, the Utica & Mohawk Valley Railway, Utica, N. Y., and the Oneida (N. Y.) Railway, to succeed Mr. Albert E. Eastman, who resigned recently as general express and passenger agent of these companies to become general manager of the Windsor, Essex & Lake Shore Rapid Transit Railway, Windsor, Ont. Mr. Watts was formerly division express agent of this company.

**Mr. W. W. Wheatly** has resigned as general manager of the railway department of the Kansas City Railway & Light Company, Kansas City, Mo., but expects to remain in Kansas City until July 1, 1910. Mr. Wheatly has been connected with the Kansas City Railway & Light Company since November, 1908, when he succeeded Mr. Charles N. Black, who is now general manager of the United Railroads of San Francisco. Mr. Wheatly was formerly connected with the Public Service Corporation of New Jersey and Brooklyn Rapid Transit Company, and accepted the management of the Mexico Electric Tramway, Ltd., Mexico City, Mex., at the solicitation of Werhner, Beit & Company, London, Eng. After serving as manager of the Mexico Electric Tramway for about two years he was elected president of the company. Mr. Wheatly remained in Mexico about a year after resigning from the Mexico Electric Tramway to look after his private interests, he being a director of the Mexico City Bank, the American Banking Company of Guadalajara and several other companies.

**Mr. Lee Massengale**, vice-president and general manager of the Iola (Kan.) Electric Railroad, whose appointment as general manager of the Lake View Traction Company, Memphis, Tenn., was announced recently in the *ELECTRIC RAILWAY JOURNAL*, was born at Denton, Tex., on July 6, 1865. He has been connected with steam and electric railways since 1883. His first position was in the shops of the Iron Mountain Railroad at Little Rock, Ark., where he served an apprenticeship of  $2\frac{1}{2}$  years as machinist. Sub-

sequently he became a fireman with the Iron Mountain Railroad. In 1885 Mr. Massengale entered the employ of the Lindell Railroad, St. Louis, Mo., and assisted in the experiment which was made of equipping one of the cars of the company with storage batteries. From 1887 until 1889 Mr. Massengale was connected with steam railroads. In the latter year, however, he returned to the Lindell Railroad in connection with the installation of the Sprague system, and subsequently became master mechanic of the company. In 1900 Mr. Massengale was appointed master mechanic of the United Railways of St. Louis, which took over all the lines in St. Louis except the St. Louis & Suburban Railway. In 1894 Mr. Massengale accepted the position of master mechanic of the East St. Louis & Suburban Railway, but resigned from the company in 1906 to become general manager of the Iola Electric Railway. On April 4, 1910, he was elected vice-president and general manager of the Iola Electric Railroad. These offices he now holds in addition to the position of general manager of the Lake View Traction Company.

### OBITUARY

**John H. Converse**, president of the Baldwin Locomotive Works, is dead. Mr. Converse was 69 years old. He was born in Burlington, Vt., in 1840, and was graduated from the University of Vermont in 1861. He first turned his attention to newspaper work, being employed for 3 years as editorial writer on Burlington Times. He then went to Chicago, where he was engaged in railroad work for 2 years. In 1870 Mr. Converse became connected with the Baldwin Locomotive Works. Three years later he was made a member of the firm, and subsequently was entrusted with the general business and financial management of the company.

**Walter C. Kerr**, president of Westinghouse, Church, Kerr & Company, died at Rochester, Minn., May 8. On March 1 Mr. Kerr went to Rochester for treatment by the Doctors Mayo, surgeons of international reputation, who found that an operation for cancer was imperative. The operation was successfully performed, convalescence was apparently rapid, but finally complications ensued which were the immediate cause of death. Mr. Kerr was born at St. Peter, Minn., Nov. 8, 1858, the son of Rev. Aaron H. Kerr, a Presbyterian clergyman, and chaplain during the Civil War. He received his primary education in the public schools of St. Peter, and entered the mechanical engineering course at Cornell University, from which he was graduated in 1879. He remained at Ithaca as an instructor in Sibley College for a year, and assistant professor until 1883, when he resigned to join the Westinghouse Machine Company. From salesman he was promoted to manager of the company's New York office, and in 1884 became one of the organizers of the present firm of Westinghouse, Church, Kerr & Company, in which he first held the office of treasurer, later that of vice-president, and became president about 15 years ago. At one time he was vice-president of the Westinghouse Machine Company, and at the time of his death was a director in the Electric Properties Company, and in the Lackawanna & Wyoming Valley Rapid Transit Company. Mr. Kerr was a trustee of Cornell University for the past 20 years, and has always taken the warmest interest in Sibley College, which is much indebted to him, both as an adviser and as a liberal donor. He was a member of the American Institute of Electrical Engineers, American Society of Mechanical Engineers, Canadian Society of Civil Engineers, Franklin Institute, Lawyers' Club, Engineers' Club, New York Railroad Club, Psi Epsilon Club, Duquesne Club of Pittsburgh and the Richmond County Country Club. Mr. Kerr was a man of high ideals, both in his business and professional life and in his work as an educator. His temperament was such that he attracted all with whom he came in contact and he had a wonderful fund of information on all the broad affairs of life as well as an intimate knowledge of many special subjects. Early in his career he conceived the idea that engineering could be highly organized, and the masterly manner in which he developed this thought is evident from the statement that his company's present organization comprises, in round numbers, 500 office engineers, 700 engineers in the field and a total of 8000 men employed on various engineering works.

## Construction News

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

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

### RECENT INCORPORATIONS

**\*Dauphin Island Railway & Harbor Company, Mobile, Ala.**—Incorporated in Alabama in the interests of the Tidewater Company which proposes to build an interurban railway from Gadsden to Tuscaloosa, via Birmingham, the same to be extended by water and otherwise to Dauphin Island. Capital stock, preliminary, \$3,000. Principal office, Birmingham. Officers and incorporators: George T. Bishop, Cleveland, Ohio, president and treasurer; F. F. Graves, Chicago, Ill., vice-president; J. M. Dewberry, Birmingham, secretary; Frank H. Ginn, Cleveland, and D. E. Mitchell, Lebanon, Tenn.

**\*Marysville & Colusa Railway, Colusa, Cal.**—Application for a charter has been made in California by this company which is affiliated with the Northern Electric Railway, Chico, to build a 30-mile railway from Marysville to Colusa, via Yuba City. Capital stock, \$1,500,000. Directors: Charles H. Hammon, Leon J. de Sabla, Samuel Lilienthal, George E. Springer and Herbert W. Furlong.

**\*Marion (Ill.) Railroad.**—Incorporated for the purpose of building an electric railway from Marion to Johnson City. Incorporators: A. E. Harper, William D. Haynie, E. J. Hughes, L. D. Doty and C. A. Brickett, all of Chicago.

**\*Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.**—Incorporated in Indiana to build an electric railway from Vincennes to Loogootee. Capital stock, \$100,000. Incorporators: Joseph L. Ebner, Vincennes; Elmer J. Binford, Greenfield; John B. Seal, Loogootee; Austin F. Cabel, S. C. Eskridge and A. J. Padgett, Washington.

**Sioux City & Eastern Interurban Railway, Sioux City, Ia.**—Incorporated in Iowa to build an electric railway through Battle Creek, Climbing Hill and Ida Grove. Capital stock, \$100,000. W. L. Harding, attorney. [E. R. J., Aug. 14, '09.]

**Scranton & Lake Ariel Railway, Scranton, Pa.**—Application for a charter will be made in Pennsylvania by this company on May 23 to build an electric railway between Scranton and Lake Ariel. Incorporators: John J. Brown, Valentine Bliss, W. J. Davis, John J. Holland, F. W. Wolterton, E. J. Lynett and A. G. Rutherford. [E. R. J., June 26, '09.]

**\*Walla Walla Valley Railway, Walla Walla, Wash.**—Incorporated in Washington to construct railways in and adjacent to Walla Walla, interurban line, and in Umatilla County, also to Milton, Ore. Capital stock, \$500,000. Incorporators: Lewis A. McArthur, R. D. Greer and E. D. Hanna.

### FRANCHISES

**Riverside, Cal.**—J. B. Jackson, who is said to represent the San Joaquin Valley Electric Railway, has applied to the supervisors for a franchise to build a 25-mile railway to connect Moreno, Lakeview, San Jacinto, Hemet and Florida. [E. R. J., April 30, '10.]

**Golden, Colo.**—Rees C. Vidler has been granted a franchise to build a railway from Golden to the foot of Lookout Mountain, from which point a cable line is to be built to the summit. [E. R. J., April 23, '10.]

**Harvey, Ill.**—The Eastern Illinois Railway, a subsidiary of the Chicago City & Connecting Railways has asked the City Council for a franchise to build a railway in Harvey. This line will connect West Hammond, Harvey, Burnham, Hegewisch and Riverdale.

**Joliet, Ill.**—The Joliet & Southern Traction Company has asked the Council for a new franchise on Jackson Street extending from the city limits over the new Jackson Street viaduct and connecting with several streets in Ridgewood.

**Minooka, Ill.**—The Chicago, Ottawa & Peoria Railway, La Salle, has been granted a franchise by the Council to build a railway in Minooka. This is part of the plan to build a 22-mile extension from Morris to Joliet.

**\*Frankfort, Ind.**—Robert Wood, Chicago, Ill., is asking the

Commissioners of Cass, Carroll and Clinton Counties for franchises to build an electric railway from Logansport to Burlington and thence by way of Michigan City to Frankfort. The company represented by Mr. Wood promises to begin work soon. The aim is to connect with the Kokomo, Frankfort & Terre Haute Railway now in course of construction.

**\*Plymouth, Ind.**—Omer F. Neff and associates have been granted a 99-year franchise by the Commissioners of Marshall County for the use of the highways from Bremen to the county line for the construction of an interurban railway to use either electricity or gasoline power. It will connect Bremen and Mishawaka.

**Cedar Rapids, Ia.**—William Dows and Isaac Smith have been granted an electric railway franchise in Cedar Rapids. [E. R. J., May 7, '10.]

**Cedar Rapids, Ia.**—The Illinois Central Electric Railway, Canton, has applied for a franchise to build an electric railway over certain streets in Cedar Rapids.

**Detroit, Mich.**—The Michigan United Railways, Lansing, has asked the Council for a 30-year franchise to build a railway through certain streets in Detroit. J. P. Clark, Jackson, general manager.

**Ironwood, Mich.**—The Ashland Power Company, Ironwood, has applied to the City Council for a franchise for electric light and power plant in Ironwood and for an interurban electric railway. The company has recently taken over the Gogebic Electric Company and proposes to construct an interurban electric railway along Gogebic and Ironwood to serve Vessimer, Wakefield and intermediate places. The power house with a capacity of 2000 kw will be constructed at Brownstown Falls.

**Joplin, Mo.**—The Joplin & Pittsburg Railway, Pittsburg, Kan., has been granted a franchise by the Council to build a double-track extension on West Fourth Street to Electric Park in Joplin.

**Corning, N. Y.**—The Corning & Painted Post Street Railway will ask the board of public works for permission to double track its lines in Corning.

**Fremont, Ohio.**—The Fremont City Street Railway has asked the Council to renew its franchise for 25 years so that the projected Fremont & Fostoria Railway, Fostoria, can use its line as an entrance to Fremont.

**Harrisburg, Tex.**—A. Foster Irwin, representing the Houston-Bay Shore Traction Company, Houston, has asked the County Commissioners for a 50-year franchise to build an electric railway over a number of the county's roads between Houston, Harrisburg and La Porte. The proposed line when completed will connect Houston and Morgan's Point. [E. R. J., May 7, '10.]

**Seattle, Wash.**—The Seattle, Snohomish & Everett Railway, Seattle, has been granted a 25-year franchise to build an electric railway in Snohomish. Charles W. Kimball, Seattle, secretary. [E. R. J., Mar. 26, '10.]

**\*Sheridan, Wyo.**—Albert Emanuel and William Sullivan, Dayton, Ohio, have been granted a franchise by the City Council to build a railway in Sheridan.

#### TRACK AND ROADWAY

**Noccalula Railway, Light & Power Company, Gadsden, Ala.**—This company will let contract for 2 miles of 50-lb. rails, trolley wire, insulators, etc. Louis Hart, Gadsden, Ala., is interested. [E. R. J., May 7, '10.]

**Fort Smith, Van Buren & Interurban Light & Traction Company, Van Buren, Ark.**—This company will receive bids during the next 30 days for the construction of its proposed 6-mile railway from Fort Smith to Van Buren. Officers: W. D. Pratt, president; Harry T. Daily, secretary and treasurer. [E. R. J., Jan. 22, '10.]

**Northern Electric Railway, Chico, Cal.**—This company has started the extensive improvements planned for Lake Winola. A 1-mile extension will be built from the present terminal to the Wilkes-Barre side of the lake. It has also decided to build a picnic ground. A grove of 44 acres has been leased. A. D. Schindler, San Francisco, purchasing agent.

**Central California Traction Company, San Francisco, Cal.**—It is announced that this company will construct a 12-

mile extension from Lockeford to Stockton. This railway connects Stockton and Lodi and is building a line to Sacramento. Sam'l B. McLenegan, Stockton, general manager.

**Chicago, Ottawa & Peoria Railway, La Salle, Ill.**—This company, which is a part of the Illinois Traction System, has completed surveys for an extension of the eastern end of the line from Morris to Joliet. Rights-of-way are now being purchased and a franchise will probably be requested for an entrance into Joliet.

**Bluffton, Ind.**—The Ft. Wayne & Springfield Electric Railway, Decatur, is contending with the Cincinnati, Bluffton & Chicago Railway for possession of the old roadbed from Portland to Union City.

**Indianapolis, Columbus & Southern Traction Company, Columbus, Ind.**—It is reported that this company is preparing to build an extension from Seymour to Bedford by way of Brownstown.

**Indianapolis, Ind.**—Mayor Shank is said to be negotiating with the Indianapolis Traction & Terminal Company for the construction of several crosstown lines and two or more extensions of existing lines. The company's franchise stipulates that within 3 years crosstown lines should be built and the Mayor asks that this stipulation be complied with.

**Cincinnati, Newport & Licking Valley Railway, Cynthiana, Ky.**—This company has completed estimates for the construction of the railway between Cynthiana and Paris and grading will be started May 15. Contracts for material are now being let. R. H. Rees, Cynthiana, has charge of the construction work. [E. R. J., April 30, '10.]

**Detroit, Lansing & Grand Rapids Railway, Grand Rapids, Mich.**—It is announced that franchises have been secured and surveys are being made on this proposed 150-mile railway between Detroit and Grand Rapids. It is probable that two lines will be built on the section between Eagle and Lowell. F. A. Bean, 706 Union Trust Building, Detroit, chief engineer. [E. R. J., Apr. 23, '10.]

**Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.**—This company expects to extend its railway from Pass Christian, the present terminus, to Bay St. Louis and that a steam ferry will be used to transport cars from Henderson's Point to Bay St. Louis. W. F. Gorenflo, Gulfport, purchasing agent.

**\*Olive Street Railway, Clayton, Mo.**—This company has just completed plans for building a 14-mile railway from Etzel Avenue and Hodiamont tracks along Olive Street road to both Cleve Cœur Lakes, each of which will be reached by branch tracks. The contract to build the line has been let. Among those interested are: Frederick Essen, J. D. Pfister, W. K. Pfister, R. A. Stevens and Carl Feld.

**\*St. Louis, St. Charles & Northern Traction Company, Mexico, Mo.**—This company has been formed at Middletown for the purpose of building an electric railway from St. Charles north through Troy, Olney, Marling, Middletown, Mount Carmel, Laddonia, Mexico and Paris. Officers: C. B. Duncan, Olney, president and manager; C. H. Rigg, Middletown, second vice-president; Chris. Pearson, Middletown, secretary, and R. M. Hendershot, Middletown, treasurer.

**North Missouri Central Railway, St. Louis, Mo.**—This company, organized for the construction of a 60-mile interurban railway from Jefferson City to Mexico via Columbia, has increased its capital stock from \$600,000 to \$2,500,000. Headquarters, National Bank of Commerce Building, St. Louis. O. F. Spaete, president. [E. R. J., Dec. 11, '09.]

**North Jersey Rapid Transit Company, Paterson, N. J.**—This company has filed an amended certificate increasing its capital stock from \$1,000,000 to \$2,000,000. The proposed 14-mile railway will extend from Paterson to the New York-New Jersey line near Suffern. It is stated that the company is considering plans for the extension of its lines from the starting point in Bergen County to Garfield and from Suffern north to Spring Valley.

**\*Bayonne Subway & Developing Company, Port Richmond, N. Y.**—This company has been organized to build a subway from Bayonne to Port Richmond, where it is to connect with the Hudson & Manhattan Railroad and with existing lines on Staten Island. Capital stock, \$100,000.

Officers: Wm. S. Van Clief, chairman; Frank Fogin, secretary, and Edward Doyle, treasurer. Among the directors are: Frederick Cozzens, A. L. Burbank, George P. Egbert and Geo. H. Treadwell.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—This company has secured private right of way between Silver Lake Junction and Bedford, and the line will be changed to that location as soon as possible. The company expects to secure private rights for the entire distance for its extension between Akron and Cleveland.

**Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.**—This company will soon let contracts for construction of the railway from Nelsonville to Athens and Logan. Surveys have been completed between Nelsonville and Athens and are now being made in upper Sunday Creek and on Sugar Creek. This company has taken over all the rights and property of the Hocking-Sunday Creek Traction Company, Nelsonville. Charles Tutt, general manager. [E. R. J.]

**Albany (Ore.) Interurban Railway.**—This company, recently incorporated, has almost completed the surveys from Albany to Sweet Home via Lebanon and South Santiam Valley. Rights of way are being secured. This proposed railway will connect Albany, Sweet Home, Lebanon, Brownsville and Holley. [E. R. J., Feb. 19, '10.]

**Lane County Asset Company, Eugene, Ore.**—This company reports that it has negotiated with the Coos Bay Rapid Transit Company, North Bend, for the use of its tracks from North Bend to Marshfield. The company is planning to build a 130-mile electric railway to connect Eugene, Florence and Coos Bay. John Baird, Eugene, secretary and treasurer. [E. R. J., May 7, '10.]

**Coos Bay Rapid Transit Company, North Bend, Ore.**—This company advises that construction was started May 1 by the Empire Construction Company, North Bend, and work is being rapidly pushed on its proposed 4.15-mile railway to connect North Bend and Marshfield. It will operate two cars. Power house and repair shops will be built in North Bend. Officers: W. P. Evans, president; M. E. Everitt, vice-president; C. D. Hockett, secretary, and A. M. Myers, treasurer, all of North Bend. [E. R. J., April 9, '10.]

**United Railways, Portland, Ore.**—This company has awarded a contract to Porter Brothers to build the Cornelis Gap Tunnel.

**Altoona, Hollidaysburg & Bedford Springs Railway, Pittsburgh, Pa.**—This company reports that it has 7 miles of poles erected and 1 mile of roadbed ready for ties. This 50-mile railway will connect Altoona, Hollidaysburg, Bedford and Roaring Springs. Headquarters, 427 Fourth Avenue, Pittsburgh, Pa. Geo. W. Burke, secretary and treasurer.

**Waynesburg & Blacksville Street Railway, Waynesburg, Pa.**—This company has engineers at work in the vicinity of Gamble's Station making changes in the survey of the proposed railway to connect Fairmont and Morgantown, W. Va., with Waynesburg and Pittsburgh. The West Virginia section of the railway is already built. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., Jan. 15, '10.]

**Pawcatuck Valley Street Railway, Westerly, R. I.**—It is stated that this company is planning to rebuild its Watch Hill line between Westerly and Watch Hill, a distance of 6 miles.

**Houston-Bay Shore Traction Company, Houston, Tex.**—This company is reported to have secured right-of-way and construction will begin May 1 on the proposed 24-mile interurban railway from Harrisburg through Harris County to La Porte. The line will be laid with 75-lb. rails and there will be 19 bridges and culverts constructed along the line which will mostly be of concrete with the exception of the large steel structure crossing over the Southern Pacific tracks at La Porte. A. Foster Irwin, Detroit, president.

**Port Arthur (Tex.) Traction Company.**—This company has completed nearly 7 miles of track in Port Arthur and expects to operate cars within 30 days. Headquarters, 503 Reibold Building, Dayton, Ohio. [E. R. J., Aug. 28, '09.]

**Clarksburg & Weston Electric Railway, Clarksburg, W. Va.**—This company, recently incorporated to build a 24-

mile railway from Clarksburg to Weston, including five bridges, has elected the following officers: S. L. Watson, president; C. W. Watson, vice-president; Walton Miller, secretary and treasurer; D. D. Britt, general manager, and James O. Watson, chief engineer. [E. R. J., April 30, '10.]

**Wheeling (W. Va.) Traction Company.**—This company has awarded a contract for building an extension, including the driving of a tunnel, to the Federal Engineering Company, Pittsburgh, Pa.

## SHOPS AND BUILDINGS

**Pacific Electric Railway, Los Angeles, Cal.**—This company will build a large depot at Seventh Street Junction in Wilmington and also establish extensive yards.

**Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Que.**—This company has decided to erect an eight-story office building on the Jacques Cartier market site. The plans and specifications are not complete, but the foundation will be made sufficiently strong to carry an additional four stories should it be deemed advisable at some future date to increase the height of the structure to 12 stories. The company will require four floors for its own use, and will lease the other floors. Tenders for the razing of the market building were submitted on April 28, 1910, and the company expects to commence the work of demolition at once. C. E. A. Carr, Quebec, general manager.

**Virginia Railway & Power Company, Richmond, Va.**—This company will build a concrete, brick and steel car house to cost \$40,000.

**Sheboygan Light, Power & Railway Company, Sheboygan, Wis.**—This company expects to build soon a new car house and car shop in Sheboygan.

## POWER HOUSES AND SUBSTATIONS

**Fort Scott Gas & Electric Company, Fort Scott, Kan.**—This company advises that it expects to place contracts during the next two months for building a new power station and expects to purchase generators, engines, turbines and coal-handling machinery. F. D. Martin, Fort Scott, general manager.

**Ashland Power Company, Ironwood, Mich.**—This company, which has recently taken over the Gogebic Electric Company, Vessimer, Mich., and contemplates the construction of an interurban electric railway, expects to develop water power at Brownstown Falls at a head of 135 ft. The work on the plant of the company at Brownstown Falls will begin very soon. The initial equipment will consist of two 1000-kw generators. A high-tension transmission line about 35 miles long will also be constructed.

**Brooklyn (N. Y.) Rapid Transit Company.**—This company has awarded a contract to the Westinghouse Electric & Manufacturing Company for three 3000-kw rotary converters, together with transformers and switchboard apparatus. These converters are to be installed in the Bridge Street and Hudson Street substations. A switchboard was also ordered for the Williamsburg power house.

**Toledo Railway & Light Company, Toledo, Ohio.**—This company has awarded the contract for a 6400-kva, three-phase, 25-cycle, 4000-volt steam turbo-generator for its new power house in Toledo to the Allis-Chalmers Company. Ford, Bacon & Davis, New York, engineers.

**Mount Vernon Railway & Light Company, Mount Vernon, Ohio.**—It is stated that this company will soon erect a new power house in Mount Vernon to have a capacity of 1200 hp. [E. R. J., Dec. 25, '09.]

**Portland Railway, Light & Power Company, Portland, Ore.**—This company has placed on order with Allis-Chalmers Company for a 500-kw, 600-volt, 100 r.p.m., vertical-shaft, water-wheel type, d-c generator.

**Kittanning & Leechburg Railways, Kittanning, Pa.**—This company has started work on the reconstruction of its power house at Garrett's Run, Kittanning, which was recently destroyed by fire. [E. R. J., April 23, '10.]

**Bellingham-Skaget Interurban Railway, Bellingham, Wash.**—This company announces that the capacity of the Noosack power plant and the York Street station will be doubled. Work on the improvements will be started at once by the Stone & Webster Engineering Company.

# Manufactures & Supplies

## ROLLING STOCK

**Fort Smith Light & Traction Company, Fort Smith, Ark.,** expects to purchase 12 new 35-ft. Brill semi-convertible single-truck cars.

**Metropolitan Street Railway, Kansas City, Mo.,** has issued specifications for 25 cars, which it will order at once. Bids are now being received.

**Fort Scott Gas & Electric Company, Fort Scott, Kan.,** expects to place, during the next two months, contracts for two cars. F. D. Martin, general manager.

**Meriden, Middletown & Guilford Railway, Meriden, Conn.,** which is building a 20-mile line from Meriden to Guilford, is in the market for three cars. Francis Atwater, Meriden, president.

**United Railways, San Francisco, Cal.,** reported in the *ELECTRIC RAILWAY JOURNAL* of April 16, 1910, as contemplating the purchase of 50 cars, has ordered this equipment from the St. Louis Car Company.

**Utah Light & Railway Company, Salt Lake City, Utah,** reported in the *ELECTRIC RAILWAY JOURNAL* of March 26, 1910, as contemplating the purchase of 24 cars, has placed the order with the St. Louis Car Company.

**Illinois Traction System, Champaign, Ill.,** reported in the *ELECTRIC RAILWAY JOURNAL* of April 30, 1910, as contemplating the purchase of 10 interurban cars, will purchase 14 interurban cars in the near future. This company is also preparing designs for six electric locomotives, each to be equipped with four 200-hp motors.

**Interborough Rapid Transit Company, New York, N. Y.,** has received bids and will shortly place contracts for 88 motor equipments for cars on the subway division, 60 motor equipments for the elevated division and 40 trailer equipments for the elevated division.

**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.,** is reported to have placed an order for 100 cars with the St. Louis Car Company. This is, in addition to the order for 100 cars, which was mentioned in the *ELECTRIC RAILWAY JOURNAL* of Oct. 19, 1909.

**Noccalulu Railway, Light & Power Company, Gadsden, Ala.,** which proposes to construct an electric railway from Gadsden to Lookout Mountain, is said to be considering the purchase of two cars having a capacity of 40 passengers each. Louis Hart and H. A. Rogers, Gadsden, are promoting the line.

**Roanoke Railway & Electric Company, Roanoke, Va.,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 26, 1910, as having contracted with The J. G. Brill Company for four semi-convertible cars of the pay-as-you-enter type, has drawn the following specifications for this equipment:

- Length of body...38 ft. 8 in. Gears and pinions,
- Over vestibule...42 ft. 8 in. General Electric
- Width over sills. 7 ft. 10 1/2 in. Gongs .....Dedenda
- Over posts at Hand brakes.....Sterling
- belt ..... 8 ft. 2 in. Heating system...Consolidated
- Interior trim.....ash Headlights.....A. & W.
- Air brakes, Motors, type and number,
- Nat. Brake & Electric 4-GE 80
- Brakeshoes, Push buttons....Consolidated
- A. S. I. R. A. standard Registers .....International
- Bumpers....Brill angle iron Seats, style.....Winner
- Center bearings..Symington Seating material.....rattan
- Control system...GE K-28-B Springs .....Brill
- Curtain fixtures, Trucks, type,
- Curtain S. Co. Brill No. 27-GE1
- Curtain material...pantasote Special device.....Wallace
- Destination signs...Hunter sliding door fixtures

**Buffalo & Lake Erie Traction Company, Buffalo, N. Y.,** noted in the *ELECTRIC RAILWAY JOURNAL* of March 10, 1910, as having ordered five suburban cars from the Cincinnati Car Company, has decided on the following details:

- Bolster centers, Destination signs,
- length .....23 ft. 6 in. illuminated dash
- Length of body....47 ft. 2 in. Fenders....locomotive pilots
- Over vestibule.... 5 ft. 4 in. Gongs .....14-in.
- Width over sills.... 8 ft. 7 in. Hand brakes.....Peacock

- Height from top of rail Heating system,
- to sills.....41 ft. Peter Smith hot water
- Body .....composite Headlights,..U. S. No. 1559
- Interior trim.....cherry Motors, type and number,
- Underframe .....composite 4-GE 87-A
- Air brakes..West. straight air Roofs.....turtle back
- Bolsters, body...built-up steel Sanders,
- Bumpers, Ohio brass pneumatic
- 3/8 in. x 8 in. steel plate Sash fixtures.O. M. Edwards
- Car trimmings, Seats, style..H. & K. 199-AE
- Persian brass-brush finish Seating material.....rattan
- Control system.....K-34 Step treads,
- Couplers.....McConway & Mason safety tread
- Torley M.C.B. radial Trucks, type.....Baldwin
- Curtain fixtures, Special devices,
- No. 88 Ring fixtures 1 Root No. 6 track scraper
- Curtain material...pantasote Wood veneer headlinings

## TRADE NOTES

**Valentine-Clark Company, Chicago, Ill.,** has moved its office from 234 La Salle Street to 193 Michigan Avenue.

**Phoenix Iron Works Company, Chicago, Ill.,** has moved its office from Room 929, Monadnock Block to Room 629 in the same building.

**Pennsylvania Steel Company, Steelton, Pa.,** removed its Chicago sales office on May 1 to the McCormick Building at 193 Michigan Boulevard.

**Lord Manufacturing Company, New York, N. Y.,** has acquired several additional iron, steel and brass foundries in order to meet the largely increased demand for its material.

**United States Light & Heating Company, New York, N. Y.,** has moved its Chicago office from the Monadnock Building to the People's Gas Building, Michigan Avenue and Adams Street.

**McGraw Publishing Company, New York N. Y.,** has moved its Chicago office from Room 590, Old Colony Building, to Room 1570 in the same building, where larger quarters have been secured.

**B. E. Mitler,** who for four years has been connected with the business department of the *ELECTRIC RAILWAY JOURNAL*, has resigned to become Eastern representative of *Municipal Engineering*, at 1 Broadway, New York, N. Y.

**Albert B. Moore,** formerly chief engineer of the Griffin Wheel Company, Chicago, Ill., has formed a partnership with Andrew W. Woodman under the firm name of Woodman & Moore, civil and mechanical engineers, with offices in the People's Gas Building, Chicago, Ill.

**Peninsula Engineering Company, Chattanooga, Tenn.,** has applied for a charter in Tennessee to engage in general railroad work. Capital stock will be \$15,000. Applicants for the charter are: W. M. Johnson, W. L. Frierson, L. M. Coleman, Paul Campbell and James F. Finley.

**American Brake Shoe & Foundry Company, New York, N. Y.,** has purchased the patents and other property of the National Brake Shoe Company and the Featherstone Foundry & Machine Company. The foundries of the latter company are located at Melrose Park, Chicago, and Burnside.

**W. C. Kalb** has resigned his position as head of the brush testing department of the National Carbon Company to accept the position as general superintendent of the Dunlap Engineering Company, which was recently incorporated as a reorganization of the Columbus Pneumatic Tool Company. Mr. Kalb is a graduate of the Ohio State University in electrical engineering.

**H. H. Seaman** has resigned his position as assistant manager of the electrical department of the H. W. Johns-Manville Company, New York, N. Y., to take charge of the business of W. S. Seaman & Company, Milwaukee, Wis., of which his father was in charge at the time of his death. Mr. Seaman was connected with the H. W. Johns-Manville Company for the past six months, and previous to that time he was with the Electric Storage Battery Company of Philadelphia.

**J. B. Comstock,** for 6 years with the Westinghouse Electric & Manufacturing Company at its East Pittsburgh works, and for 4 years manager of its publication department and printing plant, severed his connection with that company in April to accept a similar position with the P. & F. Corbin Company, New Britain, Conn. Prior to Mr. Comstock's

connection with the Westinghouse company, he filled the position with the P. & F. Corbin Company that he has recently been recalled to assume.

**Hemming Manufacturing Company, Garfield, N. J.**, announces that it has appointed Butler Keys sales manager with headquarters at 2 Rector Street, New York. Mr. Keys was connected with the Consolidated Car Heating Company for many years, and recently was with the Home Rubber Company. The Hemming Manufacturing Company owns the Hemming and Gummon patents and has completed a specially designed plant for the manufacture of fireproof and waterproof moulded insulating materials, under these patents at Garfield, N. J.

**Dorner Railway Equipment Company, Chicago, Ill.**, has made the following sales during the past month: Grand Forks (N. D.) Street Railway, closed motor cars mounted on Brill 21-E trucks with GE 1000 motors; People's Street Railway, Galesburg, Ill., one 40-ft. double-truck car; Hattiesburg (Miss.) Traction Company, three open trail cars; Helena (Ark.) Street Railway, three open trail cars; Guthrie (Okla.) Street Railway, one 20-ft. closed motor car, mounted on Brill 21-E trucks, equipped with GE 800 motors; Indiana Union Traction Company, Anderson, Ind., four trail cars. The Dorner Railway Equipment Company was the subject of an article in the *Commercial Chronicle*, of Chicago, for April 22. The article contained a biographical sketch of Henry A. Dorner, president of the company, and told of the growth of the business under his management. The offices of this company will be moved soon from 315 Dearborn Street to the McCormick Building.

**Ackley Brake Company, New York, N. Y.**, has arranged through its resident representatives for prominent exhibits of the Ackley adjustable brake at the International Exposition in Brussels and at the Argentine Centenary Exposition in Buenos Aires. The company reports recent orders received from Douai, Amiens, Lille, Limoges, Lyon, Marseille, Paris, Longwy-Bas, Nice and Rouen, France; Basle, Geneva, Bern and Zurich, Switzerland; Nivelles and Brussels, Belgium; Amsterdam, Vienna, Dusseldorf, Pamplona, Algiers and Yokohama, the latter being a cable order for 100 brakes. Since January, 1910, 1200 Ackley brakes have been ordered for foreign countries. Brakes have been shipped as far north as Trondhjem, Norway, and as far south as Melbourne, Australia. Ackley brakes are also in use as far east as Yokohama and as far west as Honolulu.

**General Electric Company, Schenectady, N. Y.**, announces the following changes in personnel in the railway department of the New York office: S. W. Trawick has been appointed district manager of the department with general supervision over railway matters in the New York office territory, which includes the sub-offices at Buffalo, Syracuse and New Haven, Conn. H. D. Hawks has been transferred from New Haven to New York to look particularly after the steam railroads entering the city that have been and are being electrically equipped. C. B. Keyes has been transferred from engineering to commercial work. He will look particularly after the surface lines in the Metropolitan district and will assist Mr. Trawick generally in the work of his department. C. F. Scott has been transferred from the railway engineering department at Schenectady and succeeds Mr. Keyes in that department at New York.

**Murphy Iron Works, Detroit, Mich.**, reports that the Boston (Mass.) Elevated Railway, after a thorough investigation, has decided to equip all its boilers at the Albany Street power station with Murphy automatic stokers. This is one of the largest stations operated by the Boston Elevated Railway, and contains 22 350-hp Stirling and eight 500-hp B. & W. boilers. Among other orders recently received for stokers are the following: City of Holyoke, Mass., Gas and Electric Department; Detroit Copper & Brass Rolling Mills, Detroit, Mich.; Massachusetts Cotton Mills, Lowell, Mass.; Anniston Electric & Gas Company, Anniston, Ala.; Poughkeepsie Light, Heat & Power Company, Poughkeepsie, N. Y.; Packard Motor Car Company, Detroit, Mich. The company also reports that the following companies have recently installed or will install Murphy heavy duty furnaces: Rochester Railway & Light Company, Rochester, N. Y.; American Woolen Company, Lawrence, Mass.; Poughkeepsie Light, Heat & Power Company, Poughkeepsie, N. Y.; Baldwin Locomotive Works, Philadelphia and Eddystone plants; Allegheny Plate Glass

Company, Glassmere, Pa.; Aluminum Company of America, East St. Louis, Mo.

#### ADVERTISING LITERATURE

**MacGovern, Archer & Company, New York, N. Y.**, have issued their May list of second-hand electrical and steam machinery, cars and equipment.

**Ohmer Fare Register Company, Dayton, Ohio**, has issued a small booklet calling attention to the merits of its indicating, recording and printing fare registers.

**Jeffrey Manufacturing Company, Columbus, Ohio**, has issued Booklet No. 38, in which the various products of the company and their wide range of application are illustrated.

**National Brake & Electric Company, Milwaukee, Wis.**, has printed bulletin No. 389 in which its various types of National emergency and variable release air-brake valves are described and illustrated.

**H. W. Johns-Manville Company, New York, N. Y.**, is mailing a folder entitled "Founded on a Rock," in which a description is given of J. M. asbestos roofing and the merits of the product are discussed.

**American Goetze-Gasket & Packing Company, New Brunswick, N. J.**, has issued a 40-page catalog and price list describing and illustrating the various types of copper and metal gaskets and metallic packings which it manufactures.

**Western Electric Company, New York, N. Y.**, has issued bulletin No. 5500-1 on Hawthorn solaris multiple direct-current arc lamps. Bulletin No. 5351, which has been reissued, replacing bulletin No. 5351 of March 1, 1908, describes the different types of Hawthorn motor-driven exhaust fans.

**Crocker-Wheeler Company, Ampere, N. J.**, has issued Bulletin No. 119, in which its large engine type d.c. generators are described and illustrated. The publication also contains several tables and other useful data of interest to central station men. The company has also issued Bulletin No. 121, which is descriptive of small engine type d.c. generators, and Bulletin No. 124, on exhaust fans.

**Westinghouse, Church, Kerr & Company, New York, N. Y.**, have just issued No. 4 of their publication *Work Done*. Among the electric railway installations carried out by the company and described in this number are those for the Denver & Interurban Railroad (single-phase); Gallatin Valley Electric Company, Bozeman, Mont.; Ohio Valley Finance Company, East Liverpool, Ohio; Pennsylvania Tunnel & Terminal Railroad's New York service plant.

#### NEW PUBLICATIONS

**Electric Traction on City and Suburban Railways.** By H. M. Hobart. London, 1910: *Tramway and Railway World*; 11 pages; illustrated. Price one shilling.

This pamphlet is a reprint of an article contributed to the *Tramway and Railway World* by H. M. Hobart, the well-known British authority on electric traction. Mr. Hobart deals with the question of acceleration of electric and steam cars; the analysis of energy consumed, as shown by diagrams giving the division into equipment losses, braking losses and work of propulsion. Mr. Hobart also compares d.c., single-phase and three-phase electric railway equipments as regards weight, cost of attaining given schedule speeds, etc.

**American Producer Gas Practice and Industrial Gas Engineering.** By Nisbet Latta. New York, 1910: D. Van Nostrand Company; 539 pages (illustrated), including index. Price \$6.

This work is a compendium describing the construction and operation of typical examples of the principal gas producers now in service. A great deal of data is presented on the properties of gas in general; the temperature, reduction and conduction of heat; the choice of building materials, and the designing of pipes, flues and chimneys used in connection with producer gas plants. The author, however, has presented only one short chapter on gas engines, and most of the figures given, such as those on areas, floor space and gas consumption, are taken from European practice. Of course, there are not so many gas installations in this country as abroad; but it is to be regretted that Mr. Latta did not elaborate upon the qualities of the gas engine for handling different classes of service, and particularly the peak load conditions of railway plants.