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Of this issue of the Street Railway Journal 8200 *copies are printed. Total circulation for* 1907 *to date,* 130,850 *copies, an average of* 8177 *copies per week.*

Organization Against Copper Thieves

The present high price of copper has, no doubt, been the cause of an unusual amount of stealing of copper from electric railways; at any rate, within the last few months reports of thefts have been very frequent. One interurban road in the Middle West recently had a thousand or more feet of high-tension line taken from the poles soon after it had been installed and before current had been turned on. Several cars of an elevated system were recently robbed of brass fixtures, and the woodwork was badly marred by the thieves in tearing out the brass parts. Numerous companies have been subjected to similar thefts, and there are very few that have not had bonds stolen, although many may not keep close enough track of their bonds to know it. In the past the railroad companies have not been very successful in apprehending thieves, partly, no doubt, owing to a lack of knowledge of the characteristics of the thieves, when they are most likely to act and where they get rid of the stolen property.

Copper thieving might be discouraged to a great extent if the companies were to organize for mutual protection, just as livery stable owners and banks organize. At present, without such an organization, a railway company suffering from a theft of copper to the value of twenty-five or fifty dollars does not feel justified in spending several times this amount in endeavoring to apprehend the thieves. The result is the thieves are encouraged by the seeming indifference of the company, and either this company or others are subjected to consequent thefts.

A great deal of copper stealing is, no doubt, done by a set of men who, to a certain extent, follow it as a business. After heavy thefts in one locality they may make a long jump to another region. Even if the companies suffering were willing to spend time and money in the apprehension of the thieves, they would have much difficulty in locating those of the wandering class.

A well-organized bureau, getting reports from all over the country, would in all probability soon be able to tell, on report of the details of a theft, just how to go after the guilty party. It would be the duty of such an organization to give as much publicity as possible to the apprehension of copper thieves in the newspapers. Such publicity would soon impress those with thieving proclivities that there was a great chance of being caught, and this would do much to lessen their natural tendency. If the detective work were carried on by a central body, the expenses, being borne by several companies, would not be heavy on any one of them. It is no more than right that the expenses should be distributed. A company spending three times the value of the material stolen in apprehending a criminal is not the only one benefited by the efforts. The fact that the efforts result in less likelihood of other companies suffering thefts makes them share in the benefits, although they do not pay for them.

Limiting Shopping Traffic in Rush Hours

The shopping traffic on a large street railway system is one of the most difficult features to handle in the rush-hour business. There is no question that the tendency of women shoppers to prolong their bargain hunting until the hours when regular commutation travel is at its height seriously hampers the free movement of cars, and it has often been pointed out that if the shoppers could be persuaded to leave the business districts a little earlier in the afternoon they would be relieved of much of the crowding to which they object so strenuously later.

Observation of the afternoon traffic in large cities shows a distinct tendency of women shoppers to start homeward before the stores and offices close for the day, but the volume of this movement is as yet small in comparison with the peak load. If women shoppers generally could be induced to leave the business district, say before 4:30 o'clock, it is certain that the business of the transportation companies between 5 and 6 would sensibly be facilitated. The stops at present are lengthened by the difficulty women find in entering or leaving cars promptly, and in the rush hours these delays slow the schedule speed most seriously on account of the close headway of the cars on lines carrying a dense traffic.

It is a question whether there is any method of persuading shoppers to go home before the heaviest rush is on. From some points of view it looks like an impossible task, and no doubt there is a decided limit to the traffic which can be thus accelerated away from the congested district. But the matter is worth considering. It is possible that something could be done by cleverly worded placards in the cars, pointing out the advantages in comfort and running time which an early departure from the business streets makes feasible. Actually, nothing short of a trial could demonstrate the value of any such scheme of attempting to cut off the top notch of the load curve.

Keeping Record of Train Delays

The aggregate amount of delays to trains forms an excellent basis for judging the efficiency of the trainmen, dispatchers, track departments and car maintenance departments of an interurban railway company, yet many systems do not keep a record sufficiently in detail to tell how much trains were delayed during any period or to be able to compare the delays of one period with those of another. Nevertheless, the work does not involve such a great expenditure of time and it could be done in such a manner as to fix the responsibility for the delays upon the department or person at fault.

Records of the amounts of delays with their causes might be kept by both dispatchers and trainmen. At the end of the month, in order to get a comparative statement, the figures could be reduced to a "car-mileage per train-minute delay" basis. This term would serve as a definite means of comparing the delays during one month with those of another. To distribute the delays among the different departments at the end of the month, the total number of minutes delay caused by cutting off the power should be totalized and charged to the power department, and those caused by defective car apparatus to the car maintenance department. In a similar manner, the transportation department and track and overhead departments could be charged with the amounts resulting from their neglect or oversight. The heads of these departments could, of course, charge against each man or each foreman the amount due him. If such a practice were carried out on a system, no doubt everybody connected with the road would appreciate to a greater degree the importance of keeping the cars running on time and would as a result make such efforts as would reduce the delays from month to month. Of course, many delays are caused by conditions outside the control of any one connected with the system. An analysis of the kind mentioned might, however, result in their reduction to some extent. If, for instance, the total delays caused by steam trains blocking the tracks at steam road crossings were kept, they would in many cases be of such magnitude as to warrant complaint to the railroad company or city authorities.

After all, the "car-miles per train-minute delay" is a good indication of the efficiency of every department of the railway, and it stands to reason that it should be kept as accurately as possible.

A Visual Signal on Electric Heater Circuits

There is no excuse for the heaters being left on when cars are left in storage houses or in the yards over night. But trainmen are usually in a hurry to leave their cars when they turn them in, and are always liable to forget either to throw the heaters off or pull down the trolley pole. Of course, if the trolley pole is pulled down, that ends the matter; but this plan is not always followed, and, with the pole up, there is always danger of fire unless the night watchman discovers that the heater switch is on and turns it off. Now if the watchman wishes to find out definitely whether or not the heaters have been left on, he must either examine the switch in the vestibule or enter the car. It is safe to say that with fifty or one hundred cars to be looked after the average man will not always do this. Were it possible to tell from the outside of the car or from a distance whether or not the heaters had been left on, the probabilities are great that the waste of current and the fires attributed to electric heaters would be less frequent. The plan suggests itself to provide a means of doing this by placing an electric light in shunt with one of the heaters. The lamp could be of such a voltage that it would burn very dimly, and its life consequently would be very long. It could be placed in the vestibule or in the interior of the car, and to distinguish its light from that of the other lights a red bulb might be used.

Placing such a lamp in the circuit in this manner would necessitate very little extra wiring. All the addition that would be necessary would be to run an extra wire from the ground side of the first heater in the circuit up to the light, as the lamp in most instances could be placed near the heater switch and the lead for the trolley side of the lamp could be run direct from the switch to the lamp. This plan would enable a watchman to discover at once any one car out of a hundred on which the heaters had been left turned on, and, further, it would enable any one to tell at a mere glance over the storage yard or car house

whether or not the watchman was attending to his duties regarding heaters.

The benefit of this plan would not be confined to the night time. During the day it would enable inspectors to tell without trouble whether or not instructions with regard to heaters were being followed. Inspectors might even appreciate one lamp in shunt with each coil of a double-coil heater, so that the point at which the heaters were being worked could be distinguished. It might in either case be well to provide a fuse in the lamp circuit to prevent it being subject to abnormal voltage in the event of the heater becoming open-circuited.

The Qualifications of a Repair Shop Superintendent

The importance of well-balanced talent in the electric railway repair shop should be fully realized by managers. There is a saying that "a Jack of all trades is master of none," but if there is an exception which proves this rule the proof will be found in the successful director of the electric railway repair shop. Fortunate indeed is the company whose master mechanic possesses the qualifications of the expert as both an electrician and a mechanic. But such men are rare, especially when they combine with this knowledge the requisite executive ability and general capacity for conducting with the best results this important department in the operating organization.

The money expended on the maintenance of electrical equipment of cars, that on trucks and brakes, and that on car bodies and furnishings should nearly balance. The first-class master mechanic, therefore, should represent just as nearly such a balance as regards his knowledge of and ability to care for the equipment. The first-class electrician who is short on experience in car-building methods and machine shop practice will come as near failing in his best efforts to keep up the rolling stock as will the first-class machinist or the first-class car builder to whom the electrical equipment is somewhat of a mystery. Evidences of such unbalanced talent can frequently be noticed by any one who has had opportunity to inspect various repair shops and shop methods, and the most casual observation of the appearance and operation of cars on the road often suggests that such a condition exists. If the property is so extensive that the repair shop work can be divided under a superintendent of rolling stock into sub-divisions of car body, truck, brake and electrical work, each in charge of a sub-head who is an expert in his particular line, the difficulty of proper maintenance is lessened. Even in this case the superintendent of rolling stock must be a man who has ability and experience in all the lines.

But it is on the smaller roads, where such a subdivision is not possible, that the successful Jack of all trades is a necessity in a master mechanic or shop foreman, and too often this necessity to economical operation is lacking. A fairly good electrician may hold the job, and his motors and electrical equipment may be in fairly good shape—his account No. 7 low—but to save his life (or his job) he cannot keep No. 6 down, and some of his cars generally sound as though they might fall to pieces on the street. The management realizes an error, and the next man on the job is a machinist, and a good one. To be sure, he doesn't know much about electricity, but he has lots of good horse sense, and that ought to do. He knows what is expected of him, or thinks he does, and there is a grand overhauling, and things begin to go better—that is, some things do. The trucks at least sound as though they were integral parts of the equipment instead of miscellaneous collections of junk iron, the brake-rods don't break so frequently and the brake-shoes brake more, but once in a while the manager notices a door latch or a window frame that seems to have been repaired with a hack saw and a cold chisel. Finally, when an expert has been called from the electrical manufacturing company to investigate the mysterious trouble in the new motor equipments and advises that the motor leads should be cleated up so that the insulation will not rub entirely off on the motor frames and brake rigging, the following of which learned advice stops the trouble, the management realizes that some sense besides horse sense is occasionally desirable.

The road that cannot afford to maintain an organization containing experts in all departments of rolling stock maintenance generally cannot afford to hire as master mechanic or shop foreman a man who combines all the qualifications ready made—he is too valuable to his present employers. It is then a matter of making a man, and the starting point is generally a person with one kind of ability or experience—electrical, mechanical, or executive. If the man chosen has the proper realization of his deficiencies, and, while exercising his particular ability, takes advantage of every opportunity to improve himself where lacking, he may develop into the all-round man that is required. He must get rid of the idea that his specialty, whatever it is, is the most important feature of the work. If he is an expert in his one line, whatever it is, it would probably be better if he should conduct his department on the theory that that particular line was the least important. Then, if he is willing to learn, if he has the ability to learn, if he will hire some men that possibly know more than he does of the points in which he is lacking, but does not let them know it, and if he will take advantage of every opportunity to learn and compare methods practiced elsewhere, both by personal inspection and through the technical press, he will make the man that is wanted. It costs something to make him, and the manager will show his ability in choosing his material.

A little money spent on the proper installation and maintenance of electrical equipment saves a lot of money in delays and electrical repairs; a little money spent on proper maintenance of trucks and brakes saves a large sum of money in repairs and accident claims; a little money spent on proper maintenance of car bodies saves a great deal of money in repairs and renewals. All these conditions tend to bring about that valuable asset, incapable of being estimated in dollars and cents, the satisfaction of the public. The management must realize, however, that no one of these three portions of the rolling stock equipment is more important to good, economical operation than either of the other two, and that to secure proper maintenance well-balanced talent in the repair shop is absolutely essential.

THE ELEVATED SHOPS AND TERMINALS OF THE BROOKLYN RAPID TRANSIT COMPANY—THE LUTHERAN PLANT AND STORAGE YARD

The opening paragraphs of the first of the four articles published recently on "The Elevated Shops and Terminals of the Brooklyn Rapid Transit Company" (see STREET RAILWAY JOURNAL, Feb. 2, Feb. 9, March 2 and March 9, 1907), stated that all of the elevated work was divided between the East New York and Thirty-Sixth Street shops, Brooklyn. The first is conveniently located for the Broadway, Lexington Avenue and Fulton Street lines, while the second serves the divisions running through South Brooklyn and to Coney Island. The Ridgewood line, however, has had no separate inspection facilities. Owing to the recent extension of this line for nearly 2 miles to Lutheran Cemetery and Metropolitan Avenue, over the right of way of a former steam dummy line, it has begun to carry a much larger traffic. The company, therefore, has found it advisable to build a separate inspection building and storage yard for this branch at a point where inspection could be conveniently carried on during lay-overs.

The new plant which is now under construction is on a plot with a frontage of over 250 ft. on Fresh Pond Road and about 1300 ft. parallel to the right of way. It will be noted from the plan, Fig. 3, that in addition to the inspection building provision is made for a heating plant, trainmen's and service building, passengers' waiting room and an 80-car storage yard with ten tracks spaced 12-ft. centers. Although the track plan shows the Fresh Pond Road trolley tracks connecting with the Ridgewood line, cars will not be operated over this junction except in emergencies. To protect the crossing at Fresh Pond Road and the right of way, an electric interlocking plant has been installed. It might

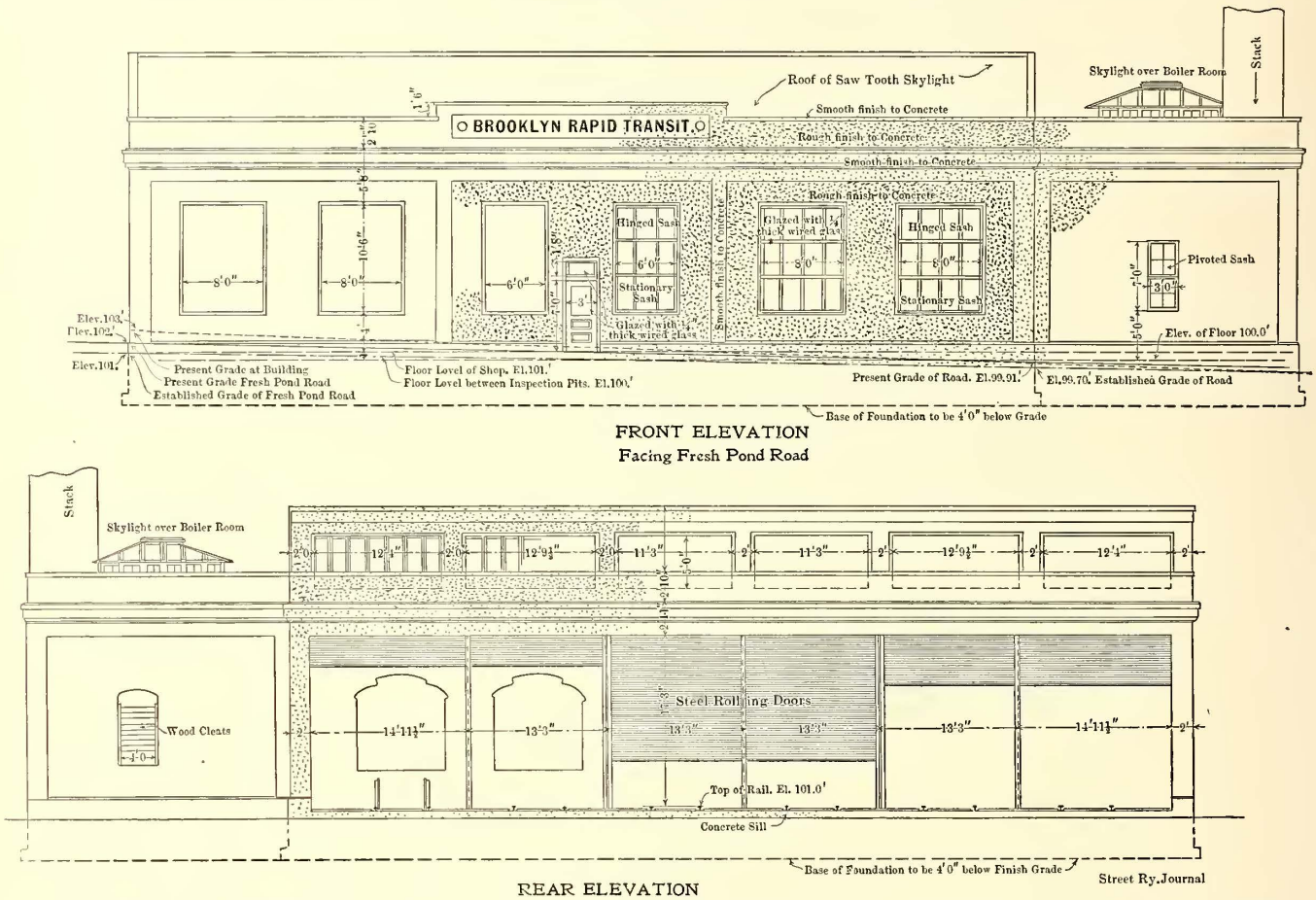


FIG. 1.—REAR AND FRONT ELEVATIONS OF THE LUTHERAN ELEVATED RAILWAY INSPECTION PLANT OF THE BROOKLYN RAPID TRANSIT COMPANY

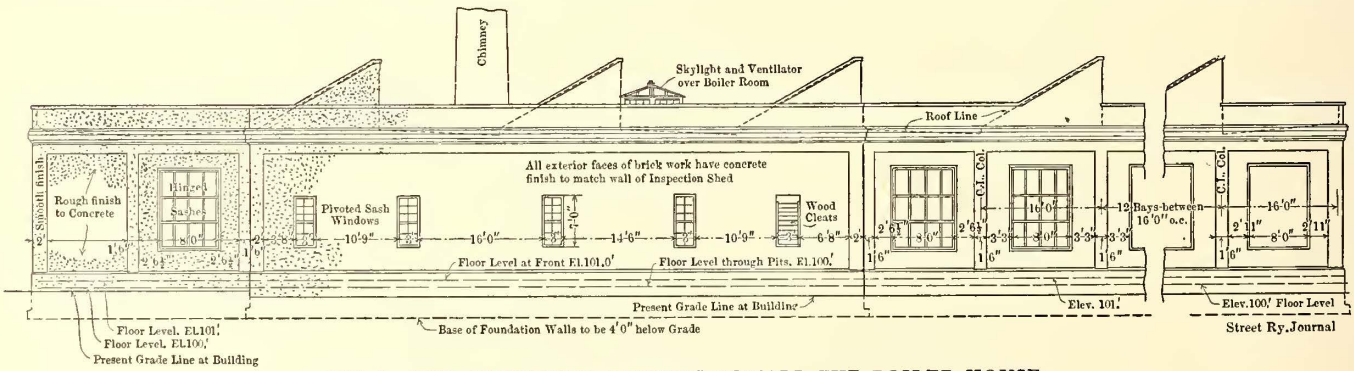


FIG. 2.—SIDE ELEVATION, LOOKING TOWARD THE BOILER HOUSE

be added that the company recently constructed just beyond the Fresh Pond installation a double-track through plate girder bridge to cross the tracks of the Long Island Railroad.

The rear of the inspection shed fronting Fresh Pond Road will serve for a stock room, offices and shop for minor repairs. The shop will contain a 20-hp compressor with air lines to the pits, as described later. The waiting room is shown as a separate structure, 15 ft. x 25 ft., placed at the intersection of Fresh Pond Road and the right of way.

THE INSPECTION SHED

The inspection shed has six tracks with a total capacity of thirty-six elevated cars. It is divided longitudinally into twenty-two bays, twenty-one of which are 16 ft. long; only the remaining one, which faces Fresh Pond Road, is slightly shorter. The side walls of the building consist of heavy iron framework supporting the side lighting, which is of the lever and gearing type used in the other elevated shops of the company. To this angle-iron framing are fastened 1-in. angle-iron studs spaced 2 ft. center to center, and to these in turn are trussed metal lath entirely enclosing all columns. A plastered wall 3 ins. thick will be carried up to the cornice, entirely covering both sides of the lath and around all columns. The columns are solidly encased with concrete to prevent rusting and the possibility of buckling under fire. A pilaster effect is produced on the exterior face of the walls by offsetting the concrete 2 ins. and forming panels, the pilaster being smooth finish and the inside panels having a rough pebble-dash stucco.

The whole roof is divided into 16-ft. bays, every other bay consisting of a 30-deg. saw-tooth built up of 12-in. I-beams at the top and 8 ins. for the intermediate portion. These extend across the full width of the inspection shed, together with 24-in. plate girders supporting each independent saw tooth. The intermediate bays are flat and are pitched away from the corresponding window of the saw-

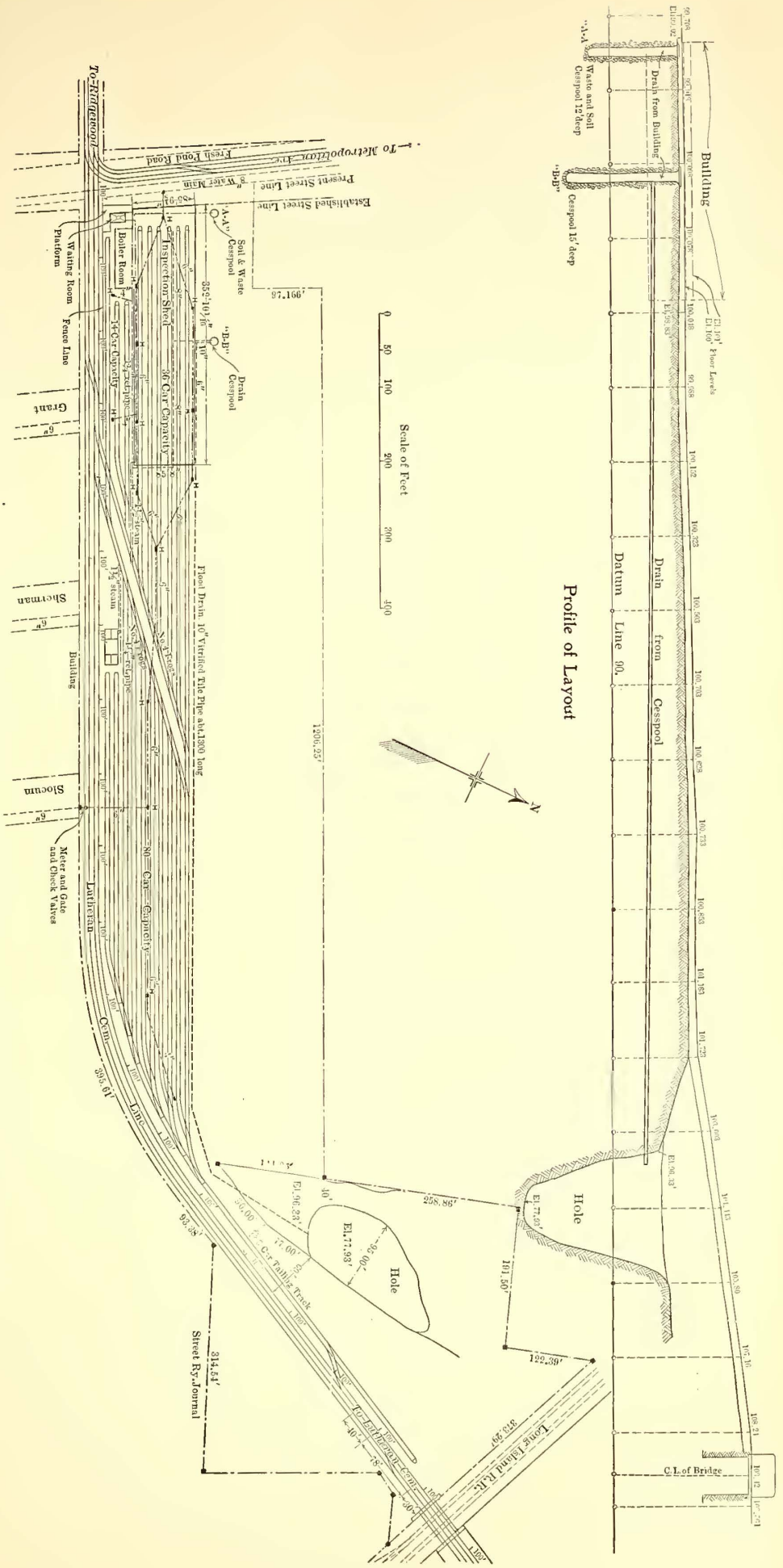


FIG. 3.—GENERAL PLAN AND PROFILE OF THE LUTHERAN ELEVATED RAILWAY INSPECTION PLANT AND STORAGE YARD

tooth ½ in. to the foot. This construction therefore allows plenty of space for heavy rains, snow, etc. The water is kept away from the main saw-tooth windows, and the leaders are carried down inside the columns in the valleys formed by the pitched flat portions of the roof and the saw-tooth back.

The roof construction consists of 4-in. reinforced concrete slabs which are carried up 4 ins. over the top of the saw-tooth and concrete cornices, and run all around them. The entire concrete roof is covered with Johns-Manville asbestos laid in hot Ajax asphaltum. The roof system is designed to carry 130 lbs. dead and live load. The roof will be flashed and counter-flashed with 16-oz. copper, the flashing extending at least 4½ ins. under the roofing and upon all parapets, copings, etc., to raggles formed to receive the same. The counter-flashing is turned into the brick work or concrete and covered with roofing cement. The windows in the saw-tooth cornices are of the metal type with the A. E. Rendle Company's angle-iron U-bar construction.

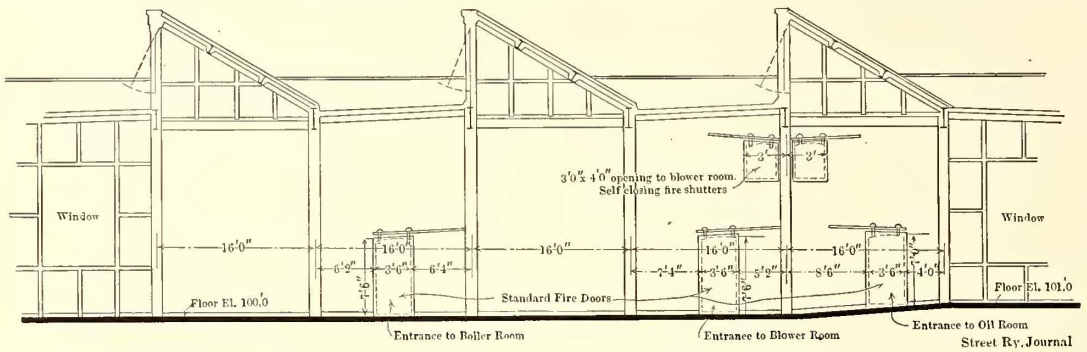


FIG. 4— ELEVATION SHOWING FIRE DOORS AND SHUTTERS, LOOKING AT BOILER HOUSE FROM INSIDE OF INSPECTION SHED

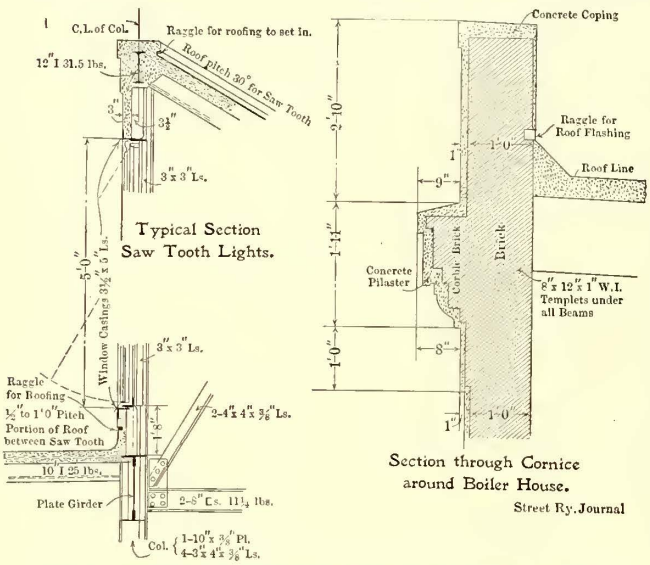


FIG. 5.—SECTIONS THROUGH THE SAW-TOOTH LIGHTS AND CORNICES

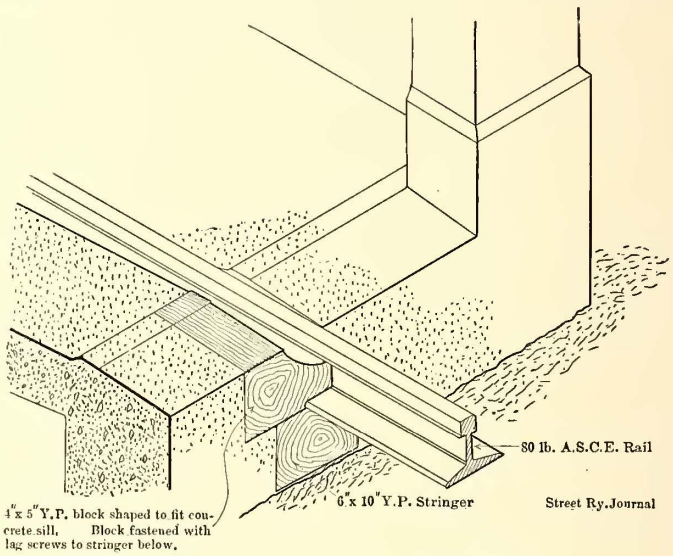


FIG. 6.—SECTION OF FLOOR IN INSPECTION SHED, SHOWING SPECIAL WOOD BLOCKS AT THE ENTRANCES

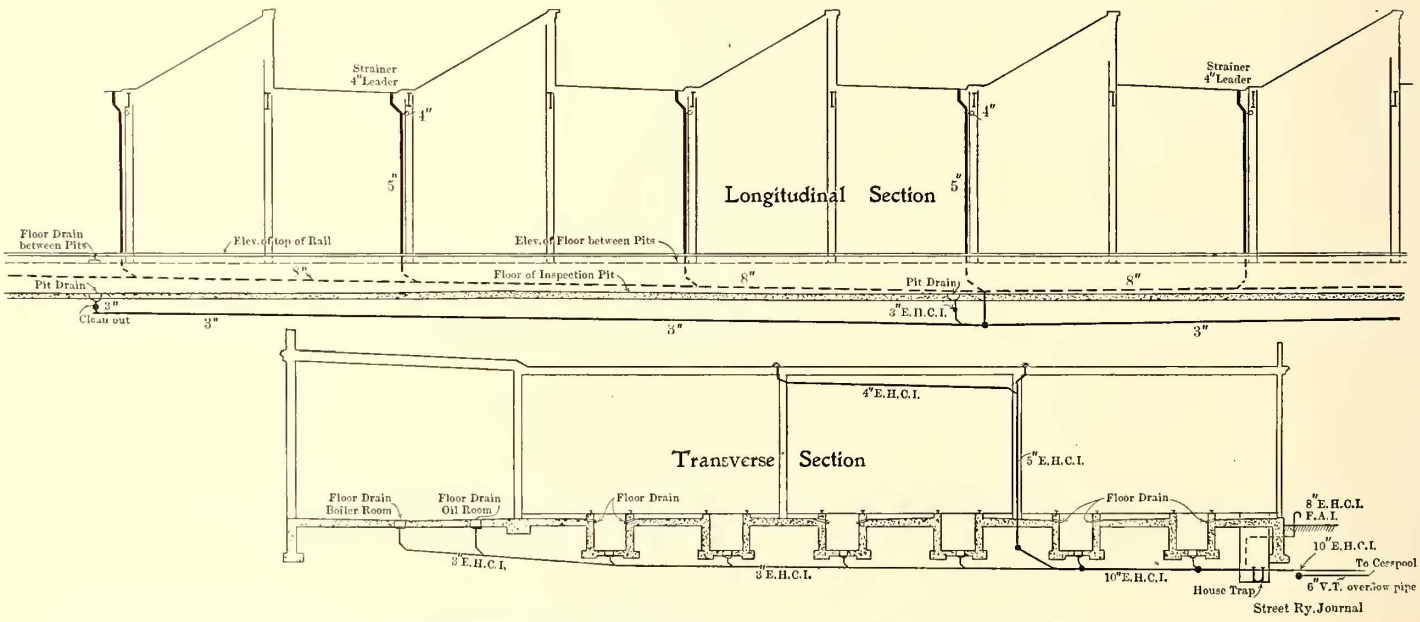


FIG. 7.—LONGITUDINAL AND TRANSVERSE SECTIONS, SHOWING THE DRAINAGE SCHEME AT THE LUTHERAN INSPECTION PLANT

The parapet walls of the inspection shed are reinforced with 1-in. square wrought-iron rods and coped as shown in the details.

The floor of the inspection shed is laid on a bed of cinders and consists of 5-in. concrete with a 1-in. granolithic finish.

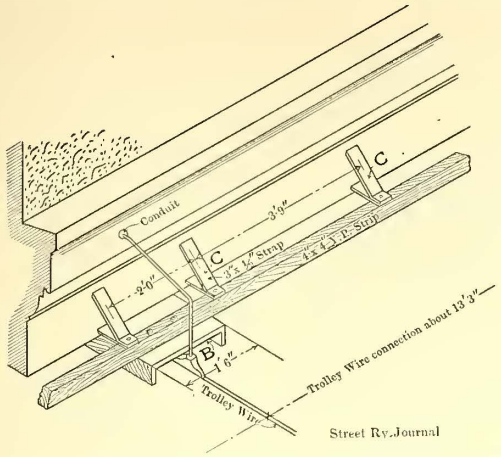


FIG. 8.—ISOMETRIC VIEW OF TROLLEY TROUGH SUSPENSION IN FRONT OF THE SHED

For convenience in drainage the floors are pitched ¼ in. to the foot in the directions indicated in the cross section (Fig. 7). This arrangement, it will be seen, gives one floor drain for two pits. The center of each pit also has a 3-in. drain which, together with the 4-in. leaders from the roof, discharges through a 10-in. pipe leading to the cesspool. The latter was built for use until such time as the municipal system is extended to this district.

Every truck is furnished with a concrete pit running the entire length and having treads at the ends with steel corner molds bonded in concrete. The tracks are 80-lb. T-rails mounted on 6-in. x 10-in. yellow pine stringers. An interesting feature in connection with them is the use of specially-formed yellow pine blocks at the entrances to fit the side of the rail as shown in Fig. 6. The use of these blocks makes it unnecessary to disturb the concrete in case the rails need renewal.

One of the most interesting features of this inspection building is the method devised for entering the shed through the six rolling steel doors. Despite its many valuable points, the rolling steel door has been subject to two troubles: first, that arising from the trolley poles striking it from either side, and second, the possibility of short-circuiting the entire building through the door when multiple-unit trains are used. The engineering department of the Brooklyn Rapid Transit Company therefore has endeavored to overcome these defects by the novel construction shown in Figs. 8 and 9. This scheme requires the bracketing out at the front and hanging on the inside of the car shed continuous 4-in. x 4-in. yellow pine strips. On the inside the trolley trough is suspended from the continuous strap and hangers. The main live trolley trough ends at the inside stringer. On the outside face of the door a short piece of trough is suspended from the outside stringer and from a block supported on the main girder lintel over the door. Inside the trough are

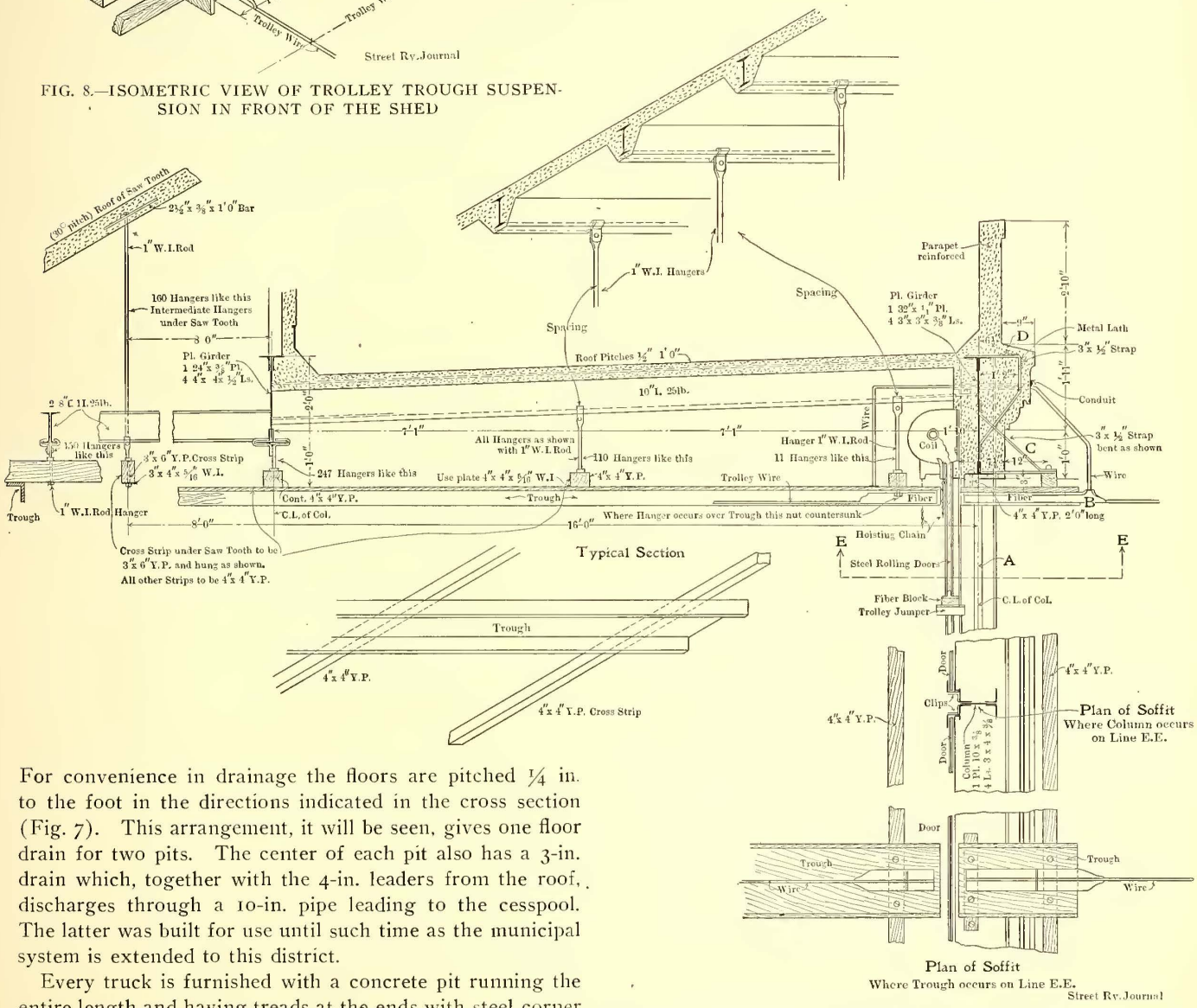


FIG. 9.—CONSTRUCTION DETAILS OF THE TROLLEY TROUGH SUSPENSION ARRANGEMENT FOR THE STEEL ROLLING DOORS

fastened insulating nosings to which the trolley wire is attached. Current from the outside is transmitted through a loricated conduit which pierces the concrete cornice and girder, thence goes down inside the building until it joins the nosing and the main trolley wire. In this way no

current can go through the doors or any other metal parts of the building. When the door rolls up between the two portions of the trolley trough it takes a fiber block jumper of the same section as the fiber nosings on the trough. This perfectly fits the gap in the trough when the door is rolled up, thus forming a continuous insulated path for the trolley wheels as the cars enter or leave the shed.

THE HEATING SYSTEM

The boiler plant is located alongside the upper end of the inspection shed. It is 80 ft. long and 25 ft. 6 ins. wide, with 12-in. brick walls having a concrete pilaster on three sides. The wall of the inspection shed forming the rear of the boiler plant is equipped with standard fire doors and windows, as shown in Fig. 4.

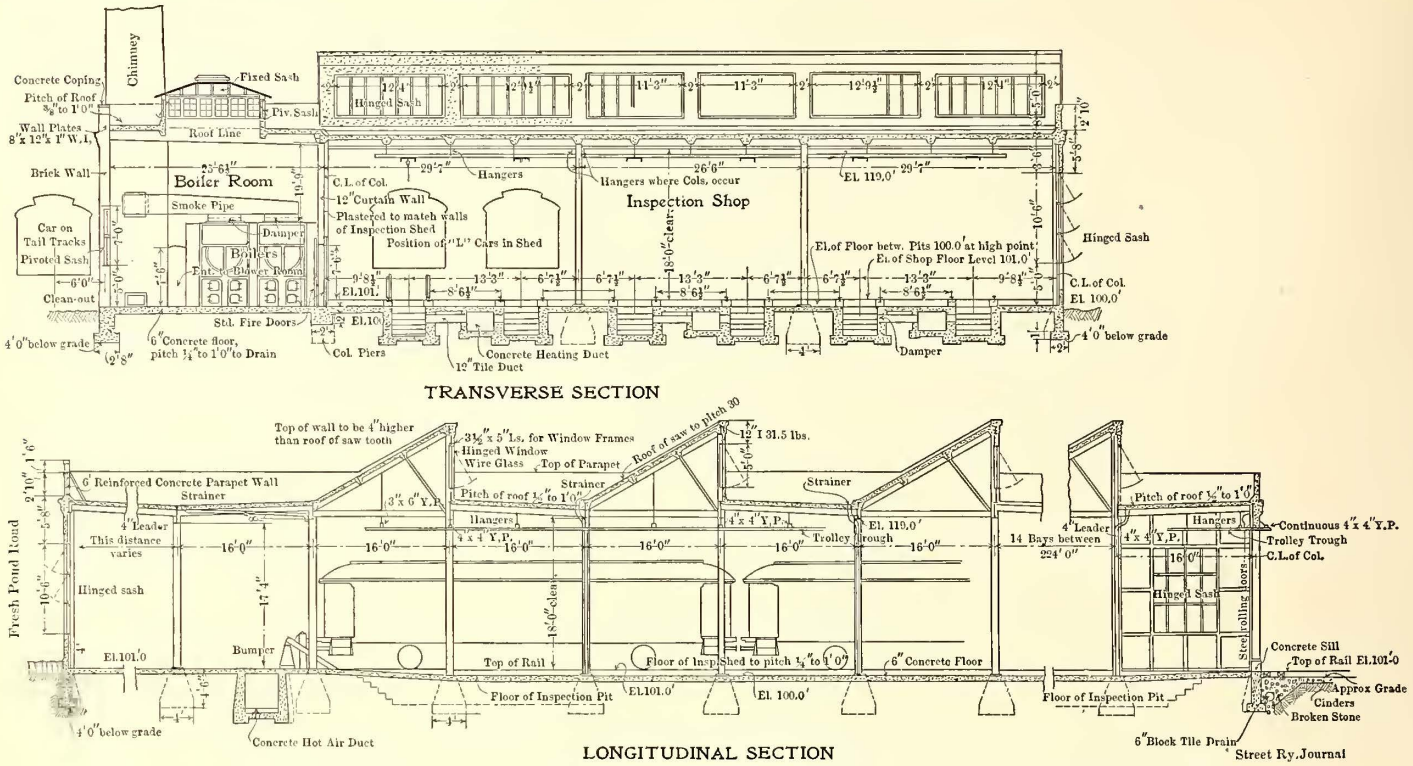


FIG. 10.—TRANSVERSE AND LONGITUDINAL SECTIONS OF THE LUTHERAN INSPECTION SHED

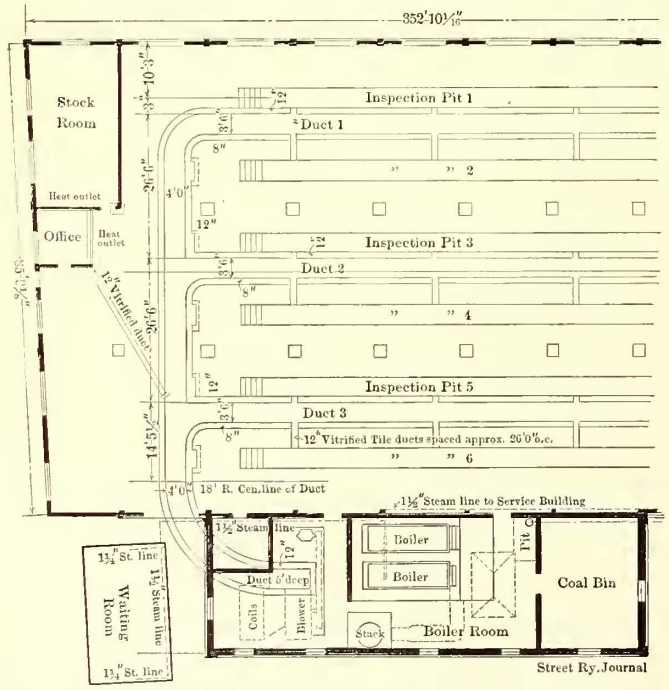


FIG. 12.—LAYOUT OF HEATING CONDUITS AND STEAM LINES

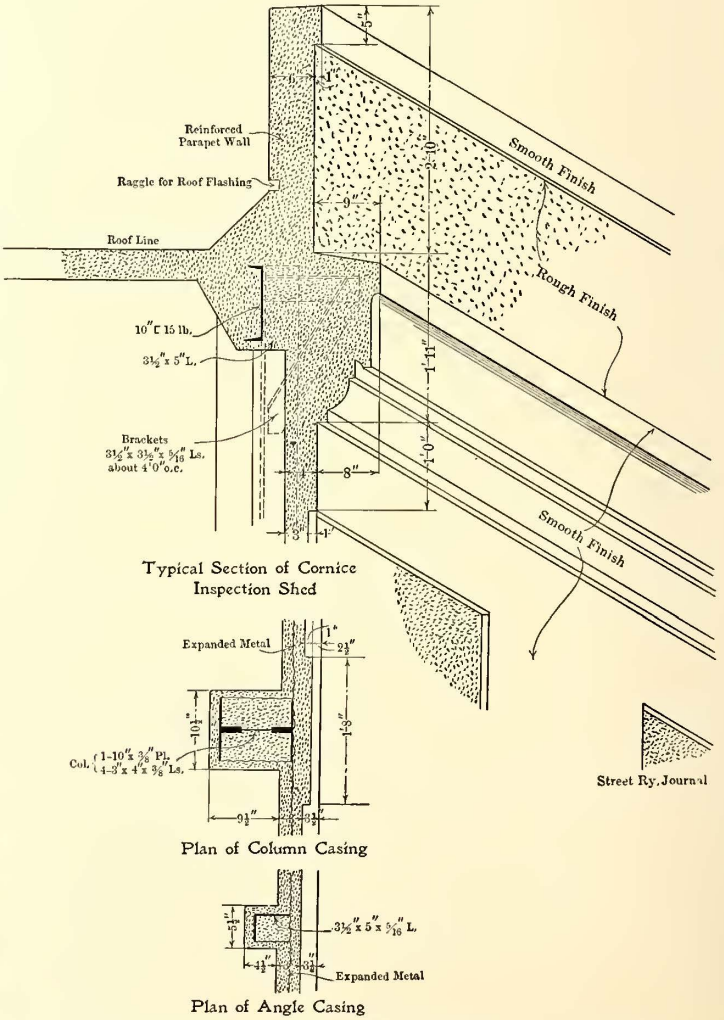


FIG. 11.—SECTIONS THROUGH CORNICES AND COLUMNS, SHOWING STYLE OF CONCRETE WORK

The building is divided into three sections to accommodate the coal storage, boilers, blower and oil department. The coal bin is nearest the storage tracks from which coal can be unloaded conveniently, and in like manner ashes from the boiler room can be carried away on the nearby tail track. The chimney will be of the Custodis hollow brick radial type, 36-in. diameter at the top and 95 ft. above the boiler room floor.

The boiler room will have two horizontal tubular return boilers, 54-in. diameter by 15-ft. length, made up of sixty-four 3-in. tubes. The heating throughout will be of the indirect type except that steam radiators will be used in the passengers' waiting room and the service building. Condensation from the indirect heating system will return by gravity, and from the direct radiation with the assistance of a feed pump.

The longest steam line will be led from the boilers for 500 ft. to the service building following the route indicated in Fig. 3. This will consist of a 1½-in. asbestos-covered steam pipe with a 1¼-in. return pipe laid in an 8-in. x 10-in. duct made of 2-in. spruce. To reduce radiation losses, the duct will follow the inner side of the inspection shed wall as far as possible. A second but much shorter steam line, 1½-in. diameter, leads to the waiting room. Both lines receive steam at a pressure of 40 lbs. per square inch.

The blower outfit, which is to be mounted on a steel platform, will consist of a centrifugal fan with an 8-ft.

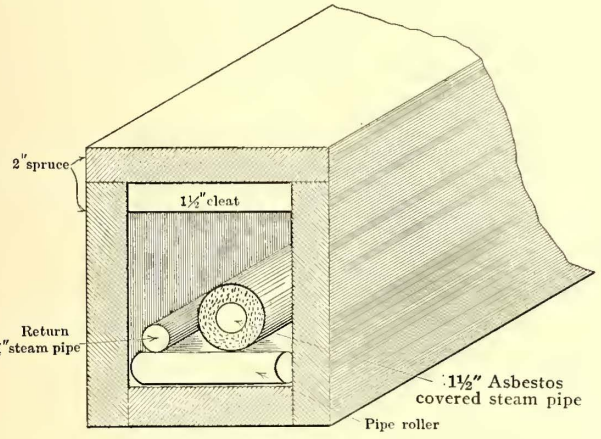


FIG. 13.—SKETCH OF BOX CONTAINING STEAM PIPES

wheel, 4 ft. wide, driven by a 30-hp Northern motor whose speed can be varied from 160 to 205 r. p. m., according to the heating conditions. The heater coils contain 6500 ft. of 1-in. pipe arranged in two sets of coils, equivalent to a total heating surface of about 2242 sq. ft. Each set of coils is enclosed in a separate casing with the steam and return connections so arranged that either set can be cut out for repairs without stopping the fan. Doors are provided to close the passage between the sets of coils and the fan while such repairs are being made.

The heated air is carried from the blower room through a concrete duct 4 ft. wide and 5 ft. deep which runs across the back of the inspection shed. Before turning in between tracks 1 and 2 it is tapped by two 3-ft. 6-in. ducts running between the other pairs of tracks and by a 12-in. vitrified tile duct dividing for a 6-in. outlet in the office and an 8-in. outlet in the stockroom. The ducts running between the sets of tracks are tapped at intervals of about 26 ft. by 12-in. vitrified tile ducts connecting each pair of pits. The heat is regulated by dampers set in the pit walls.

The tops of ducts forming floor areas are reinforced with 1-in. wrought-iron rods and Clinton wire cloth designed to

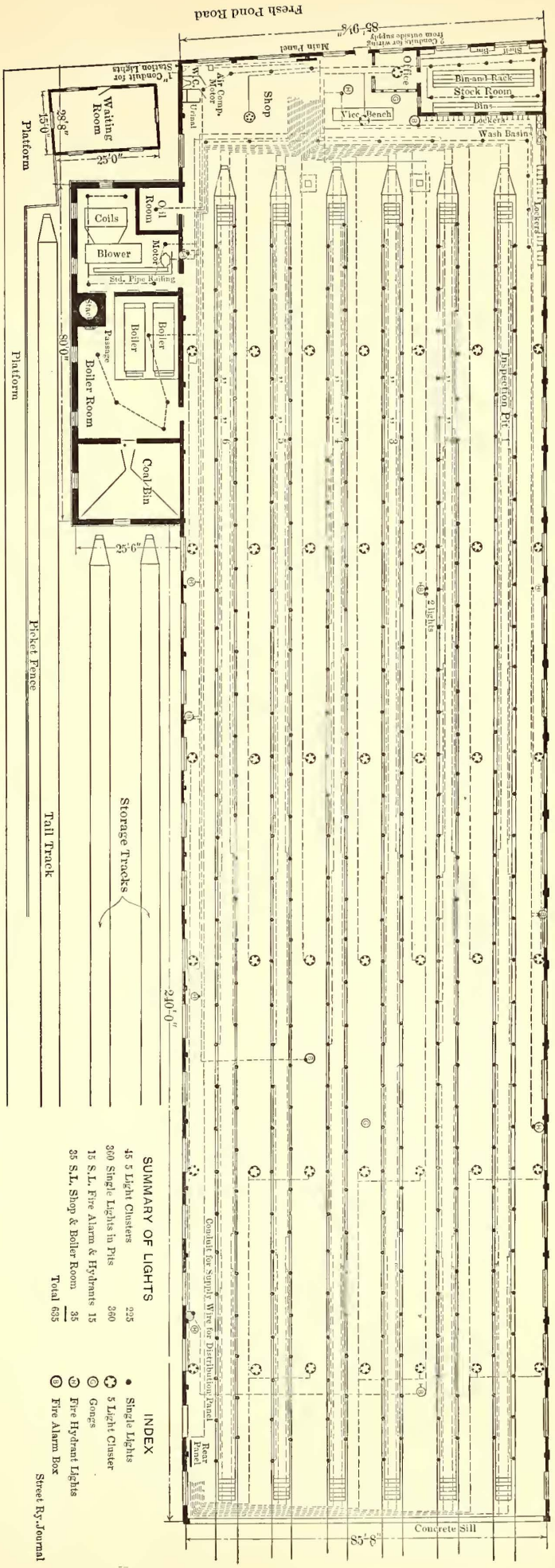


FIG. 14.—PLAN OF THE LUTHERAN SHED, SHOWING THE LOCATION OF THE LIGHTS, WITH KEY TO THEIR USES

carry a live load of 300 lbs. per square foot, except the portion leading to the blower room (designed to carry the walls above) which will be reinforced with 4-in. I-beams, placed about 24 ins. centers, and with wire cloth.

LIGHTING SYSTEM

The lighting arrangement of the main building group is well shown by the symbolic scheme in Fig. 14. It will be seen by this that the lights in the inspection shed will be made up of five-light clusters of incandescent lamps. These clusters will be spaced 26 ft. across the shed and will be attached to the columns between the tracks. The pit lights are in staggered recesses of the type shown in detail on page 234 of the Street Railway Journal for Feb. 9, 1907. The conduits are carried inside and directly under the track stringers.

Groups of five incandescent lamps are also shown in the office and shop portions, but these, like the rest of the installation, also have single lamps. There are extra single lights in connection with the fire-protection system.

FIRE PROTECTION

Effective fire-fighting means are provided both in the storage yard and inspection shed by the installation of R. D. Wood 4-in. fire hydrants with the proper length of fire hose in boxes. These are indicated by the points marked *H* on the plan Fig. 3. On Fig. 14 are indicated the positions of the alarm gongs, fire-hydrant lights and alarm boxes for the main building group. All fire doors and shutters conform to the requirements of the National Board of Fire Underwriters for tin-clad doors and shutters.

AIR PIPE LINE

The air pipes used in connection with the work in the inspection shed run from the air compressor tank to the roof and are then carried over a horizontal line and across the full width of the inspection shed. The main line has four branches which continue below the floor level and run over to the 6-in. x 10-in. yellow pine stringers on which the rails are mounted. The ¾-in. air lines running along these stringers have six ½-in. outlets on each line equipped with stop cocks.

GENERAL

The construction features of the Lutheran as well as the Thirty-Sixth Street and East New York plants were designed and built under the direction of W. S. Menden, chief engineer, and H. J. Kolb, assistant engineer and architect.

USE OF WAX IN THERMIT REPAIR WORK

G. E. Pellissier, of the Goldschmidt Thermit Company, has applied with excellent results to thermit repair welding a very ingenious method of making molds which is used quite generally in making intricate bronzes. In fact, the plan is said to have been employed as early as the sixteenth century by Cellini, the famous Italian goldsmith, but so far as is known it has not been applied before to shop work. In truck repairs it is often difficult and inconvenient to make a very satisfactory wooden pattern for the mold. One reason is that the shape of the parts to be welded is generally different in every case. Again, the pattern has to be so small that it is liable to become misplaced while the sand molds are being fitted around the truck frame. If this occurs the weld will be made at the wrong point.

The improvement consists in using yellow wax as a pattern or matrix for the casting. The parts to be welded are first laid together and a wax pattern of exactly the form desired in the final weld is shaped about them. After this is done the molding sand, which consists of fire clay and sand, is tamped around the matrix in the usual manner except that a small hole is left in the very lowest part of the mold. The pattern for runner and riser are made of wood in the usual manner. When the mold box is completely filled, the runner and riser are withdrawn; then, instead of taking off the mold and drying it, the torch is turned directly on to the green sand. The heat melts the wax, which runs out of the hole at the bottom of the mold, leaving a perfect mold. What little wax soaks into the sand rather improves the mold than otherwise. The wax does not adhere to the metal but leaves it absolutely clean. After the mold is thoroughly dry, the hole at the bottom can be closed up with a sand core. The mold is then ready for casting.

The work can be done much more quickly and cheaply by this method than by the old way. It is, of course, applicable to all kinds of thermit welds, but is especially useful in making welds on motor frames, intricate castings, etc., or in any case where fitting the mold is the hardest part of the job. Mr. Pellissier has found that in doing the work in this way it is necessary to have a good torch, so that the mold can be dried out thoroughly and the interior heated to red heat.

CONDUCTORS' WITNESS CARDS USED BY THE OKLAHOMA CITY RAILWAY

Conductors on the Oklahoma City Railway carry in their pocket a supply of witness cards which, in case of an accident, they distribute among the witnesses for signature. Having the witnesses write their own names reduces the difficulty of reading them, as frequently occurs when the

WITNESS CARD

Name _____

Street _____ No. _____

City or Town _____

_____

Occupation _____

Date _____ 190 —

PLEASE FILL OUT AND RETURN TO CONDUCTOR

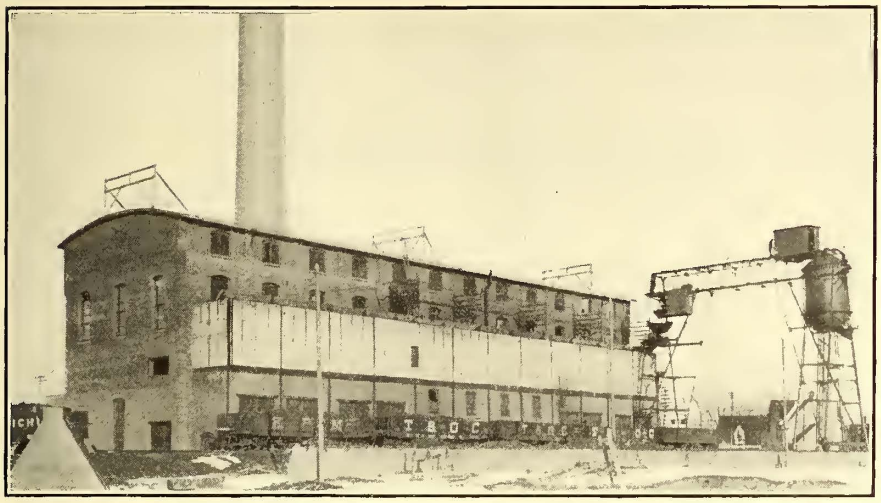
TYPE OF WITNESS CARD DISTRIBUTED BY CONDUCTORS ON THE OKLAHOMA CITY RAILWAY AFTER AN ACCIDENT

trainmen write them, and also prevents errors in spelling due to misunderstanding the people giving their names. Of course, cards are also more advantageous than one form on which all the names are written, because the necessary number may be distributed and collected signed within a couple of minutes.

It is reported from Montreal that President William Mackenzie, of the Rio de Janeiro Tramway, Light & Power Company, Ltd., who recently went to London, has just sold there and on the Continent the balance (about $4,000,000) of the $25,000,000 bond issue held in the treasury.

NEW POWER STATION AT FORT WAYNE, IND., PUT INTO SERVICE

The Spy Run power station of the Fort Wayne & Wabash Valley Traction Company, at Fort Wayne, Ind., which was described at some length in the convention number of the



VIEW OF THE COMPLETED POWER STATION AT FORT WAYNE, TOGETHER WITH THE COAL-HANDLING APPARATUS

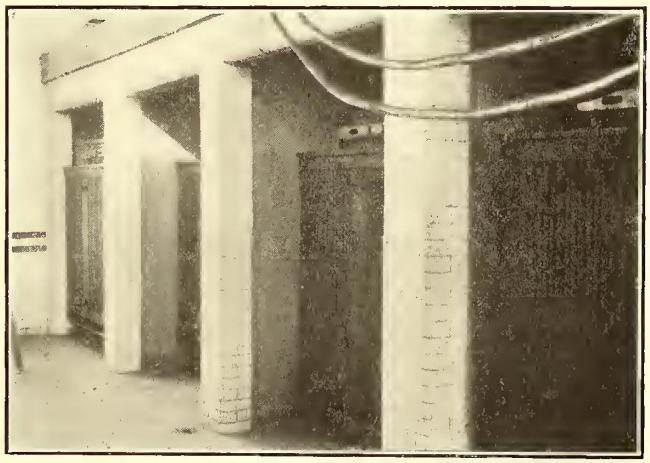
Street Railway Journal, Oct. 13, 1906, has been put into operation. Power generated in it is being transmitted to Logansport, 76 miles distant. As was mentioned in the article referred to, the feature of this station is that the Westinghouse turbines are installed on a second floor immediately over the boilers. The station is designed for five 15,000-kw, one 500-kw and one 400-kw Westinghouse turbines. With the exception of one of the larger turbines, all of the machines are now installed. The turbines are all of the enclosed type, ventilation being effected by drawing air through ducts from the outside of the building through the generator casings and discharging it into the boiler room.

Five switchboards are installed on a gallery extending almost the entire length of the room. These consist of a 25-cycle generator board, a 25-cycle rotary converter board, an exciter switchboard, a 60-cycle rotary board and a board for the 60-cycle generators. All of the high-tension apparatus is located at one end of the generating room. Underneath the high-tension gallery are six concrete cells for the six 375-volt to 33,000-volt oil-cooled step-up transformers. The transformers are supported on low trucks made of channel iron so that they may be readily pulled out in front of the cells, from which position they may be reached by the overhead crane. Behind the transformer cells are the static interrupters and above are the high-tension switches and lightning arresters. All of the wiring in the station is carried in bitumenized fiber conduit, of which about 6 miles are installed.

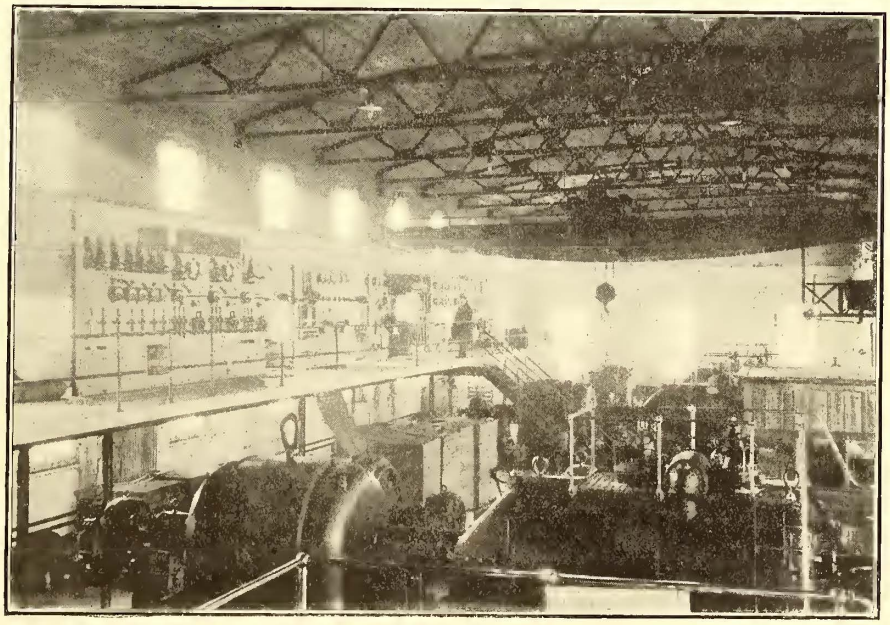
The coal-handling apparatus is shown in an accompanying illustration. A gantry crane spans a concrete coal storage pit 60 ft. wide, 180 ft. long, and having a capacity of 7500 tons of coal. The crane carries a motor-driven McCaslin coal crusher. A clam-shell bucket elevates the coal from cars or from the coal pit and dumps it into a hopper above the crusher. After passing through the crusher it falls into a concrete coal bunker extending the length of the building. The coal-handling plant has a capacity for 40 tons of coal per hour, which should be ample for some time to come.

AN OHIO TALK ON RAILWAY TAXATION

Attorney-General Wade H. Ellis, in an address at Massillon, Ohio, recently, said that in making up the tax valuations on public service corporations, where franchises have been given, the market value of stocks and bonds should be taken into consideration. The tax valuation on tangible property is sometimes too low because the market value of the stocks of a company are high and are therefore of greater value. He said he did not think that corporations should be taxed on both the securities and the tangible property they own.



TRANSFORMERS IN CONCRETE CELLS



INTERIOR OF THE FORT WAYNE POWER STATION

THE DENISON & SHERMAN RAILWAY, TEXAS

While the interurban systems of the Eastern States have been gradually working away from city electric railway practice towards that of steam roads, it is interesting to note that the first electric interurban line operated in Texas was built at the outset as nearly according to steam railroad practice as conditions would permit. This road now operates between Denison and Sherman, a distance of 10.5 miles,

THE HEAVIEST CUT ON THE LINE

in connection with small city systems in the two terminal cities. The two cities have a population of about 15,000 and 10,000, respectively. There are many similarly located cities of about the same size in the United States not having interurban connections, and interest in a description of this road is enhanced by the fact that its receipts are very good evidence that roads connecting such towns would give satisfactory returns to the investor. In 1905 the receipts were $104,591 and the operating expenses $60,683, giving a gross income less operating expenses of $43,908. At the present time the system is isolated, but in the course of about two years it will be connected in Sherman with the lines of

OFFICE AND STATION AT WOODLAKE

the Texas Traction Company being built between Dallas and Sherman, a distance of 65 miles.

The offices of the Denison & Sherman Railway Company, the power house and shops are located at Woodlake, about midway between the two cities, and there is also at this point a lake and park which is the chief amusement resort for the terminal cities.

TRACK AND OVERHEAD CONSTRUCTION

The interurban line is built on a private right of way varying in width from 50 ft. to 100 ft. The roadbed was constructed with a maximum grade of 1½ per cent. This necessitated one 20-ft. cut and several fills and trestles. The trestles are rather heavy, being constructed with six stringers. Both sand and cinders are used as ballast. The rails, which are 70 lbs., are in 60-ft. lengths. All of the switches are of the through type and are equipped with spring switches and Elliot frogs. Switch stands of the low target type are used. The rails are bonded with both pin and compressed bonds.

Span wire overhead construction is used throughout the system. In addition to the trolley the poles carry telephone wires and two 0000 feed wires. These feeders are for the purpose of feeding the city systems as well as the interurban line.

POWER HOUSE AND SHOPS

The power house at Woodlake is built in conjunction with a car storage barn and contains two simple Corliss engines

PAVILION USED AS A PARK STATION BY THE DENISON & SHERMAN RAILWAY COMPANY

belted to two 200-kw, 500-volt generators. The shops are located in a frame building near the power house and are well equipped with machinery for taking care of the system.

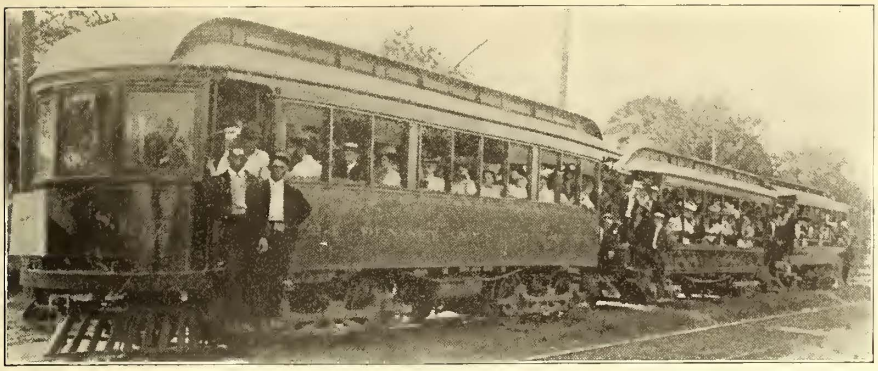
THE CASINO AND THEATER

A room separate from the remainder of the shop serves as a paint shop.

CAR EQUIPMENT

The car equipment consists of five interurban motor cars, seven open trail cars for use on the interurban line, and six cars with 16 ft. to 20 ft. bodies which are used in local service in the terminal cities. The interurban cars are from 37 ft. 8 ins. to 44 ft. long, and from 8 ft. to 8 ft. 9 ins. wide over all. They have a seating capacity for forty-

four people, and the cane seats are provided with arm rests. Two of the cars contain three and the remainder two compartments. The rear platform is open and is provided with a grill railing. A transverse pipe railing divides the floor space into a passageway into the car and a space for smokers behind it.



A THREE-CAR SPECIAL TRAIN ON THE LINE OF THE DENISON & SHERMAN RAILWAY COMPANY

As the park at Woodlake is regarded as the chief amusement resort for the two cities, it is the source of a considerable income, and is as a consequence well kept up.

THE PARKS

There are, in fact, two parks at this point, containing 45 acres—one for white people and a smaller one of about 5 acres for colored people. The two races are kept entirely separate. Both parks are well wooded and are located on rather hilly ground. The main attraction of the larger park is a lake which contains 11 acres. This lake, which is about 20 ft. deep near the dam, runs back several hundred feet, where the waters diverge and follow up two heavily wooded ravines. A band stand is located in the middle of the lake near the dam. The largest building in the park is the Casino, or theater, which has a seating capacity for 840 people. The stage is well equipped with scenery and dressing rooms are located on either side of it. The auditorium is provided with electric fans. A separate dancing pavilion was constructed last season. Near this pavilion is constructed a "shoot the chute" from which boats slide into the lake. A large pavilion built just below the dam serves as a station. As dancing is indulged in freely by colored people, a pavilion for this amusement has been built in that portion of the park set aside for them. All of the park buildings are painted a bright yellow with tuscan red trimmings, which color has been adopted as a standard by the company for both buildings and cars.

The parks are operated in a manner to attract only the better class of citizens. No intoxicating liquors are sold in them, and care is exercised in selecting the theater attractions. The park season lasts a little over three months, but as the climate is comparatively mild, the parks are kept open throughout the year. During the season a five-cent fare between the terminal cities and the park is made after 7 p. m., and trail cars are employed in handling the crowds.

CASINO, DANCING PAVILION AND SHOOT-THE-CHUTES IN THE PARK OF THE DENISON & SHERMAN RAILWAY COMPANY

POWER HOUSE AND SHOPS, WITH LAKE AND DAM IN THE FOREGROUND

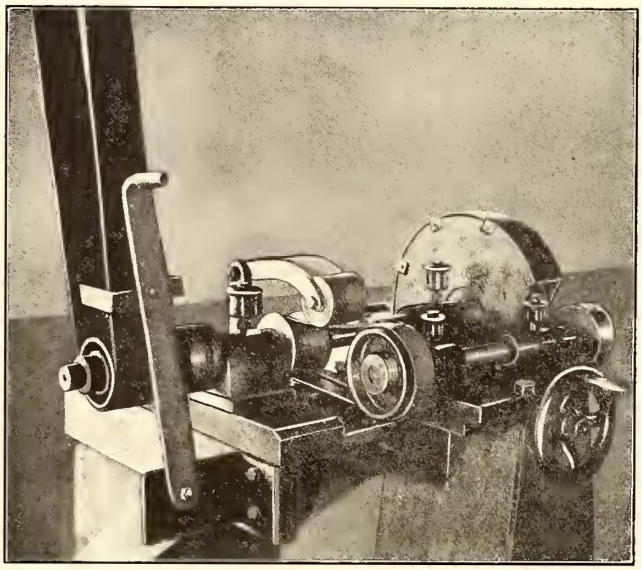
OPERATING FEATURES

Two local cars are operated in Denison and three in Sherman. On the interurban line a forty-minute schedule is maintained in winter with three cars up to 7 o'clock, when cars are run hourly. In summer a half-hour service is given after 12 p. m. The cars are dispatched by telephones, the instruments being located in cast-iron city fire alarm boxes on the trolley poles. The one-way fare between Denison and Sherman is 25 cents, but commutation tickets are sold at 17½ cents. No passes except occasional complimentary trip passes are given. Newspaper advertising is paid for in cash. Regular express cars are not run and only express matter that can be handled in the combination passenger cars is received.

The West Penn Railways Company, of McKeesport, Pa., will erect a grand stand, bleachers and fence at Olympia Park for free use by the McKeesport Baseball Association.

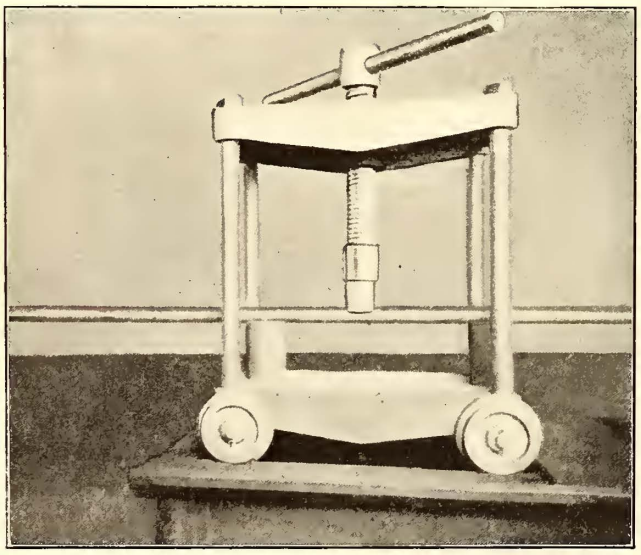
SHOP PRACTICE AT LITTLE ROCK

The shops of the Little Rock Railway & Electric Company contain several original devices for facilitating work, and there are several features of the practice in the shops which are of special interest. The courtesy of D. A. Hegarty, general manager of the Little Rock Railway & Electric Company, and the aid of W. T. Tunnah, master mechanic, makes it possible for this publication to give an account of the most interesting shop features.



TROLLEY-WHEEL GRINDER

A trolley wheel grinder built by William Kranz, shop machinist, is of interest. The company formerly had a brass furnace and manufactured its own trolley wheels, and this machine was used in grinding the grooves to the proper shape. It is built with two shafts, one of which carries an emery wheel with a specially shaped face, while on the other is bolted the trolley wheel to be ground. This second shaft is mounted on a carriage and by means of a hand wheel its distance from the emery wheel shaft may be varied. It is driven by a belt from a pulley on the grinder shaft. An idler maintains the proper belt tension. Since the practice of casting wheels in the shop has been abandoned this device is used to regrind wheels to shape. By so doing an increase of about 10 per cent is obtained in the life of wheels. A 4-in. wheel makes about 5000 miles. About two minutes is required to grind or regrind a wheel.



DEVICE FOR STRAIGHTENING POLES AND AXLES

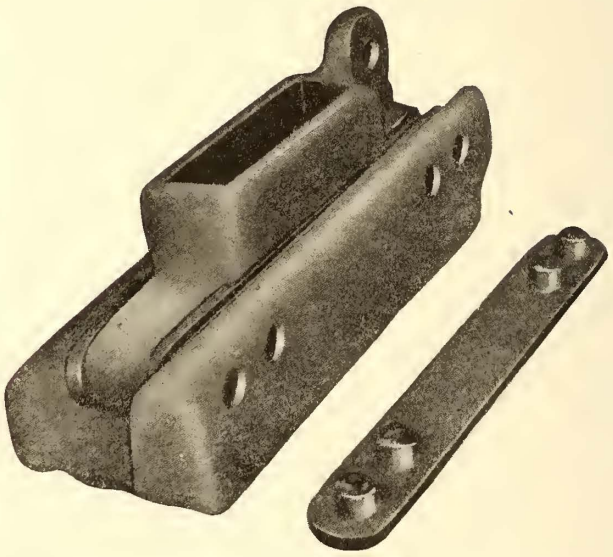
Another interesting device is used in straightening trolley poles, armature shafts and axles. This is essentially a "jim crow" mounted on wheels gaged to run on the bed of a large lathe. When axles are to be straightened, the device is placed between the head and tail stock of the latter, and while the part to be worked upon rests in the lathe, pressure is applied upon it with the "jim crow."

Instead of hammering dashes back into shape after they have been bent up in accidents or collisions, the dents and irregularities are rolled out in a press built especially for this purpose. This press, which was the suggestion of C. J. Griffith, superintendent of the railway department, is built with heavy rolls somewhat after the design of mangles in steam laundries.

CAR NUMBERS ON SIDE TRANSOM WINDOWS

PAINTING AND OVERHAULING CARS

In repainting cars all lettering is omitted and the omission of this, together with that of the scrolls and other ornaments formerly used, results in a saving of about $14 per car. Pullman green has been adopted as a standard car color, as this is the only color that has been found to hold. Other colors are bleached by the alkali soil. Contrary to usual practice, the seats and posts of summer cars are painted and grained when the cars are put through the paint shop. This practice it is considered gives a better appearance than when varnish only is applied to the stained woodwork. The seats and posts of such cars are given two coats of lead and a graining coat and are then finished with

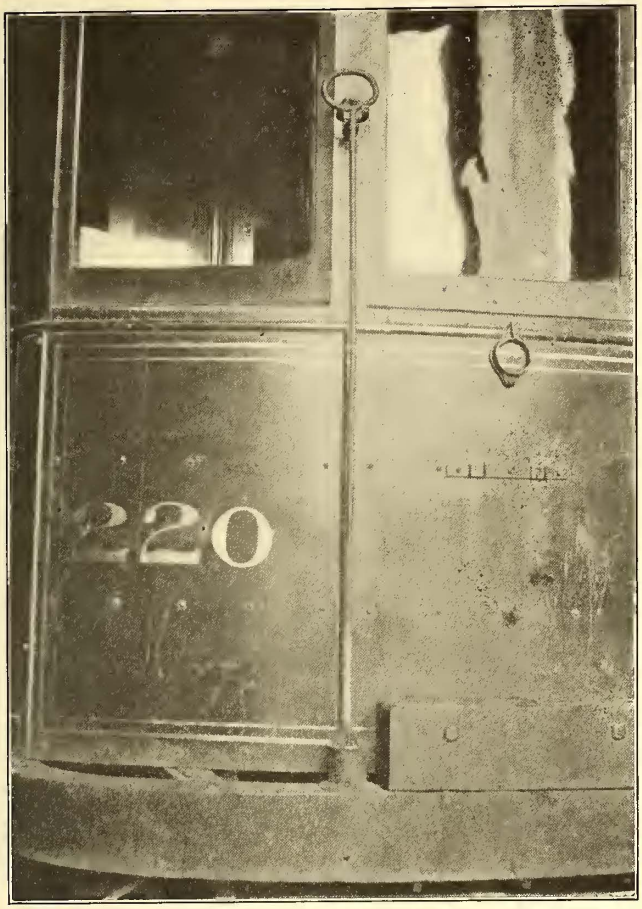


SHOES FITTED IN THE BRAKE BEAM RUNWAY OF BALTIMORE TRUCK TO TAKE UP WEAR

two coats of varnish. Cars are brought in the shop for a thorough overhauling once each year. As double equipment is used this is equivalent to an overhauling after six months of service.

SIGNS ON CARS

Instead of tacking miscellaneous card-board signs such as those making special announcements, prohibiting smoking, and talking to the motorman promiscuously about the car, all of these of a permanent nature are painted on the woodwork, while those which are subjected to change are printed on cardboard and are inserted in card racks at the ends of the car. "Remain Seated Until Car Stops" signs are placed in a rather effective manner on the backs of the seats of the open cars. On closed cars similar signs are placed in the interiors and over the vestibule doors. With these signs constantly before them, passengers if injured through disobeying them have only themselves to blame. Another sign which might to advantage be adopted by other systems is that on the controller on open cars reading, "Danger, Feet Off." This sign is printed in white letters and is intended to prevent passengers bracing their feet against the controller and defacing it. Car numbers are painted on the deck windows as shown in an accompanying view. It frequently happens that after an inspector has observed a motorman or conductor disobeying rules at night he is unable to report the violation because of his inability to catch the number of the car. By painting the numbers on the deck windows where they can be readily seen at night some of the difficulties of the inspectors are removed. Contrary to the usual practice, all of the cars are provided with fire extinguishers. These are of the dry powder type and take up very little space.



METHOD OF HANGING SWITCH-ROD AT LITTLE ROCK

One of the reproductions shows the manner of hanging switch rods to prevent them swinging and marring the dash. The lower end of the rod rests in a small cup screwed to the bumper iron.

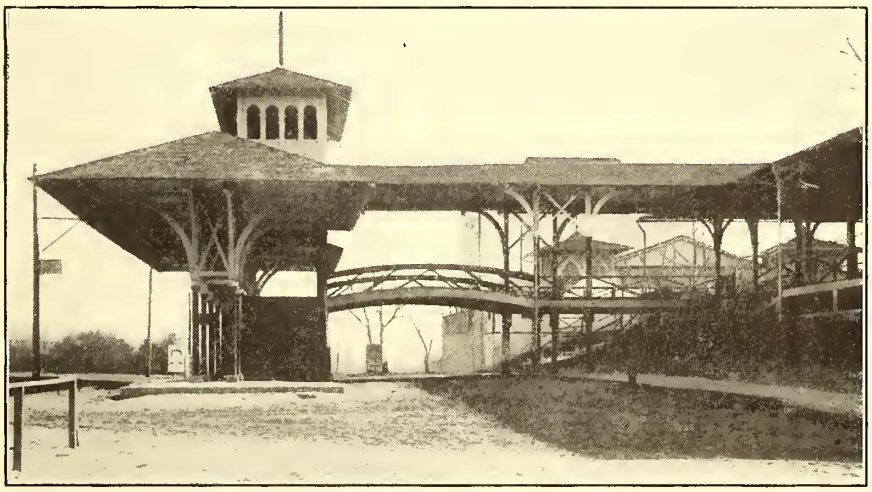
A kink of advantage to users of Baltimore trucks is shown in a view on page 688. Instead of replacing the worn runways of these trucks in which the brake beam slides, the wear is taken up by fitting in the shoes ordinarily used on the brake beams. They are placed in such a position that that shoe on the runway and that on the slide wear against each other.

ELECTRIFICATION AT ST. PETERSBURG

It is reported that work on the ten contracts which the Westinghouse Electric Company secured last year from the municipal authorities of St. Petersburg, covering the electrification of the first section of the tramway system of that city, is being rapidly pushed, and it is now estimated that the contracts will be completed very nearly on schedule time—by the last of September next. The contracts covering all the work necessary for the complete electrification of this first section amount in the aggregate to $5,500,000. In connection with this contract the Westinghouse Electric Company formed a Russian company which has acquired a complete electric manufacturing establishment at Moscow to manufacture the greater part of the apparatus required.

PARK ENTRANCE AT OKLAHOMA CITY

At Delmar Park, one of the parks reached by the Oklahoma City Railway, quite an artistic railway station has been erected. A pavilion supported by two lines of posts near the center extends over the track and a concrete platform. From each end of the platform steps ascend to a covered passageway, which is over an adjacent carriageway leading into the park proper. The park, which is owned and operated independent of the railway, embraces several acres and contains the usual attractions, including a theater, which is used as a roller skating rink in winter. A scenic railway extends through the central portion of the grounds.



PARK ENTRANCE AT OKLAHOMA CITY

HINTS FROM A CONDUCTOR

GUIDING WOMEN TO AND FROM THEIR SEATS

A great deal has been written about the subject of women and their getting off cars the right way. Men instinctively face forward in getting off a car, but women, for some unknown reason, seem almost always to face toward the rear. The two explanations generally offered for the women are that it seems to be quite natural for them, especially in cities where cars stop on the far side, to turn before alighting in the direction of the corner past which they have been carried, and also that women always make a practice of gathering their skirts about them with their left hand, this, of course, leaving the right hand free and forcing them in alighting to turn backward. It would not add greatly to the burdens of the conductor to lend his aid in instructing the women in the proper way of alighting, and if this were done in a gentlemanly way no serious offense could be taken at the conductor's action. In fact, it seems that this is the only hope of ever training the women to alight properly. Placards and advertising done by street railways in their own cars seem not to have had any effect on the ladies. It would also seem advisable to require the conductor, where operating conditions will permit, to direct women to seats. They, more than men, seem bound to get aboard the open cars at the seat which is nearest to them when the car is brought to a stop. One might say, offhand, that it would require time for the conductor to do this work, but this would be compensated for by the fact that egress at the time of getting out would be materially lessened.

NOTIFYING MOTORMEN AND INSPECTORS

Various schemes are in use for notifying motormen and conductors that they are to see the superintendent. On some systems the practice is followed of posting a bulletin, and the men look over the list some time during the day and report to the superintendent at their convenience. Another method followed is for the superintendent to notify a man when he is wanted, through the starter, upon whom this task often works an unnecessary hardship. It would seem that the idea might be followed of employing an alarm clock in this work. The superintendent could have before him at all times a list of the names of the men and the times they start on their runs, and set the clock to the time of the man he wished to see. Thus, motorman Burns is to be seen. The superintendent looks at his list and sees that Burns is scheduled to be in the station at 4:10 p. m. He sets the clock for 4 o'clock, and when it rings tells the starter to tell Burns to see him before taking his car out. Conversely, it would be a good thing if each trolley car carried a flag of a certain color to be placed in a conspicuous place if an inspector was wanted.

DETACHING TRANSFERS

A question that bothers conductors not a little is that of detaching transfer slips easily. Frequently the conductor moistens his finger at his mouth in order to assist him in detaching the slips, a plan which is unhygienic, to say the least. A much better way for the conductor to do is to look after his transfers as soon as he receives his pad. If at the beginning of his run he can take the pad between the thumb and forefinger of each hand and run the transfers from left to right. They will separate readily. He can then tear the right-hand side about ¾ in., and with ease after that hand out the transfers one at a time. Another good scheme is for conductors to attach their pads by a string to a button of their coat, and pull the transfers off by running their hand down the pad.

HANDLING THE BELL-CORD

A simple expedient which would tend greatly to reduce the number of accidents would be for the conductors always to have the bell cord under proper control no matter where they are on the car. Although the rules specify that conductors shall be in view of the platform when passengers are boarding, it is nevertheless absolutely impossible at times for a man to be in a position where he can see the rear platform. It frequently occurs that a stop is made for a passenger when the conductor is in the middle of the car busily engaged in collecting fares. Frequently he relies either on the word of a passenger on the platform or on his own judgment as to the time allowance for a passenger properly to board a car, and then gives the bell a sharp jerk, releasing his hand immediately. If he would pull the bell and retain the control of the strap for a second or two, it would not seriously interfere with his work, and if the occasion should arise for his then stopping the car he could do so immediately.

TIME OFF

The question of time off for motormen and conductors is one that causes no end of trouble both for the superintendent and the starter, especially the latter. All sorts of excuses are made by men who desire to get away, and when the pressure on the line is great for men, a man who has asked to get away and been refused frequently feels that the starter might have discriminated in his favor. Would it not be better, where operating conditions will permit, to arrange the tables for 11 hours and 40 minutes a day, say for six days, than to make them up for ten hours daily for the seven days? This would give each man one day off every week and in no way decrease his income. It would of course lessen the troubles of both the starter and the superintendent.

REPORTING DEFECTS IN APPARATUS

Just why it is that motormen and conductors are so frequently berated for reporting damages to their cars it is impossible to understand. Brakes, wheels, ratchets and other parts will at times go wrong, and where the trouble is not positively serious, and a man feels that possibly he may be told that he has not handled his car with sufficient care, he does not report a slight defect. It would seem to be much better if a barn foreman would induce the trainmen to report at once any injury to the apparatus. In this way things could be corrected which, if allowed to run, go from bad to worse and eventually result in the car being laid up in the car houses. Another thing, the cost of operation is materially increased where cars are run that are not in proper condition for service. The car-house foreman should not only be constantly on the lookout for trouble, but should compliment his men on reporting faults as soon as they are found.

IDENTIFYING OLD MEN

When applicants for employment come before the superintendent of employment, that official sometimes suspects that a man is an old street railroader who for some reason or other has lost his previous job. Where a suspicion of this kind does exist it seems to me that the matter could be easily settled by the superintendent appointing one of his assistants to watch the man when he is breaking in. A man who has worked on a car and is thoroughly conversant with its duties will surely disclose his familiarity with things. He may impulsively go through the entire routine without

ever a thought of what he is doing. Or he may, on the other hand, attempt to cover up his knowledge of the work. In this case he bungles so noticeably that it will be detected at once. I have in mind an experience of my own in changing from one car house to another. The motorman asked me upon taking out the car if I had had any previous experience in railroading. I said that I had not, and when we had finished the day he said to me: "When you told me that you never had had any experience I said to myself: 'We shall be in the soup all day; but when I heard the bells I knew that you had worked as a conductor before." I observed, not so very long ago, without his knowing it, a man breaking in who was unconscious that the instructor was on the car. He boarded the car, wound up the brake, looked at the air, tapped the bell, worked the sand lever and threw the switch a couple of times, as well if not better than the instructor had done some time before.

TRACK CONSTRUCTION IN DALLAS, TEXAS

The track construction of the Dallas Consolidated Electric Street Railway, of Dallas, Tex., on its Ervay Street line, while of the concrete stringer type, differs somewhat from that used in other cities. No heavy cross-ties at all are employed. In addition to the customary tie-rod midway between the base and the top of the rail, a second tie-rod or bar is clamped to the base of the rail at points equi-distant from the round rods. The ties of each set are placed 10 ft. apart. The upper ones are ¾ ins. in diameter and are bolted to the rails in the usual manner. The lower ties, which are ½-in. x 1½-in. bar iron, extend under the rails and are fastened in a vertical position by a special clamp on each side of each rail. The concrete stringer proper under each rail is 18 ins. wide and 13 ins. high, but it is an integral part of the 7-in. bed of concrete placed between the rails and tracks and extending to the curb line.

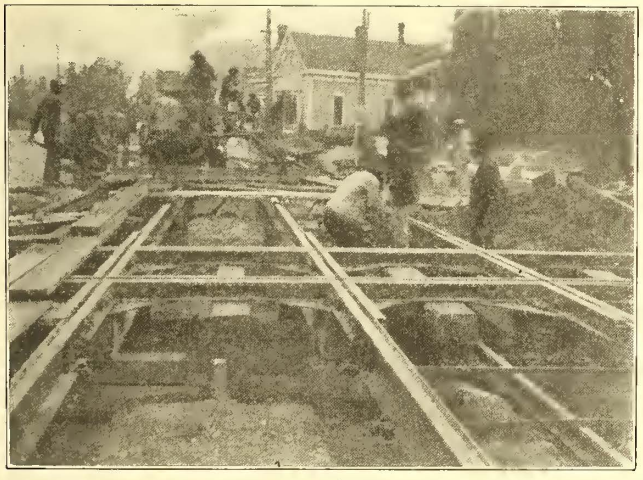
In laying new tracks on streets that are being improved, if single track is being replaced with single track, traffic is suspended on the line and the concrete allowed to set seven days before cars are run over it. The same method is used in replacing single track with double track, but in double track when the old rails are being replaced with new construction one track is taken at a time, using a temporary cross-over so that the service is not hindered.

The concreting and paving is done under contract by the company having a contract for paving the streets. The railway company pays for that between the rails and tracks and for 2 ft. on each side of the outside rails. The concrete is a mixture of 1 part cement, 3 parts sand and 6 parts limestone. A portable steam-operated continuous mixer is employed. In putting in the concrete, space is left around the blocks supporting the rails. After the concrete has set the blocks are removed and the holes left by them are filled in. The concrete is always allowed to set seven days before cars are run on the tracks. The streets are finished with a 2-in. layer of bitulithic paving which is carried up to the rails without use of paving block next to these.

Grooved 9-in., 95-lb. rails in 60-ft. lengths are used. These are bolted together with eight-bolt continuous rail joints and are electrically connected with two 210,000-circ.-mil plug bonds. On double-track work the slope of the street necessitates the outside rail of each track being placed ½ in. lower than the inside rails. No superelevation is given to the outside rails on curves, but at curves the gage of the track is made ¼ in. wider than on tangents.

The track construction at a steam road crossing is especially interesting. Under each rail intersection is riveted a steel plate measuring 30 ins. x 36 ins. and ½ in. thick. The spikes are driven into 16-in. x 16-in. timbers which are placed under each rail of the electric system and extend between the rails of the steam road tracks. In addition to the heavy timber, ties of standard size are spiked to the steam road rails. The whole crossing is then blocked up 3 ins. above the normal grade and a bed of concrete 18 ins. deep is placed under it. This bed extends on either side of the steam road track 6 ins. beyond the ties and back under it to the property line on each side of the street. After the concrete has set eight days the crossing is dropped to the normal grade. At railroad crossings bonding of the track is continued through old T-rails which are embedded in the concrete and are connected to the railway tracks at either end by copper bonds.

The track construction described has been used on about 8 miles of track in Dallas. Some of this track has been in service for three or four years, and with exception of a few places where the foundation was not firm it has been very satisfactory.



STEAM-ROAD CROSSING BEFORE CONCRETING, SHOWING THE RAIL UNDERNEATH TRACK, WHICH SERVES AS A BOND OVER THE CROSSING

THE TRACK BEFORE CONCRETING, SHOWING THE METHOD OF SUPPORTING RAILS ON BLOCKS AND THE TWO SETS OF TIES

ORGANIZATION OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

A short account was published in a recent issue of this paper of the meeting of accounting officers of the electric interurban railways of the Central Western States, at the Algonquin Hotel, Dayton, Ohio, March 2. At this meeting it was decided to form an association, to be known as the Central Electric Accounting Conference, for the purpose of enabling representatives of the accounting departments of electric lines to become acquainted with each other and to afford an opportunity for the discussion of any matters of interest in reference to accounts which might be deemed of sufficient importance and of mutual interest. The following were present:

L. T. Hixson, auditor Indianapolis & Eastern Ry. Co., Indianapolis & Northwestern Tr. Co., Richmond St. & Interurban Ry. Co., of Indianapolis.

Walter Shroyer, auditor Indiana Union Tr. Co., Anderson, Ind.

A. F. Elkins, auditor Columbus, Delaware & Marion Ry. Co., Delaware, Ohio.

F. K. Young, auditor Scioto Valley Tr. Co., Columbus, Ohio.

H. E. Vordermark, auditor Ft. Wayne & Wabash Val. Tr. Co., Ft. Wayne, Ind.

A. C. Henry, auditor Lake Shore El. Ry. Co., Norwalk, Ohio.

J. J. White, auditor Dayton, Covington & Piqua Tr. Co., West Milton, Ohio.

R. A. Crume, auditor Dayton & Troy El. Ry. Co., Dayton, Ohio.

W. B. Wright, auditor Indianapolis & Cincinnati Tr. Co., Rushville, Ind.

W. I. McLure, auditor Toledo, Urban & Interurban Ry. Co., Findlay, Ohio.

H. A. Baymiller, freight auditor Toledo, Urban & Interurban Ry. Co., Findlay, Ohio.

R. H. Carpenter, auditor Western Ohio Railway Co., Lima, Ohio.

C. B. Baker, freight auditor Western Ohio Railway Co., Lima, Ohio.

H. H. Stephenson, ticket auditor Western Ohio Railway Co., Lima, Ohio.

C. C. Collins, general freight agent Western Ohio Railway Co., Lima, Ohio.

R. J. Wells, auditor Dayton & Xenia Transit Co., Dayton, Ohio.

M. W. Glover, auditor Indiana, Columbus & Eastern Tr. Co., Lima & Toledo Traction Co., of Cincinnati.

On motion of A. F. Elkins, duly seconded and passed, M. W. Glover was elected chairman of the conference and C. B. Baker was elected secretary.

An executive committee was elected, composed of the following: Walter Shroyer, acting auditor Indiana Union Tr. Co.; A. F. Elkins, auditor C. D. & M. Ry. Co.; A. C. Henry, auditor Lake Shore El. Ry. Co.; C. B. Baker, freight auditor Western Ohio Ry. Co.; M. W. Glover, auditor I. C. & E. and L. & T. Tr. Cos. It was decided that the executive committee would handle such matters as might come up in connection with the conference and which might not be of sufficient importance to call a special meeting of the conference to consider. It was decided that the next meeting of the conference be held at Indianapolis on Saturday, June 1, 1907, the hour and place to be determined later and all members to be notified.

The following plan for the settlement of interline freight and ticket accounts was adopted and it is expected that this plan will be followed by all lines whenever practicable.

INTERLINE FREIGHT ACCOUNTS

Interline billing shall cover the movement of freight and express shipments between such points and over such lines as may be agreed upon between the accounting departments of the respective lines. It is understood that when shipments covered by interline billing move over more than two lines, the forwarding line shall furnish to the intermediate line or lines, daily, copies of all way-bills moving over such lines or line. Settlement for all interline way-bills shall be made by the receiving line.

A report of all interline way-bills received shall be rendered by the receiving line on or before the fifteenth day of the succeeding month and shall include all way-bills received during the month for which the report is rendered. The original report, accompanied by a division statement, showing the apportionment of earnings between all lines interested, shall be mailed to the forwarding line and legible copies of such reports and division statements shall be mailed to all intermediate lines interested. The report and division statement as rendered by the receiving line shall be accepted as a basis for settlement, and all errors or omissions shall be taken up by correspondence with the receiving line and adjustment shall be made in the succeeding month's report.

The receiving line is responsible for the collection of proper revenue on all way-bills received and shall correct the freight earnings on all way-bills to basis of current rates and divisions and should issue correction sheets to all lines at interest, reporting the way-bill on monthly abstract at corrected figures, but no changes may be made in the advanced charges or total prepay of any way-bill received, until authority for the change is obtained from the forwarding line. If errors occur in the advanced charges or total prepay shown on way-bills, the receiving line should make a request to the forwarding line for authority to correct, and as soon as authority is received, issue correction sheets to all lines at interest accordingly.

As soon as interline abstracts have been exchanged between lines for each month, and not later than the twenty-fifth day of the succeeding month, the debtor line shall forward a voucher in favor of the creditor line for the balance due on interline billing for the previous month. It is understood that the debtor line shall not wait for any bill or notice from the creditor line before making the voucher.

It is desirable to settle interline billing each month, and the voucher should show month for which settlement is made. If more than one month's interline billing is settled by one voucher, the balance for each month should be shown separately on voucher, so that the creditor line may properly handle the amount in its accounts.

It is expected that all lines will promptly reply to all communications relating to differences in interline abstracts, so that adjustment of all errors may be made whenever possible in the following month's account.

INTERLINE TICKET ACCOUNTS

Ticket reports shall be rendered monthly, covering all ticket sales over foreign lines, and the line selling tickets shall apportion earnings to all lines at interest. Ticket reports shall be rendered as soon after the close of each month as possible, not later than the fifteenth day of the succeeding month, and the reports as rendered shall be accepted and all differences handled by correspondence and included in subsequent report.

As soon as ticket reports for any month have been exchanged, and not later than the twenty-fifth day of the succeeding month, the debtor line shall forward a voucher in favor of the creditor line for the balance due on interline tickets for the month for which rendered, without waiting for bill or notice from the creditor line. It is desirable to settle interline ticket accounts monthly, but if more than one month is included in the voucher, the amount for each month should be specified to enable the

creditor line to properly handle the payment. It is understood that interline excess baggage will be included in ticket reports and settlements.

Other matters of interest were discussed, but no definite action taken, and it was decided that members should be requested to submit to the secretary, in time for him to transmit them to all members, a list of subjects to be discussed at the next meeting of the conference, so that all members may know what matters will be brought forward for discussion.

Another subject discussed was the authority of the conference. It was decided that the conference did not, and did not desire to, assume any authority over, or to bind its members or any lines represented, to follow its rulings. Its object was simply to afford a means of having the auditors and other accounting officers of electric lines in the Central States, meet from time to time and discuss matters of interest in the hope that such discussion would be beneficial to all concerned, and would result in a uniform method of handling accounts. It was decided that the name "conference" would be better than the name "association," as the latter would possibly be misunderstood and the purpose of the gatherings be misconstrued.

The secretary was instructed to forward to the auditors or other accounting officers of all electric lines in the territory covered and not represented at the meeting, a request to become members of the accounting conference and to attend the next meeting in Indianapolis, if possible.

It is not expected that the meetings will last longer than one day, and as they are to be held in centrally located points, the time spent in attending such meetings will not be great.

DEDICATORY EXERCISES OF THE ENGINEERING SOCIETIES BUILDING

The dedicatory exercises of the new building of the United Engineering Societies, at 27 West Thirty-Ninth Street, New York, were held on April 16 and 17. This building, it will be remembered, was erected by money given by Mr. Carnegie on land purchased by the American Institute of Electrical Engineers, American Society of Mechanical Engineers and American Institute of Mining Engineers. It contains auditoriums of various sizes, a large union library and the headquarters of the different associations. A number of other associations, like the American Street and Interurban Railway Association and National Electric Light Association, also have offices in the building. Before the meeting on Tuesday Mr. Carnegie made a tour of the building and spent considerable time in the headquarters of the American Street and Interurban Railway Association.

During the exercises on April 16 Charles W. Hunt, past president of the American Society of Mechanical Engineers, presided. Rev. Edward Everett Hale opened the exercises with prayer. Communications and felicitations were presented from the President of the United States, the President of Mexico and the Governor General of Canada. That from President Diaz was offered in person by the Mexican ambassador. The others were read by T. Commerford Martin, president of the Engineers' Club.

Charles F. Scott, chairman of the building committee, then presented a historical address. He referred to the initial offer from Mr. Carnegie which was made at the time when the three societies were wellnigh strangers to one another. To utilize the gift they had to plan and work together. Mr. Scott continued:

"Three members were appointed from each of the three engineering societies and three from the Engineers' Club, which also participated in Mr. Carnegie's gift. The building had to be planned not only for the present, but the future. So rapid has been the growth that the aggregate membership of the three societies has increased 53 per cent since the gift was made. In his offer of the gift Mr. Carnegie had said that co-operation is "the keynote of success," and that "there is a harmonizing effect which counts for everything in the progress of any great movement, political, social or scientific." For this reason he associated the club with the societies in his gift, and the same idea has been found in the reception rooms in the societies' building. In a sense the crowning feature of the project, as it is of the building itself, is the library, which is a storehouse of power of great value and far-reaching influence. Years ago an engineer was apt to work by himself; technical knowledge and experience were kept secret. Stagnation resulted. Through increase of knowledge and interchange of experience progress came. In those branches where discussion has been most active progress has been most rapid. The new building will enable the societies to become more useful in the dissemination of knowledge."

Chairman Hunt then presented to Mr. Olcott, president of the United Engineering Societies, the key of the building. He then introduced Mr. Carnegie, who made a most felicitous address. Among other things, Mr. Carnegie said:

"It is the spirit of the men that does the work; the safety of human society lies just here. Whenever we coalesce to do some good, a unification and a consolidation take place. Whenever men meet to conspire against the public good—to do some evil—they find themselves unable to trust each other. That's why you needn't worry about the future and about what problems society is going to meet. Quite apart from whatever evil exists, the principle of improvement is inherent in us. To-day is better than yesterday and to-morrow will be better than to-day. So I look forward to the future of this building, and I know that the organizations to whom it is devoted will advance and continue to meet the developing needs of our age."

Mr. Carnegie also spoke of the inspiring value of co-operation and acquaintanceship as represented by a union building for the various associations. He continued: "We only hate those we don't know. The younger I get, and the more experience I have with men and women, the more I come to realize the truth of this. To know the virtues of your brother is to know the spirit of brotherhood. That is why I am an advocate of the peace of the world. We only have to know our brothers the world over to realize that all men of all nations are indeed brothers."

President Arthur T. Hadley, of Yale University, delivered the principal address, which was on the "Professional Ideals of the Twentieth Century." A digest of President Hadley's address follows:

PRESIDENT HADLEY'S ADDRESS

The men who did more than anything else to make the nineteenth century different from the other centuries that went before it were its engineers. Down to the close of the eighteenth century the thinking of the country was dominated by its theologians, its jurists and its physicians. These were by tradition the learned professions; the callings in which profound thought was needed; the occupations where successful men were venerated for their brains. It was reserved for the nineteenth century to recognize the dominance of abstract thought in a new field—the field of constructive effort—and to revere the trained scientific expert for what he had done in these lines. Engineer-

ing, which a hundred years ago was but a subordinate branch of the military art, has become in the years which have since elapsed a dominant factor in the intelligent practice of every art where power is to be applied with economy and intelligence. A building like this is therefore the symbol of all that is most distinctive in the thought of the century that has gone by. A hundred years ago we might have had a building in honor of theologians or of lawyers or of physicians; but one that symbolized the achievements of the engineer was beyond men's dreams, because the world at large had neither felt the need of his work nor dreamed how soon it should be seeking his leadership.

The public has recognized that scientific conduct of a business means the substitution of universal experience, learned with difficulty and applied with toil, for the narrower range of individual experience which was at the disposal of the so-called practical men of fifty or a hundred years ago. Of this change the engineer is the representative and the leader. He it is that makes physical science in its various lines applicable to the complex problems of construction and development. He it is who has paved the way for the recognition of the technologist and the expert in every line of human industry. He it is who has shown how mathematics, instead of being an abstract discipline, remote from everyday human affairs, may become the means of applying truths for a long time remote and undiscovered to the everyday affairs of the world in which we live. Not the buildings that you have built, not the railroads that you have planned, not the machines that you have invented, represent your greatest achievement. Yours is the proud boast of having in one brief century established science as the arbiter of the material affairs of mankind, and of having enforced her worship upon a world once reluctant but now gloriously admiring.

What then, you will ask. Is there anything which remains to be done comparable in importance to this? Yes, there is. An equally large part—perhaps in one sense a much larger part—of your professional duty yet remains to be accomplished. It is not enough to have technical training. It is not enough to know the special sciences on which the practice of a profession is based. A man ought to have clear conceptions of the public service which his profession can render and the public duty which its members owe. Thus, and thus only, can the engineer, the lawyer, the physician, or a member of any other learned profession, rise to the full dignity of his calling.

For there are two quite distinct qualities which must be combined in order to secure the best professional service; two quite distinct tests which work must meet in order to be pronounced first-class. One of these is the technical standard; the other, for want of a better word, may be called the ethical standard. The man who wishes to build a good railroad must not only lay it out according to the rules of the surveyor's art, with proper curves and grades and bridges which will not fall, but he must also have some intelligent regard to the needs of the population, the safety of travel, and the many other factors which determine whether a railroad shall be a work of public use or a source of industrial bickering and financial disaster. This combination of public and private demands is not peculiar to engineering. It can be illustrated in every other profession of importance. It is not enough for the lawyer to give advice which shall be technically sound and which shall enable his clients to keep out of jail. He must learn to take a large view of the law as a means of public service instead of private gain. It is not enough for the physician to know how to cure specific diseases. He must know how to care for the larger problems of public health, and to use the resources of the community in a way to meet as fully as possible its sanitary needs.

This larger view of professional obligations is not so fully recognized as it should be. We have in the nineteenth century made so much progress in the technical training of doctors and lawyers and engineers that we sometimes forget that there is need of anything more than technical training. We have let the old idea of public leadership, which was prominent in the minds of the great professional men of past centuries, give place to another and narrower ideal which is fully satisfied when a man has made himself a technical expert. Many a man of real eminence in his calling deliberately rejects the wider conception of professional duty which I have here indicated. Perhaps he recognizes the claims of public service, perhaps he does not; but in any event he believes that these claims rest upon him as a man rather than as an engineer or a lawyer. In his professional capacity he says he is hired not to tell what the law ought to be, but what it is; not to advise how a railroad can do the most public service, but how certain men with certain ideas of their own can best use the differential calculus to get those ideas carried out. This is perhaps the prevalent view of professional ethics to-day. I believe that it is a wrong view, which must menace not only the influence and standing of the professions themselves, but the general interests of the republic. It has been said that engineering is the handmaiden of commerce, but I do not believe that the men who have planned and dedicated this building will be satisfied with any handmaidenly conceptions of what their successors ought to do. If for a moment, in our zeal for new technical developments, we have let our responsibilities as public servants fall out of our hands, I feel sure that we shall be ready to take them up again as soon as our eyes are opened to the real situation.

There arises now and then among our engineers a man with this quality of looking into the future—call it genius, call it insight, call it imagination. One of your own members said in a memorable speech that the thing that distinguishes a man of the first rank in his profession from a man of the second rank is the possession of this quality of imagination. Unfortunately it is rare. We cannot all of us have it. But we can have more of it than we now have, if we will modify our training and widen our standards of professional success. Excellent as is the course in our technical schools, it does tend to have a narrowing effect instead of a broadening one. The ideals of our engineering societies are high, but they are not always as broad as they might be. The widening of the course in the schools and greater readiness in our associations to recognize services which we now call non-professional will, I am convinced, do more for the engineers and more for the community than would be represented by ten years' progress in mining or machinery and the various developments of applied science.

We celebrate to-day, and we are justified in celebrating, the recognition of science as a necessary guide in the conduct of the material affairs of each man's business. Half a century hence, when our descendants shall meet in this building, or some greater building, I am confident that they will celebrate a yet greater thing—the recognition of the right of men of science to take the lead in enlightening the thought of the people on public affairs and the responsibility of filling the highest positions in the service of the commonwealth.

In the evening of April 16 a general reception was held in the main auditorium, at which the presidents of the three engineering societies, President Olcott, of the United Engineering Society, and John W. Lieb, Jr., chairman of the dedication committee, received the guests.

On the afternoon of Wednesday, April 17, the exercises were continued under the chairmanship of Mr. Lieb, and addresses were made by the presidents of the four founder societies, Dr. Sheldon, of the Electrical Engineers; Prof. Hutton, of the Mechanical Engineers; Dr. Hammond, of the Mining Engineers, and T. C. Martin, of the Engineers' Club. Addresses were also made by representatives of the affiliated associations, and greetings and felicitations were received and read from foreign and national scientific societies and institutions of learning.

An address was then made by James Douglas, past president of the American Institute of Mining Engineers. At the conclusion of Mr. Douglas's address, Alexander Graham Bell was made the recipient of the John Fritz gold medal by Charles F. Scott, chairman of the board of award. Commemorative medals for distinguished services were also presented to Messrs. Pope and Raymond, secretaries of the Electrical and Mining Engineers, and Prof. Hutton, past secretary of the Mechanical Engineers. The presentations were made by A. R. Ledoux, past president of the Mining Engineers.

Professional sessions of the Mining and Mechanical Engineers were held on Thursday, that of the Electrical Engineers having been held on the evening of Monday. The exercises concluded Friday evening with an informal smoker and vaudeville at the Madison Square Garden Concert Hall, in which all of the associations joined.

MODERN TRAIN DISPATCHING ON INTERURBAN RAILWAYS *

BY H. H. POLK
President and General Manager, Interurban Railway Company

The managers of electric railways until recently have given but very little attention to that most important part of train operation, the dispatching of trains. However, they have at last come to the realization that safety in this respect is just as important to electric trains as it is to steam trains, and that it should be done in much the same manner. Even to-day the dispatching systems in vogue on most electric railways are very crude.

There are three important factors in train operation to be taken into consideration, viz.:

(1) First, and above all others, is safety both to passengers and property; this must be had regardless of cost.

(2) The speedy operation of trains over the road, giving them all possible dispatch commensurate with safety.

(3) The economical operation of trains, keeping them on the "go" all of the time, and not letting them lie "dead" on some side track waiting to meet something.

To obtain these very important results it is absolutely necessary that trains should be operated on train orders issued from a central office and directing train movements in addition to the ways provided for in the rules and time tables. The printed time tables which show the meeting places and time of all regular trains and the rules which direct how these trains are to proceed with relation to each other, if understood by all trainmen alike and faithfully carried out, will prevent collisions. If, however, it becomes necessary to issue special orders for trains not on the time card, then the train order is absolutely necessary. These orders must be clearly expressed, and the form and even the paper on which they are written must be such that they may be easily and quickly understood by all whose duty it is to read them. Conductors and motormen must know that they are given by competent authority and that all concerned have corresponding orders. There must be only one dispatcher issuing orders on a division at a time. This is one of the few cases where one head is better than two, for two dispatchers issuing train orders on the same division would not only involve a very serious risk, but would contribute largely to the lack of confidence on the part of all trainmen. Never let two men dispatch a train.

When a time card is issued a receipt for it should be taken from all persons concerned; this makes sure that it has been received. It is much more difficult to be assured that train orders have been received and understood by all concerned. After the order has been prepared by the dispatcher it is transmitted to the desired persons either by telegraph or telephone. The telephone is almost universally used by interurban railways for dispatching trains, while the telegraph is employed by steam railways. In my opinion, the telephone is far superior for transmitting train orders in interurban service. All stations and sidings can be equipped with telephones, by which a train crew may communicate with the train dispatcher at any time, thus avoiding serious delays.

The system now in use on the line I represent follows the standard dispatching systems of steam railroading, with some modifications necessary to adapt it to our use. All trains leaving the central waiting station of the Des Moines City Railway Company are under the jurisdiction of that company while running on its tracks, and receive their first order from the interurban dispatcher at Beaver Valley Junction, on the Beaver Valley Division, and at Grand View Park, on the Colfax Division. At these points are located telephone booths, which are equipped with telephones, a pad of standard thirty-one train order blanks, and a locked box in which to deposit the third copy. Of the latter I shall say more later on. One of these booths is also located at each siding on the line.

The conductors of an out-bound train, on arrival at these points, steps into the booth and calls up the dispatcher, saying, "Jones train, No. 96, at Beaver Valley Junction." The dispatcher reads to him the order which he wishes to issue, the conductor writing it himself verbatim as given. In so doing he makes three copies by use of carbon sheets, one copy to be given to his motorman, one to be retained by himself and the third to be deposited in the box, to be used in case of any misunderstanding of orders and as a means of placing the blame upon the proper person. After the order is written by the conductor, he reads it back to the dispatcher, who checks it with his copy. If correct, the dispatcher says "complete." The conductor then writes "complete," together with the time the order is made, and signs his name. He then goes to the motorman's cab and gives him a copy of the order, which the motorman, in turn, repeats to him. The conductor is now permitted to board his train. He gives two bells and the train starts.

We are very particular to have the conductor deliver the order to his motorman before boarding his train to avoid absolutely any start without a thorough understanding on the part of the motorman. With us it is a very serious offense to violate this rule. A few years ago we had a very serious accident, caused by the crew disobeying this regulation. The conductor, after receiving his order, stepped on the rear platform, signaled the motorman ahead, and was walking through the car to give the motorman his copy when the collision occurred. The order in this case was a "hold order."

Conductors are required to report at all stations where agents are located, and should a train become delayed between stations the conductor must call the dispatcher from the nearest telephone booth, thus giving him the opportunity to change the order if desirable. Our sidings are about 2 miles apart, but trains must report only at such sidings as are designated on the time card, and must never leave these designated sidings without a clearance or train order. In-bound trains must report their arrival at Beaver Valley Junction and at Grand View Park and also at the central waiting station in Des Moines.

Our dispatcher issues daily an average of 120 train orders. On the Beaver Valley Division we operate thirty-six passenger trains, two package express cars and two freight trains between 5 a. m. and 12:40 p. m., making a total of 1303 miles per day. While on the Colfax Division we run thirty-four passenger trains, four package express cars, and freight trains when necessary, making 1065 miles per day.

The telephone line as installed consists of two No. 9 B. B. galvanized iron wires carried on cross-arms in the usual manner on the same poles and underneath the high-tension transmission lines, and transposed every ten poles to prevent interference from parallel power and feeder line. The dispatcher's switchboard was made by the Stromberg-Carlson Telephone Manufacturing Company. The telephone instruments are of standard make and of the bridging type.

* Paper read at the Clinton meeting of the Iowa Street and Interurban Railway Association, April 19-20, 1907.

By reason of the almost constant use of the telephone line by the dispatchers, it became impossible to transact any company business without seriously interfering with the safe dispatching of trains. It, therefore, became necessary to build a second telephone line, or install what is known as a composite system. We chose the latter, as it was much the cheaper and meant only the cost of installing telegraph instruments. By so doing we have doubled the capacity.

In the installation of the telegraph we had the choice of two general methods, one being what is known as the European or open circuit method, the other being the American or closed circuit method. The former of these two systems was adopted upon the advice of Mr. Cunningham, our electrical superintendent, as it has many advantages over the latter, especially for the composite system. The European or open circuit system is essentially a multiple system, while the American or closed circuit is a series system. With the European open circuit no power is used except when the instruments are actually in use. Another advantage is that in case the line should break, instruments could be used on each side of the break. As no switches are used on the keys, it is impossible for the operator to go away and leave the line open by leaving his key open.

Both sides of the telephone line are used as one side of the telegraph line. For the other side the telegraph instrument is connected to ground by means of an impedance coil, wound so as to offer impedance to the a. c. telephone and signaling current passing from one side of the line to the other, but offering little resistance to the d. c. telegraph current passing from both sides of the telephone line through the telephone instruments to the ground.

The success of the composite system, of course, depends upon both sides of the telephone line having the same resistance, impedance, capacity and inductance. In other words, the telephone line must be perfectly balanced, so as to prevent the d. c. intermittent telegraph current impulses from passing from one side of the telephone line to the other through the receivers. In a perfectly balanced line there is no disturbance or interference between the telegraph and telephone instruments.

The use of the telegraph on the telephone line does not necessitate any more care than would be necessary for a satisfactorily operating telephone circuit paralleling high-tension lines. The energy used to operate the telegraph instruments is obtained at each station direct from the 600-volt d. c. feeder by shunting one 16-cp lamp in a series of five.

A composite system not only doubles the amount of business that can be handled over a single line, but is much more reliable and convenient than either a telephone or telegraph line alone. The telephone and telegraph are not affected by the same cause, and what would disable one will often not affect the other.

AMUSEMENTS—HOW SHOULD THIS FEATURE BE HANDLED BY THE OPERATING COMPANIES?*

BY H. W. GARNER,
General Manager of the Oskaloosa Traction & Light Company

It is not within the bounds of this paper to review the opinions and observations of any great number of persons engaged in devising, constructing and operating amusement resorts and catering to the pleasure whims of the public, for the railway manager has only to read the excellent articles on amusement parks and their operation regularly appearing in electrical periodicals to keep in touch with the extent, development and constant progress along this line.

It has been reliably stated that this country presents the greatest and most prosperous development of outdoor amusements in the world. In this connection it is safe to assert that, without electricity, the summer park, as we know it, would never have been evolved and brought to its present high stage of development.

This paper will endeavor to state, first, what the electric railway companies of Iowa have accomplished and are doing in furnishing or promoting amusements as a feature of their operation and for the purpose of inducing traffic; second, to determine as nearly as possible to what extent the companies can make conservative and profitable investments in maintaining or assisting amusement resorts, and third, to point out in a general way the best methods to pursue as shown by experience and observation.

The management and features of pleasure resorts certainly present as varied sides as the transportation business itself, and to-day millions of dollars are invested in this generally profitable industry. It is safe to say that every railway in this, as well as other States, has been in some way the originator or sponsor for the resorts now in operation or contemplated. In only a very few of the larger cities of Iowa has the amusement park taken a separate place in the business world and passed from the hands of the street railway into private control. In every instance, however, the street railway is absolutely essential to the development of these parks; the interest of the park operators and the railways are mutual.

The electric railways of Iowa are now represented by some twenty-three separate companies operating over 500 miles of electric street and interurban track and serving an approximate population of 500,000. For convenience, the companies are divided as follows:

Companies serving population of 40,000 to 100,000 = 6.
Companies serving population of 20,000 to 40,000 = 6.
Companies serving population of 10,000 to 20,000 = 7.
Companies serving less than 10,000 = 4.

In preparing this paper the writer assumed that the majority of members at this meeting would not be interested in conditions existing in cities of over 100,000 people.

To a certain extent, every one of these companies has engaged in the amusement business, and every manager apparently retains some distinct if not comforting memories. The writer remembers when it was one of his duties several years ago to preside over the ticket office of a summer vaudeville theater, and after each performance of a colored minstrel troupe locked up their band instruments for safe keeping, that these instruments were referred to in a certain chattel mortgage given to secure their railroad fare advanced. At the end of a rainy week the minstrels had faded away, but their instruments adorned the company's office for some time after.

To-day, however, reports from the different cities show that the railway companies are well advanced in having provided amusement parks for the patrons of their lines, and in several towns the companies have established and are now maintaining creditable and valuable amusement facilities in connection with their lines.

While it is not the purpose of this article to disclose to what extent the various cities have invested in this de-

* Paper read at the Clinton meeting of the Iowa Street and Interurban Railway Association, April 19-20, 1907.

parture, it may be stated that three companies own their parks outright and operate them directly. Eight companies derive benefit from amusement parks operated privately, by the city or leased by the company. The eleven remaining railways have no pleasure resorts on their lines.

The three companies first mentioned guarantee the expenses of the parks, and none of them reports a profit out of the actual park operation. From this it might be inferred that as a separate financial undertaking, apart from the profit derived from increased railway traffic, the summer park in Iowa has not proved a paying investment on the whole. With very few exceptions, the entrance to all parks is free, and it is a question whether the possible benefit secured in making an admission charge and enabling the management to provide better attractions might not be offset by a decrease in patronage due to the admission charge.

Every manager reports that the band concert is the most attractive feature, when furnished in congenial surroundings, as among shady trees, gardens and greenswards.

And here is the secret now well known: That every manager who sets out to furnish summer amusements must hold ever before him the fact that mankind never ceases to love and take pleasure in the open air, the beauties of nature and the restfulness of good music.

He was a clever man who named a park "Sans Souci," for it means, in French, "Without care," and the railway manager whose duty and interest it has become to provide for this side of man's nature knows very well, from observation, that his park or his amusements are successful and lasting only when they cater to the desire to be merry and care free.

Other attractive features which have been provided by the companies include vaudeville, theatrical and operatic performances, moving pictures, merry-go-rounds, balloon ascensions and other aerial acts, boating and bathing, figure eights, roller coasters and various other features. The writer will not attempt to go into the relative merits of the different amusement devices, since they are discussed frequently among railway men and are well described in the pages of the excellent railway publications that find their way into every office.

Sunday is universally the best day for the parks, and, as nearly as the writer can ascertain, the amusements furnished or intended at every park operated in Iowa, directly or indirectly, by street railway companies are absolutely clean and moral in nature and free from objectionable features. It may be added that the only parks or amusement resorts that have stood the test of time and are recognized as legitimate and permanent investments to-day are the respectable ones.

Certain members of this association will remember very distinctly a recent bill introduced in the last Legislature governing Sunday amusements. It was a significant fact that in the debate on this bill before the committee the attractions and music furnished at parks operated by street railway companies were not specifically designated by the supporters of this measure as the sources of amusement considered a desecration and obnoxious. Nevertheless, every man who was present at this hearing knows, and as developments proved later, that if this measure had become a law practically every park now operated by street railways would have closed its gates, for this measure, aimed at a supposed existing evil, would have embraced in its jurisdiction every park and pleasure resort, and the great public—the people who ride—would have been deprived of the great blessings that are due to the restfulness of beautiful shady parks, the diversion of pleasing, innocent amusements, and the refreshing stimulus of music.

What railway could operate its park without the Sunday traffic? It is the one day in the week the park is made for. This bill did not become a law because the street railway men of Iowa convinced their representatives that the parks were created for the people, and that no man had yet openly presented any convincing arguments why the parks should be closed. The laws for the next two years are made, but it behooves every street railway company operating or interested in any amusement resort patronized by the public on Sunday so to operate that park that no man can support a measure to close it because it is a nuisance or otherwise objectionable to any great class of men.

Most of the railway companies of Iowa financially encourage baseball games; in fact, if the truth were told, the National game could hardly flourish without the boosting hand of the street railway. Circuses are welcomed, and in many instances are furnished the grounds free when adjacent to car facilities. Chautauqua meetings have generally proved good traffic producers. Street fairs and carnivals are somewhat out of date, and railway companies have apparently not suffered any great loss. County fairs, race meets, conventions and football are all worthy of encouragement.

Harvest days for the street railways are not without their burdensome conditions. Chief among these in handling summer traffic are: The restriction of single-track roads; regular schedules delayed on account of extra traffic; increased liability to accident on account of increased traffic; inability to secure competent and trained men for short periods of summer traffic; and last, but not least, sufficient reserve capacity in cars and peak-load problems.

These so-called "necessary evils" must be faced, carefully considered and then provided for by every manager. To attempt to standardize the remedies for these conditions would be as impracticable as to attempt to reduce to an exact science the design and operation of amusement parks. Local conditions must be recognized in each particular case, but to this can be added the known experience of the past.

To many of the street railway managers of Iowa the extent to which their company is warranted in establishing or investing in the amusement field is a perplexing question. On one hand you are told by the experienced, successful park manager, "If you go in—get in strong." The writer knows of several instances when we "got in strong." On the other hand, a too conservative policy may be depriving your company on every bright summer day of traffic waiting to be invited. With at least one-half of the companies operating in Iowa, the writer does not believe, from his observation, that it is financially possible to maintain an attractive park theatre regularly during the summer season. In the other cities it may be possible, although reports received from those companies do not indicate flattering returns on the venture itself.

In nearly every city, however, where a street railway is operated it appears to be practical and eminently desirable, according to the size of that city and the resources of the company, to secure, either directly or indirectly, by lease or purchase, park grounds distant from the center of the city, but provided with good car facilities. In the smaller cities the assistance of the City Council and the people are almost necessary for the establishment of a public park. Only three companies of Iowa appear to own their parks and amusement resorts. Every other city derives its bene-

fits by financially co-operating with either private or public parks.

In preparing this paper the writer is indebted for several excellent letters received in response to requests for suggestions, and among these is a letter from Paul D. Howse, general manager of the "White City," Chicago, modestly designated as the "Finest Amusement Park in the World." It may be of interest to learn from Mr. Howse that the "Fire Show" was the greatest single attraction ever placed in the "White City." The scenic railway has had the longest life and drawing power. Free attractions are maintained at all times that "White City" is open. In Mr. Howse's opinion, street railway parks have been unsuccessful most frequently because no money was spent for free attractions.

In closing, I believe no better advice can be given to the members of this association on the question of how amusement features should be handled and considered than that which has come to me through the courtesy of E. C. Boyce, vice-president of what really is one of America's most beautiful scenic resorts, "Dreamland," Coney Island. Although Mr. Boyce has been interested in building many of the largest amusement resorts of this country, his suggestions are equally valuable for the guidance of managers interested in smaller enterprises. He says:

In cities of from 5000 to 65,000 population, I would advise street railways to keep clearly in mind the fact that an amusement resort should be considered solely as an indirect means of creating traffic for the railway. In this connection, I append the following list of things that may be profitably undertaken:

1. The erection of a band stand and maintenance of free music during the summer season, the cost of said music to be governed entirely by the income from traffic.

2. Free fireworks, weekly or bi-weekly. An excellent exhibition can be had for an expense of $50.

3. The building of a roller coaster or so-called figure eight, which is one of the two amusement devices that can be profitably operated for an indefinite period and whose first cost is comparatively low. The other is the merry-go-round.

4. Free out-door attractions, aerial acts, animal shows, etc., particularly attractive where prizes are given to children.

Aside from the things above enumerated, I would not advise street railway companies to invest in any other form of amusements or entertainment. The most practicable method is for the company to lease or purchase a suitable tract of ground preferably between 20 and 60 minutes ride from the city, make the same reasonably attractive by means of bunting, electric lights, etc., and plan to sub-let concessions either on a percentage or for a flat rental, preferably to local people, for any and all wholesome forms of amusement. The rental thus obtained always returns a large percentage of profit to the owners of the land.

It is always possible to find sufficient concessionaires to make a resort as attractive as the business will warrant. In this way a railway company cannot possibly lose money on the venture and it is always able to control the conduct of the resort generally, this latter being a very desirable feature. Under no circumstances is it wise to charge an admission fee to such a resort. The policy of the railway should be liberal in the matter of supplying and charging for electric light, power concessions, space, etc.

Mr. Boyce's suggestions, in my mind, are conservative and are well worth following, either by the company already engaged in the amusement business or one about to venture in the field.

The officials of the Fort Wayne & Wabash Valley Traction Company have organized an association embracing in its membership the various department heads of the company. It is the plan to hold meetings twice each month to discuss matters relative to the company's affairs and to promote a still higher state of efficiency in all the departments.

THE STEAM MOTOR CAR: ITS VALUE IN INTERURBAN SERVICE*

BY W. G. WAGENHALS,
of the Kobusch-Wagenhals Steam Motor Car Company

While considerable advance has been made in the development of the steam motor car by English, Austrian and French inventors, the field has practically been neglected in this country. The only real effort to develop a steam motor car of any size was made in the year 1898 by the Baldwin Locomotive Works, which built a car on the order of the Cincinnati, Hamilton & Dayton Railway Company for use between the cities of Middletown and Hamilton, Ohio. This car was to be run in competition with the interurban electric line, of which I was at that time general manager. I paid very little attention to the details of this machine, but, after repeated trials, it was placed out of commission. Since that time I know of no effort to design a steam motor car for railroad service.

About three years ago, I built a steam railroad 24 miles in length, from Ripley, Ohio, to Sardinia, Ohio, and finding that the passenger receipts did not justify the operation of a train service, I endeavored to find some form of a self-propelled car which would reduce the expense of operation, as our franchise obligated us to run three trains each way per day. I took the matter up with Mr. Kobusch, president of the St. Louis Car Company, and he advised me that there was nothing in the market which would fill these conditions. At that time I had under contract 24 miles of steam road and 50 miles of electric road, and after talking the matter over with Mr. Kobusch, we formed a partnership for the construction of a motor car for this service, I agreeing to give up the construction business and devote my entire time to the perfection of a motor car along the lines which I presented to him at that time. After nine months of work in this direction, we have produced the largest self-propelled motor car which has been built in this or any other country.

This car[1] has a total length of 32½ ft., with seating capacity of sixty-four people. The weight on driving wheels is 115,600 lbs., and on rear truck 62,960 lbs., or a total weight of 178,560 lbs. This car has a greater tractive weight than the largest six-wheel locomotives. Under repeated tests, it has handled twenty-two loaded freight cars on level track at a speed of 5 m. p. h., which gives its maximum pulling capacity. It has developed a speed of 45 m. p. h. on ½ to 1 per cent grades, at which speed it would easily be able to handle one or two trailers. It has a water carrying capacity of 2000 gals., sufficient for a 45-mile run, and an oil tank capacity of 1000 gals., sufficient for a 500-mile run. This car has been run over the Burlington Railroad out of St. Louis in the presence of mechanical men and general superintendents of the largest steam railroads in the country, and no criticism has been offered by them as to its design or performance. No alterations have been made in the original design of the car, as every detail of the operating mechanism has worked out as originally designed.

The engine is built entirely of steel castings, with the exception of cylinders and valve chambers, which are of cast iron. The frames of the engine are so designed that they form, at the same time, an oil-tight case for the cranks and cross-head; the forward end of this case is extended

* Paper read at the Clinton meeting of the Iowa Street and Interurban Railway Association, April 19-20, 1907.

[1] This car was illustrated on pages 568 and 569 of the Street Railway Journal for Oct. 13, 1906.—[Eds. note.]

to form an axle bearing to hold the engines in line with the driven or truck axle. The arrangement is identical with the present method of mounting motors on an electrically propelled car. All bearings are provided with removable brass shells, which make the repairs of the wearing parts practically the same as an electric motor car. The success of the car can be attributed to a combination of both steam and electric railroad practice, so far as the general mechanical design is concerned, the duplex steam engine displacing the motor.

The engine on the forward truck is connected to the boiler on the body of the car through a flexible steam connection, consisting of one expansion and two ball joints, which have been demonstrated to be perfectly tight under 300 lbs. pressure. The boiler is of the marine water-tube type, tested to 500 lbs. per sq. in. cold water pressure, with an allowed running pressure of 250 lbs. per sq. in. This type of boiler is in service on quite a number of United States Government torpedo planting boats. After five years of continued service it has been shown that they require a minimum of repairs, while, owing to the rapidity of the circulation, very little scale is formed.

The boiler has a greater number of square feet of heating surface for its size than any boiler in the market to-day. In a space of 8 ft. square and 8 ft. high there are over 1215 sq. ft. of heating surface, with a total grate area of 43½ sq. ft. This compares favorably with the largest six-wheel locomotives of to-day. Steam is generated by crude oil, atomized through a steam jet burner of special design, which sprays or atomizes the oil in the fire-box, and although we have five of these burners, it has never been necessary to use more than two of the same, with the car exerting maximum effort in speed or pulling capacity.

In one of the tests over the Burlington Railroad, on a 1½ per cent grade 8 miles long at a speed of 35 m. p. h., the car started the grade with 180 lbs. pressure and mounted the top with 250 lbs., with the engine running at ¼ cut-off. This performance was made in the presence of a number of Burlington officials, and was declared by them superior to any performance made by their locomotives.

The engines used on this car are specially designed, with cylinder 11 in. x 12 in. stroke. The valves are of the piston type, and were furnished by the American Balance Valve Company, which has recently furnished to the Pennsylvania Railroad over 1200 pairs of valves of the same type. These valves have shown perfectly tight under pressure of 300 lbs. per sq. in. Owing to their design, there is very little friction, and they can be moved by hand under this pressure.

The valve gear is a standard type of Stephenson link, as used in the ordinary locomotive. All bearings are amply large to withstand the different strains and, as noted above, the engines are so designed that they are self-lubricating, the frames forming the crank cases. The cylinders, while small in comparison with locomotive practice under the pressure used, develop 275 hp at the rail.

The connection between the car body and truck for the control of the link is made through an arc of a circle with a similar arrangement as used with the brake system for an ordinary double-truck interurban car. This allows for curvature of the truck without affecting the position of the links or the throw of the valves.

The exhaust of the engine passes through the center plate, through a metallic packed joint, which also allows for curvature, the exhaust ending in the stack of the boiler. The car is heated by both exhaust and live steam.

The foregoing will give you some idea as to the design and type of car. Now as to its practicability and uses. The car was originally designed to displace train service on branch lines of steam railroads where the ordinary train service would not pay. With a locomotive and one or two cars, four or five men are necessary for the operation of the train. They consist of an engineer, fireman, brakeman, conductor and flagman, without taking into account hostlers and repair men at the terminals. This type of car is operated by two men, an engineer and conductor. The same service can be obtained, and it is possible for the engineer to do his own repair work and also supply the car with fuel oil when necessary, as the only labor involved is the connection of a hose from the storage tank to the tank under the car and the opening of a valve. Compare this with the unloading of coal from a car in the hoisting bucket, the operation of a crane, and the removal of cinders as is necessary where coal is used for fuel. We claim to make a saving in labor alone which will pay the interest on the investment.

As stated, the car was designed to take the place of train service on a steam road. I do not claim that the car can be operated in competition with electric power where the service is hourly or less intervals, in which case operation by electricity is superior to any other power. But for interurban service, where a service of one or two hours is all that is necessary, the steam car can be operated for less money than the electric system. Take as an example, short lines from 10 miles to 20 miles, such as county seats, and the small distant towns which have no railroad connection. This car opens up a field where it can have no competition.

The expense of construction lies only in the roadbed and equipment of one or more cars. All freight and express matters can be handled with the same equipment, as the car is able to pull several trailers at its maximum speed.

Repeated tests have shown a consumption of oil of about 2 gals. per mile run. Figuring oil at 3 cents per gal., gives a running expense per mile, which compares very favorably with the gasoline type of motor car or steam generated with coal.

FREIGHT HANDLING BY ELECTRIC LINES*

BY P. P. CRAFTS,
General Manager of the Iowa & Illinois Railway Company

It was not so many years ago that projectors of an interurban railway were shown the exit when they approached capitalists with a proposition in which the earnings from freight handling were to be considered as a part of the road's income. Now the situation has reversed and the investor gives very careful consideration to that part of the business which he formerly scorned.

What has brought about this change of front? Simply the faith locked in the breasts of interurban managers that freight haulage would sooner or later become profitable and a strong influence in the earning power of properties under their charge. These managers have continued to hammer away until in the western section of the Central West, particularly, the results have been generally satisfactory and, in some cases, astonishing.

You may ask why should not Eastern roads have developed their freight business in the same proportions. A number have met with considerable success, but owing principally to physical and franchise conditions, due to lack of experience and foresight of the earlier builders, the freight business has been greatly restricted. The more recently

* A paper read at the Clinton meeting of the Iowa Street and Interurban Railway Association, April 19-20, 1907.

constructed interurbans, however, have drawn a lesson from the earlier roads and now build with proper regard to that traffic.

It is now customary, wherever possible, to organize interurbans under the general railway laws, to build on ample right of way and when built through small towns under franchise rights, to obtain the right to transact a general railway business, including freight; and in such towns to locate the line at some other point than on the main street. When conditions warrant, steam rights are obtained. The character of roadway construction is also changing, not only for the maintenance of high-speed passenger service, but also for the operation of heavy freight trains, with steam locomotives, if necessary.

It is impossible to give here an estimate of the proportion of freight to total gross earnings which might be expected of a new road, for that is governed purely by local conditions, some of which I will enumerate:

First, the population served outside of the main terminal and its dependence upon that terminal as a trading center;

Second, the proximity of other trading centers to the population served outside of the main terminal and railway facilities tending to attract business away from the latter;

Third, steam trunk line connections leading to the main arteries of commerce and the ability of interurbans to establish joint rates with them.

The Interurban Railway of Des Moines and the Iowa & Illinois Railway of Clinton provide examples of the first and second conditions, respectively. Des Moines, being located at a great distance from a city of superior class, is the normal trading center for the towns reached by the Interurban Railway, consequently the current of freight traffic to the smaller towns is principally from Des Moines.

In the case of the Iowa & Illinois Railway, however, although the tri-cities, that is, Davenport, Rock Island and Moline, would seem to be the normal trading center for Clinton, owing to the difference in population, yet the latter is only 138 miles from Chicago, and as a consequence Clinton divides its business. Although its trading with the tri-cities is constantly increasing, it will continue to be divided to a greater or less degree, depending largely on the business getting methods of the tri-city merchants, jobbers, etc.

The examples just illustrated bear more particularly on the package or less than carload traffic.

A full exposition of the third condition cannot be given without consuming too much time. In general, however, an interurban having proper freight terminals and handling facilities and which offers quick and efficient service, together with joint rates with some trunk line in competition with other trunk lines operating between competitive points, may reasonably expect a fair division or a greater portion of the freight traffic.

Shippers desire the best service with lowest rates, but assuming rates to be even, shippers are generally favorable to the roads which provide good passenger accommodations, and consequently the interurbans reap the reward of frequent passenger service. The proportion of freight to total gross earnings varies in this State from 5 per cent to an amount in excess of passenger earnings, depending upon the conditions given above.

Interurban freight traffic may be properly divided into the following classes:

First, strictly light packages, transported only in baggage rooms of passenger coaches, at express rates or at a fixed charge per package or per hundred, regardless of class, and generally termed express business;

Second, less than carload freight transported on fast baggage cars at regular freight or special tariffs under regular or special classifications, generally the former;

Third, a combination of class two and the haulage of a few local carload shipments daily, at regular tariffs and classification;

Fourth, regular carload traffic hauled by steam or heavy electric freight locomotives at regular tariffs and classification; or any combination of the foregoing classes.

A freight business of the first class may be conducted at small expense and is of material assistance in the earnings of a road. The freight carried generally consists of packages easily transported in baggage compartments of passenger cars, which are usually empty except for a very few trips per day; as usually no extra office force is required, the only expense is stationery, books, and possibly a small storage space at the main terminal. In some cases when the charges are a certain rate per package, regardless of weight within reasonable limitations, a proper system of tickets dispenses with way-bills, expense bills, etc.

Inasmuch as the majority of freight-handling interurbans of the Middle West come under the head of the second class, and that part of the paper will probably be of interest to the greater number of electric railway managers, I will enter into greater detail in handling the subject.

Interurbans which conduct their freight business under the head of the second class more nearly approach operating conditions parallel to the time freight business of steam railways. The ability of the interurbans to make fast time and to deliver at highways, farm crossings, and warehouse or store doors, offers an inducement to either the shipper or the receiver, which assist in obtaining the business. Being usually restricted, however, to a narrow car, similar in appearance to a passenger car, due to operating over city streets, there are limitations to the freight earning capacity of an interurban so situated.

To make such a business profitable depends largely upon the opportunity of the management to secure combined freight and passenger depots at the terminals, and in the larger local towns to avoid extra labor in billing and handling at stations; upon the charges of terminal city railways for the right to haul freight over their tracks, and the hour of day when freight may be delivered to the receiver.

Generally speaking, the margin of profit in this class is close, and only careful management will produce a profit, particularly during the first few months after the business is started. Expenses must be carefully watched and attractive freight houses and convenient handling facilities at terminals sacrificed for something which costs less to maintain.

Damage claims must be very carefully handled, and to that end it is advisable to adopt some system of billing and accounting which permits the easy tracing of a shipment from origin to final destination. Some interurbans have adopted simple billing systems requiring only one writing to make the receipt, way-bill, expense bill and office copy. Such a system, however, does not permit proper checking, particularly if merchandise is transported over more than one road.

After an interurban enters the second class, a good local commercial agent is a necessity. The business consisting of a great number of small shipments requires constant attention to develop and care for, particularly if competition exists. A live commercial agent, who is a good street man and not a desk man, earns his salary many times over, particularly if he understands how to deal with shippers.

The business obtained depends considerably on the personality of the commercial agent.

A few interurbans make team deliveries, either adding to the tariff to cover for optional deliveries, or an express tariff covering team delivery is maintained. In all cases which I have personally investigated, I discovered that the cost of operating teams consumed a large portion of the profits derived from the car service. As an illustration, one 50-mile interurban whose rates were based on express tariffs and whose freight earnings amounted to nearly $13,000 per year, derived only $2,600 net earnings. I believe the inducements of frequent service compensate for any advantage gained by making team deliveries.

I fear that many managers, in charging expenses to the freight business, do not give proper consideration to such items as additional clerks, printing and stationery, insurance on goods in freight houses, a proper percentage of the receipts to cover loss and damage, power for freight cars, proportion of track and line maintenance, telephone service, interest on the freight handling investment, etc. Neglect of these items deceives the manager, as well as his stockholders, and unless receipts grow beyond the safe point the awakening will be painful and embarrassing.

An average interurban operating 30 to 50 miles in a total population from 130,000 to 200,000 should not enter the freight field unless its receipts from freight will exceed $10,000 per year, beginning with the second year. If the receipts are below that figure, the margin of profit will be too small for consideration or the expenses will exceed the receipts.

Perhaps a brief description of the freight business conducted by the Iowa & Illinois Railway Company may be of interest as illustrating the point brought out above.

We went into the freight business in a very tentative manner. In fact, it took considerable time for us to decide whether or not there was sufficient business in less than carload lots to warrant the purchase of a freight car and the expense of conducting a freight business.

The next grave question was that of rate, and after considering for some time a reduction of the rate below that permitted by the Iowa State laws for Class A roads, we finally concluded to adopt the maximum tariff and to consider the business as freight and not express.

At first our old passenger depot in Davenport served as a freight depot as well, but within a very few months we outgrew the capacity of the space allowed to freight and were forced to take our passenger business to a new location. In Clinton, we still have sufficient space to handle the business, but within a very few months will be compelled to seek additional storage room.

Immediately upon starting the business, we engaged a commercial agent, and the quick growth of the receipts to the point where we were paying expenses showed our wisdom in so doing. With one freight car engaged in the business, some freight being carried on passenger cars, within one year the business grew to a gross exceeding $10,000 per year. During the summer and fall of 1906 we were compelled to operate our freight car two round trips per day for nearly 75 per cent of the time, and after the contract with the American Express Company was put in effect we purchased and placed in service a trailer freight car having the same capacity as the motor car. The better facilities which we have been able to offer shippers since purchasing the second car have increased the business at a very rapid rate, and we are now considering the purchase of a third car.

We make a specialty of beating the time of the steam railroads by twenty-four hours between Davenport and points on the Chicago & North Western Railway in the western part of the State on less than carload business. For this reason we obtain considerable business which is transferred to that road.

The schedule of our freight cars is as follows: The trailer express car leaves Clinton at 5:15 a. m. attached to one of the passenger motors, arriving in Davenport about 6:30 a. m. This trip accommodates the south-bound American Express and such freight business as is offered for early delivery. The motor express car leaves Clinton at 8:45 a. m., doing all of the local work, arriving in Davenport about 11 a. m. Returning in the afternoon, the trailer car leaves Davenport at 3 p. m. attached to a regular passenger motor, and carries nothing but transfer to the Chicago & North Western, local goods to Clinton, and American Express, no intermediate local freight being accepted for this trip. The motor car leaves Davenport about 3:45 p. m., carrying local freight and such Clinton local as cannot be handled by the trailer car.

Besides this, rush shipments of milk, cream, butter, eggs, etc., in small quantities are handled from certain stations, in the baggage rooms of the passenger coaches. Our passenger schedule, however, is extremely close, and permits very little freight handling.

The north-bound American Express is handled on three successive passenger cars, leaving Davenport at 6, 7 and 8 p. m. We anticipate in a very short time having a third car to handle the north-bound American Express and such freight as is offered to us after 3:45 p. m., leaving Davenport at 7 p. m.

With reference to the trailer freight car, we find it very much cheaper to operate than a motor car; but, of course, it can only handle through business. It does not seriously delay the passenger motor car to which it is attached.

When the business was started, we adopted what we considered a very simple set of forms for billing and accounting; but we soon ascertained that the tracing of damaged and stray shipments was very difficult, and, after carefully looking over the field, we finally adopted the same forms as are used by the Chicago & North Western Railway. These forms appeared at first to be very complicated, but a short acquaintance with them indicated their simplicity and ease of tracing damaged and stray shipments.

We make a specialty of rush orders by telephone via our private line. Oftentimes a merchant in Clinton finds himself short of some particular article, telephones to the Clinton office, and we transmit it to the shipper in Davenport through our Davenport office over our private line. Shipments so ordered are frequently in Clinton within two hours from the time we were called up at the Clinton office.

Whenever possible, we deliver from the cars to the store doors, which saves drayage and naturally brings business our way. A number of small platforms at which we stop our local express car have been built between towns by the shippers. We constantly endeavor to please our shippers and to show a spirit of co-operation, which has a great influence on the growth of our business.

We endeavor to be conservative in the charging off of expenses against the freight business and work into it anything which rightfully belongs to it. We go so far as to charge off monthly 3 per cent of the gross freight receipts. This is piling up a tidy fund, but we propose to allow the account to grow, for at any time we may have to meet heavy freight damages, due to fire, water or wreckage. At the present time the gross earnings from this business amounts to practically 15 per cent of the total gross earn-

ings, and we hope to see it reach 20 per cent on the same basis, that is, while our freight business comes under the head of the second class.

Referring again to the main subject in hand, very little can be said about interurbans coming under the third and fourth classes. Their business is merely a further development from the first class. The earnings from freight then becomes a large percentage of the total, and in the fourth class may equal or exceed the passenger earnings.

Joint tariffs are desirable either with steam trunk lines or a system of interurbans, particularly the former, that the carload business may prove profitable. Owing to the antagonistic attitude of the steam railroads, however, joint tariffs are difficult to establish, except where competitive conditions are such as will induce one of the steam roads to join with the interurban.

Let us hope that before long, under rulings of the national and State railway commissions, interurbans will be given the same rights to establish joint rates with their larger steam brothers as are enjoyed amongst the latter, irrespective of the fact that electricity is used as motive power.

Interurbans coming under the third and fourth class generally must of necessity have steam railroad terminals and yards, and the experience of our steam friends should teach us how far we can go in the development of such facilities. It is a very easy matter to become seriously overloaded with yard and terminal maintenance and fixed charges which are not warranted by the traffic handled, therefore such matters should be very carefully watched.

Another point which has been discussed by interurbans for several years is the best and cheapest motive power, namely, steam versus electric locomotives for hauling heavy trains. It is my opinion that unless a road is equipped for very heavy traffic in its power house, sub-stations, overhead wiring, etc., operation of heavy trains by electricity involves too great an investment, and therefore it is much cheaper to operate by steam locomotives. Take the ordinary interurban of 30 to 50 miles in length as an example. Its power generating equipment, sub-stations and overhead lines, particularly the two latter, have not sufficient capacity to operate heavy locomotives successfully. Consideration of the investment necessary for the increased capacity against the higher operating expense of a steam locomotive compared with an electric locomotive will favor steam operation.

In conclusion, I wish to say that the development of the freight business upon electric railways within Iowa has been very healthful for the past few years and bids fair to continue its growth in reasonably high percentages from year to year. We have all gained considerable experience in this part of our business, and, looking into the future, can readily see the benefits which our properties will derive. The development of the freight business has also been particularly strong in the States of Ohio, Indiana, Michigan, Wisconsin, Illinois and Missouri, or in that section of the country generally termed the "Middle West."

As an example of the growth of freight business on interurbans in Iowa, I will enumerate the present and guaranteed prospective roads which make freight haulage a feature of their business. The Inter Urban Railway, operating from Des Moines to Colfax on one division, to Perry and Woodward on a recently constructed second division, is an excellent example of the development and growth of freight traffic on interurbans. It conducts both a fast less carload and a carload business upon Iowa distance tariff and classification. An operating and joint rate agreement with some of the steam trunk lines is of assistance to the road and the territory served by it. Both electric and steam locomotives are employed as motive power.

The Waterloo & Cedar Falls, one of the first roads in Iowa to enter the freight field, conducts practically the same class of business and under like conditions, relating to joint rates and motive power, as the Inter Urban Railway.

The Mason City & Clear Lake Railway conducts a considerable carload business between Mason City and the Chicago & Northwestern at Clear Lake, operating under an agreement with the latter road. All freight is hauled by electricity. Its carload business is of considerable magnitude on that account.

The roads mentioned may be included under the third and fourth classes. Beginning on a comparatively small scale, the growth of traffic has been steady and substantial, until now their receipts from freight haulage constitute a large proportion of the total gross.

The Cedar Rapids & Iowa City road commenced operating in 1904 and immediately entered the freight field, conducting both a less carload business in a baggage car and hauled carload business by an electric locomotive.

The Iowa & Illinois Railway commenced operating in 1904, at first carrying packages on passenger coaches, and started a baggage car in 1905. This business has developed as described earlier in this paper. A very small local carload business is conducted, an electric locomotive or the baggage car being used as motive power.

Neither of the last two roads mentioned have joint tariff agreements with any of the trunk lines, but the Iowa & Illinois Railway does a considerable transfer less than carload business on two locals, as described earlier.

The Cedar Rapids & Marion City, Tama & Toledo, and the Oskaloosa Traction & Light Company conduct a local business partly in baggage rooms of passenger coaches and partly in baggage cars. These roads are examples of the first and second classes.

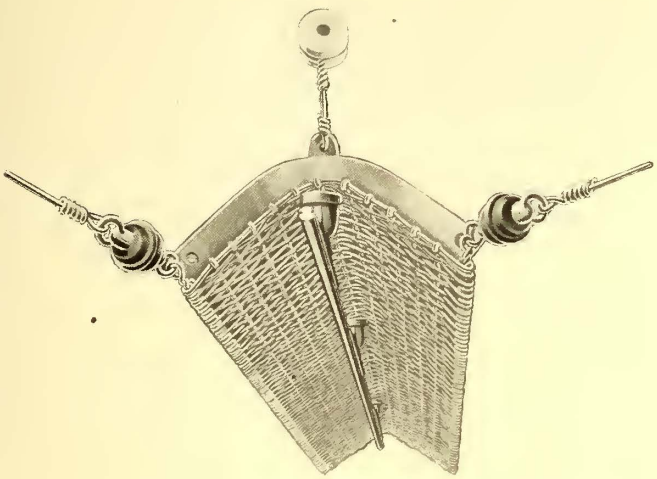
The Fort Dodge, Des Moines & Southern Railroad, now under construction, connecting Fort Dodge, Boone, Ames and several smaller towns with Des Moines, will be the greatest example within this State of combined electric and steam operation, and the development of this road will be undoubtedly watched with great interest by the electric railway men. This road is really a combination, physically at least, with the present Newton & Northwestern steam line, inasmuch as approximately 40 miles of the latter road will be electrified to complete the connections between the branches touching the towns above mentioned. It is proposed to operate electric passenger and fast freight service combined, with steam locomotives for heavy freight service. The combined length of the roads involved will be nearly 160 miles.

Backed by our experience in the past and at the present, I believe we can feel assured that any average interurban, the investment in which is warranted by the prospective passenger business, has practically assured a successful freight business, which will become an important factor in its earnings with a very few years.

On Thursday of last week a car bearing President Webb, of the Columbus, Delaware & Marion, and a number of guests from Louisville, made the trip over the line from Columbus to Marion in one hour and thirty minutes, ten minutes less than the fastest schedule time. The distance is 50 miles, and the officials wished to demonstrate to their satisfaction the possibility of operating a fast summer express between Marion and Columbus.

A TROLLEY GUARD FOR PROTECTING CARS AT STEAM RAILROAD CROSSINGS

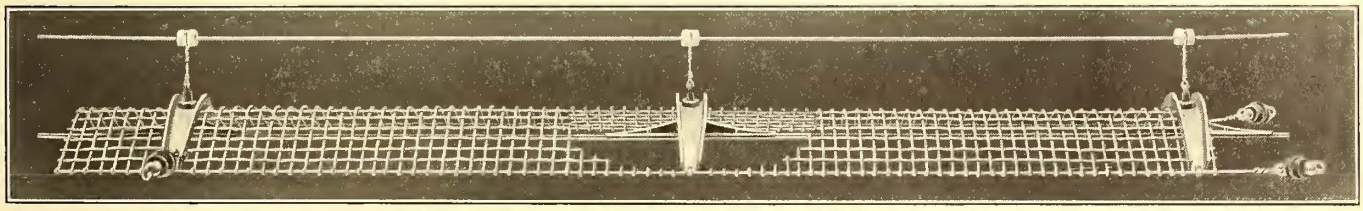
A trolley guard for installation at steam railroad crossings which has met well the requirements for which it was designed and is in service on such lines as the Cleveland Electric Railway, the Syracuse Rapid Transit Railway, the United Traction Company's lines in Albany, the Toledo Railway & Electric Company and a number of other roads,



VIEW FROM UNDERNEATH GUARD FOR PROTECTING SINGLE TROLLEY

is manufactured by the National Railroad Trolley Guard Company, of New York. The guard is made of woven galvanized iron, aluminum or copper wire, with extra heavy selvaged edge, and may be of any desired length all in one piece. When in position the guard assumes the form of a perfect inverted trough. This feature of the guard, which is always alive, makes it certain that if the pole jumps the wire the supply of current will not be cut off and the car can proceed without interruption.

Besides making for lightness, the open mesh form of construction provides against the accumulation of ice and snow and damage from winds. In addition, the guard offers practically no resistance to the passage of exhaust gases and steam from locomotives passing under it. Still another feature insured by this lightness is the doing away with the necessity of providing special suspension for the guard. The actual weight of the guard as installed is 13 ozs. per running foot of aluminum and 18 ozs. per running foot of galvanized iron wire and copper wire. The method of suspension, shown in the accompanying illustration, provides against the object of the guard being defeated by bolts or nuts working loose. The essential parts of the guard are the woven wire and the hangers, which are shipped together, with instructions for installing. The width of the single guard is 10 ins. and the depth 5 ins. The width of the double guard is 15 ins., with the double trolley 6 ins. between centers. The hangers are made of galvanized iron, drilled to take the standard ear, and they hold the mesh to its proper shape. To clamp the ear and mesh to the under body of the hanger, eye-bolts with set nuts are furnished. Due consideration has been given the question of strains. To provide against them substantial hangers are spaced 5 ft. apart. The wire mesh itself is Roebling No. 10 galvanized and copper wire and No. 9 aluminum with No. 6 Roebling selvage. In addition to its use at steam railroad crossings the guard also is available for service in car houses, at undergrade crossings, and, in fact, everywhere that the slipping of the pole from the wire is likely to entail special hazards.



THE GUARD AS IT APPEARS WHEN INSTALLED

BOOKING SHOWS FOR THE SUMMER THEATER

It is just at this time that attractions that have proved successful at the theaters are booking for the summer with the theatrical exchanges, these shows including all sorts of variety acts. Some of them have fascinated metropolitan audiences for months, and are even world-famous. A number of those which have been playing at such theaters as the New York Hippodrome and London Crystal Palace, like Ralph Johnstone, the aerial cyclist, and Con. Gaston Bordverry & Company, the champion sharpshooters, who play a piano with guns, have signed for the summer season with the Prudential Vaudeville Exchange, of New York, which offers these and about 200 other shows to park managers. The list of this Exchange affords any combination that may be desired, including such successful shows as E. E. Rice's "Girl from Paris," musical comedy with sixteen people; the Western comedy-drama, "The Belle of Silverton," which is twenty-two minutes in the acting, and includes in the cast only three people, and the comic opera, "The Witch of Salem," which is thirty minutes in the acting, and includes in the cast some seventeen people. The same company also offers Edouard Waldman's Dramatic Company in standard repertoire, and such musical attractions as Conterno's Band, with its "Battle of our Nation," and Restorff and his band.

THE GUARD AS INSTALLED TO PROTECT DOUBLE TROLLEY

NEW AUTOMATIC RADIAL COUPLER

To meet the requirements imposed by the operation of interurban, urban and elevated cars in trains, the Ohio Brass Company, of Mansfield, Ohio, has recently placed on the market the Tomlinson automatic radial coupler, in the operating of which no adjustment whatever is required, except the alignment of drawbars. Backing the

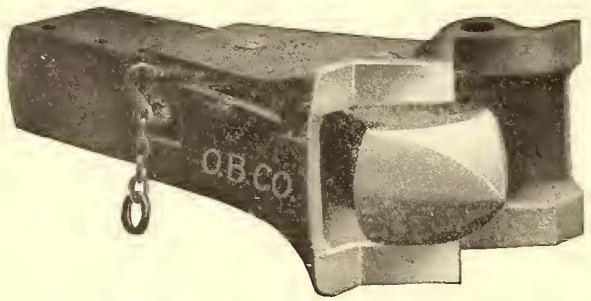


FIG. 1.—TYPE A, FORM 2, NOS. 2 AND 3 COUPLER FOR CHANNEL BAR DRAFT GEAR

cars together engages and firmly locks the couplers, and as there are no loose parts to be inserted in the coupler to put it in readiness for action, a car cannot, it is said, be left, through negligence or otherwise, with the coupler in an inoperative condition. After uncoupling, which is accomplished by simply pulling a chain, the parts return automatically to the normal position, ready for recoupling.

The coupler is made in two sizes, known as Nos. 2 and 3. Size No. 2 is designed to meet the requirements of all classes of city and light interurban service, and size No. 3 is adapted to elevated and subway service, also heavy interurban service, and for all service where it is desired to intercouple with steam road cars. Beside the variation in size, the couplers differ as to draft gear connection. They are made in four forms, for rectangular-bar draft gears, for channel-bar gears, for 80-lb. rail section gears and for drop gears, the principle of the coupler action being the same in all.

The coupler consists essentially of a strong malleable iron headpiece, which is hollow and contains an arrow-pointed, drop-forged coupler hook, with sufficient play in a horizontal direction to allow the coupler hooks of two engaging couplers to slide past each other and become

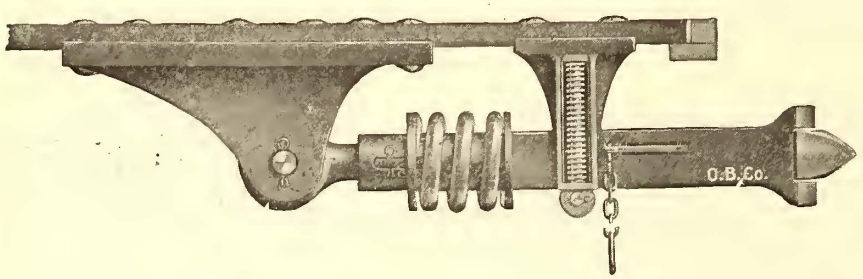


FIG. 2.—TYPE A, FORM 4, NOS. 2 AND 3 COUPLER WITH DROP DRAFT GEAR

locked. This hook is shown plainly in Fig. 1. The hook in each coupler is prevented from moving past the center of the coupler. It may, however, move toward the side of the coupler in opposition to the action of a spring. Thus, when the opposing coupler hooks meet, they are forced apart against the action of the springs sufficiently to allow the hooks to slide past each other, the shoulders interlocking. The arrangement is such, however, that should the spring in one of the couplers break and allow the hook to move to one side, there still would not be sufficient clearance to allow the couplers to unlock. The spring is under tension only at the instant of coupling or uncoupling, and gets no strain of the train load, either pushing or pulling. In uncoupling, the hooks are forced apart by a lever cam. To this lever cam is connected a chain, a slight pull on the chain of either coupler being sufficient to disengage the hooks.

An important feature of the coupler, and one which effectually prevents lateral movement of the coupler heads,

FIG. 3.—TYPE A, FORM 1, NO. 2 COUPLER FOR RECTANGULAR BAR DRAFT GEAR

is the form of the coupler face used. The faces of the couplers are serrated, as shown, and fit together accurately. They have large bearing surfaces and the serrations prevent any movement in a lateral direction. When once coupled the connection between the cars is practically rigid, and surging of the cars is prevented. This feature greatly facilitates the control of the train and does away with the necessity of buffing platforms. It is also impossible for the cars to become uncoupled when rounding curves.

The coupler will intercouple with all standard radial car

FIG. 4.— TYPE A, FORM 1, NO. 2 RECTANGULAR BAR DRAFT GEAR

couplers now in use without removing or even deranging any of its parts. By the addition of any emergency knuckle it will couple automatically with all M. C. B. couplers, as used on steam roads. A wedge-shaped extension of the knuckle is made of the right dimensions to fit into the space in the Tomlinson coupler, which ordinarily receives the coupler hook of the opposing coupler.

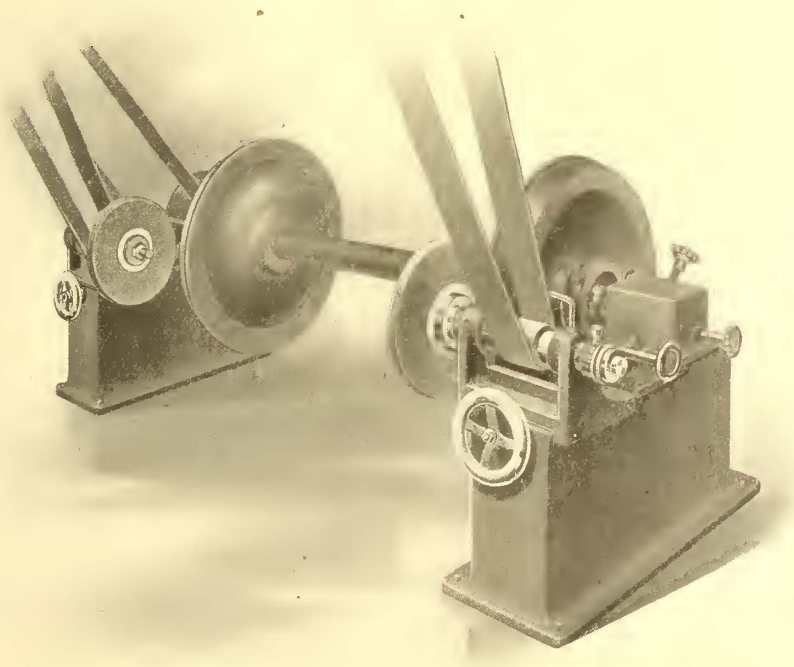
Fig. 2 illustrates the spring hanger attachment which is used where sharp variations in the grade line make necessary some allowance for vertical play of the coupler and draft gear. The hanger consists of a rectangular casting through which the draft gear passes, being supported by a yoke which rests on springs, allowing vertical movement, either up or down. These springs carry the weight of the coupler and draft gear and normally hold the former in a position parallel to the car sills. The spring, however, allows vertical movement through a considerable range, so that the coupled car can conform to any sudden change of grade. The carrier is supported by a radial slide bar under the car sills, the slide bar being formed in the arc of the circle, around which the hanger is free to slide when going around curves.

In Fig. 3 is illustrated the Type A, Form 1 coupler, made

in the No. 2 size. It is for rectangular bar draft gears and is adapted for city and light interurban service. Fig. 1 shows the Type A, Form 2 coupler made in the Nos. 2 and 3 sizes the No. 2 size for city and light interurban service, and the No. 3 size for heavy interurban, subway and elevated service, and all places where it is necessary to intercouple with steam road cars. This coupler is for channel-bar draft gears. Fig. 2, besides illustrating the spring hanger attachment, of which mention has been made, shows the Type A, Form 4 coupler with drop-draft gear. This coupler and draft gear are made in both sizes. Fig. 4 shows the Type A, Form 1, No. 2 rectangular bar draft gear.

CAR WHEEL GRINDER

The Hampden Corundum Wheel Company, of Springfield, Mass., has recently perfected and is now placing on the market a very effective and simply-constructed floor car wheel grinding machine intended for street railways desiring a low-priced, yet efficient, grinder. The device consists of two independent beds which are adjustable to any railway gage. The car wheels are run in adjustable bearings, into which they are rolled on an attached incline. These bearings enable the operator to grind a car wheel true, even if the axle is badly worn or sprung and out of alignment. The car wheels are revolved at ten r. p. m. by a belt and gearing, a large gear being put on the axle before the car wheels are put into the machine. This large gear has adjustable bushings, designed to take up any variation in the size of the axles. The emery wheels are each mounted on a shaft 1½ ins. in diameter, which runs

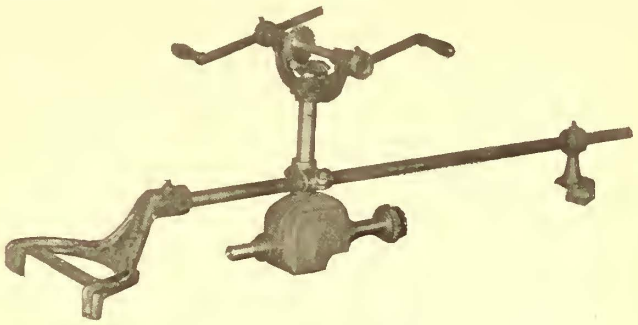


CAR WHEEL GRINDING MACHINE

in two sleeves, 3 ins. in diameter and 7 ins. long, the sleeves being prevented from turning by a keyway; this makes a very rigid construction. An eccentric on a large gear operates the automatic feed by which the emery wheel is carried across the face of the car wheel. This device is reversible through a racking pawl, so that the emery wheels can be fed across the car wheels in either direction. The entire weight of the machine itself is 1325 lbs.

NEW TRACK DRILL

A new track drill has recently been perfected and placed on the market by the Reed Francis Company, of Worcester, Mass. This machine has two extension cranks, near enough to each other for one man to use both arms for driving the drill. The crank in the position illustrated gives a direct motion from the body and doubles the power obtained, but when more power is required two men can



TRACK DRILL WITH EXTENSION CRANKS

work the drill, one at each crank. The drill is provided with an automatic friction feed to adjust the feed rate, this feed acting also as a quick return of spindle by reversing the cranks. The leverage of the crankshafts can be lengthened or shortened, according to the power and speed required, and other adjustments made for different demands. The socket is bored for 41-64 straight shank drills, and a sleeve is provided so that drills with a ½-in. straight shank can also be used. One revolution of the crank gives one revolution of the drill. When the top yoke is removed and one crank is put on the upright shaft, a speed of one revolution of the crank to two revolutions of the drill is obtained. A radical improvement has also been made over the ordinary track drill in that the lower gearing parts have been enclosed to remove the possibility of dust, gravel and other substances getting into the lower gears and interfering with the smooth and natural working of the machine.

CARS FOR CHICAGO INTERURBAN

The Chicago, Lake Shore & South Bend Railroad Company has just placed an order with the Niles Car & Manufacturing Company, of Niles, Ohio, through the J. A. Hanna Company, of Cleveland, for twenty-four 57-ft. heavy interurban coaches of full steam railway width, 10 ft., and fitted with seats 41 ins. long. Fifteen of the cars are of the exclusive passenger type, with passenger and smoking compartments, and nine cars are combination passenger, smoking and baggage type. All are fitted with Baldwin class 90-35 heavy trucks with 38-in. M. C. B. section steel-tired wheels and prepared for four Westinghouse No. 148 a. c. motors geared to 75 m. p. h. This, it is believed, is one of the first interurban electric lines to purchase cars of full steam railway width and of M. C. B. dimensions generally and fitted for operation over steam railroads.

RECENT ORDERS FOR PEACOCK BRAKES

Among a few of the orders received during the last month for Peacock brakes by the National Brake Company are the following: Virginia Passenger & Power Company, sixty-four brakes; Greensboro, N. C., Electric Company, thirty brakes; Georgia Railway & Electric Company, of Atlanta, eighty brakes; Augusta Railway & Electric Company, eighteen brakes; United Traction Company, Albany, fifty brakes; Chicago City Railway Company, six hundred brakes; Hudson Valley Railway Company, thirty brakes; Charleston Consolidated Railway & Gas Company, sixteen brakes; Maryland Railway & Electric Company, eighty brakes; Vallejo, Benicia & Napa Valley Railway Company, of California, sixteen brakes; San Jose & Santa Clara Railway Company, twenty-four brakes; Toronto Railway Company, one hundred brakes; Worcester Consolidated Railway Company, fifty-six brakes.

Other orders have been received from more than fifty companies, among them many roads that have placed their first orders for this brake.

ELECTRICITY AT JAMESTOWN

Electric power for the approaching exposition at Jamestown, like that at the Buffalo Pan-American fair, will come from a distance. Having no Niagara to rely upon, however, power in this case will be furnished by steam turbines in the power house of the Norfolk Railway & Light Company, about 7 miles from the exposition grounds. This fair will be the first where the electrical power will be generated by steam turbines. The machines will be of the Curtis type, these, as well as the complete electrical equipment, being supplied by the General Electric Company.

The exposition authorities have entered into a contract with the Norfolk Railway & Light Company to furnish all the current required for illumination and power. Power generated at the Jamestown power house will be transmitted to a model sub-station in Machinery Hall. Here will be located the transforming and distributing apparatus. This equipment consists of large air-cooled transformers, many smaller type H transformers for general illumination, as well as constant-current transformers for the series-arc lighting system, which will be used for police illumination. At the sub-station also are motor-generator sets, to provide direct current for the operation of searchlights and small motors where they may be installed by exhibitors.

The switchboard for controlling the various circuits throughout the exposition grounds is in a gallery, and is typical of modern switchboard engineering. All the electrical machinery follows standard lines similar to that installed at the St. Louis, the Pan-American and other American expositions.

Those who have seen the plans for the Jamestown exposition predict that the electrical features, particularly the illumination, will equal, if not exceed, the display at the famous Pan-American exposition. Thousands of Edison lamps will be supplemented by searchlights, both on land and on the fleets anchored in Hampton Roads, combining to make the nightly pageant magnificent and beautiful.

INCREASE IN WAGES IN MEXICO

On Monday, April 8, a new schedule of compensation for the motormen and conductors of the Mexico Electric Tramways, Ltd., went into effect on all the lines of the system. In the cases of the motormen the increase amounts to about 10 per cent, while in the case of the conductors it amounts to even more than this. The following is the new schedule of compensation for the motormen:

During the first year of service, 17 cents per hour; during the second year, 18 cents; during the third year, 20 cents; during the fourth year, 22 cents.

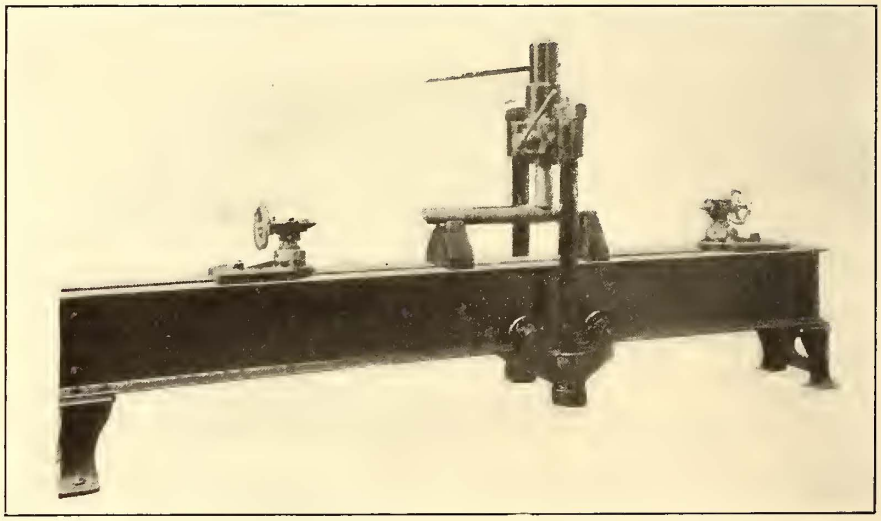
The conductors of the company, who have heretofore been paid at the rate of 10 cents per hour and 1 per cent of the receipts that they turn in, shall, from April 8, receive each 15 cents per hour, the percentage on money turned in being entirely abolished. The present compensation paid motormen of the tramways is as follows:

During the first two years, 15 cents per hour; during the third year, 18 cents per hour; during the fourth year, 20 cents per hour, and during the fifth year, 22 cents per hour.

The Mexican Light & Power Company, Ltd., is now furnishing about 300 hp to the Mexico Electric Tramways, Ltd., and by June 1 it will be furnishing about 500 hp. The stations to which the Necaxa people are supplying the energy are Churubusco, Indianilla and Veronica.

AXLE STRAIGHTENER FOR THE PUBLIC SERVICE CORPORATION

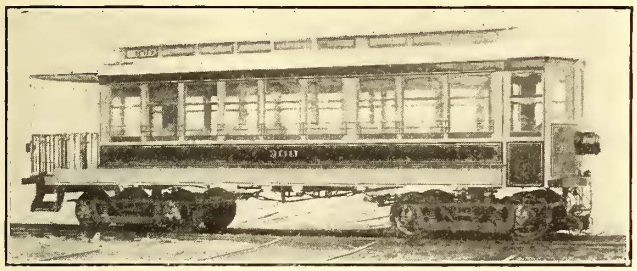
The accompanying cut illustrates an interesting axle and armature shaft straightener built for the Public Service Corporation by the Columbia Machine Works and Malleable Iron Company, of Brooklyn, N. Y. This device is operated by hydraulic pressure. The pump is worked by the long horizontal lever shown; the short lever is connected to a pinion shaft which works in a rack on the plunger to permit the rapid height adjustment of the plunger. The round nuts on the center heads are used to raise and lower the centers so that the height can be adjusted for any size shaft or gear up to 28 ins. diameter. The center heads also have an inside spring which avoids removing the center points from the axle centers when straightening shafts because the spring takes up the pressure at the ends. This last feature is a very important one, since it saves much time by permitting the center heads to remain in the same position during the entire straightening process.



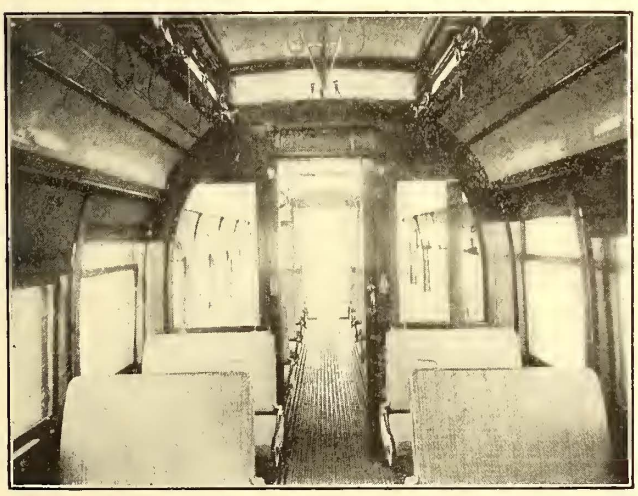
AXLE STRAIGHTENER FOR THE PUBLIC SERVICE CORPORATION

INTERESTING CARS FOR A MAINE ROAD

The three types of cars ordered recently by the Lewiston, Brunswick & Bath Railway Company from the J. G. Brill Company have just been put in operation. The two types of combination passenger and smoking cars are intended for interurban service, while the standard closed type of single-truck car will be used for local service. The 7-ft. observation platform car, which is illustrated, is of the single-end type. The high-speed trucks used under these car bodies are unusually large for a car body of the dimensions of this one, and it was desirable to place them as near the ends of the car as possible, care being taken to have the location suitable for the proper negotiation of curves. It will be noticed that the sill plate is carried out beyond the corner post as far as the steps. These observation cars, which were eight in number, contain the grooveless post, semi-convertible window system, as do the two other combination cars ordered. These latter cars differ, aside from the dimensions, from those already described in the platforms only, access being from either end and from either side. The same type of high-speed trucks is used on both types of combination cars. The third type received by the company is of standard closed type mounted on 21 E single trucks. The windows contain no sashes, the glass being secured in rabbits by rubber washers. The dimensions of the observation cars follow:



CAR WITH OBSERVATION PLATFORM

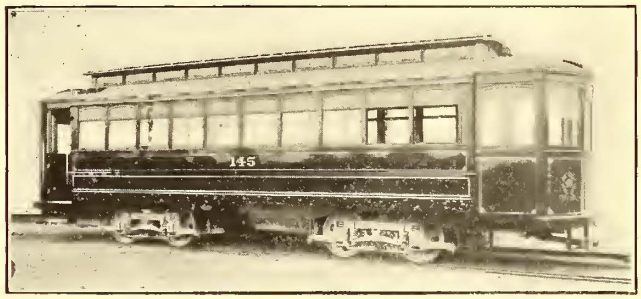


INTERIOR OF OBSERVATION CAR

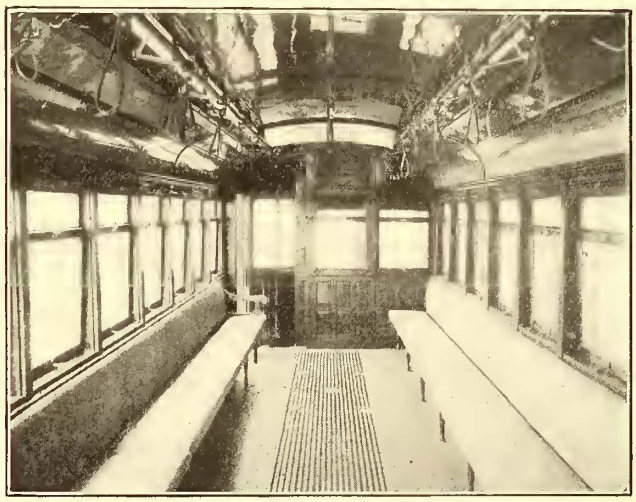
Length over end panels, 25 ft. 10 ins.; over vestibules, 36 ft. 4 in.; motorman's compartment, 3 ft. 6 in.; width over sills, including sheathing, 8 ft. ½ in.; over posts at belt, 8 ft. 4 ins.; height from bottom of sills over trolley board, 9 ft. 7¼ ins.; size of side sills, 4 ins. x 7¾ ins.; end sills, 5¼ ins. x 6⅞ ins.; sill plates, ⅜ in. x 12 ins. The length over end panels of the other double-truck combination car is 25 ft. 4 ins.; over vestibules, 33 ft. 8 ins.; other dimensions, same as mentioned heretofore. The finish of all three types is of cherry, with ceilings of birch; another feature common to the new rolling stock is Brill seats with corner grab handles.

ADDITIONAL CLOSED CARS FOR EAST ST. LOUIS

The car illustrated is one of two lots lately purchased from the American Car Company by the East St. Louis & Suburban Traction Company, which operates all the lines in East St. Louis, Ill., and the suburban lines connecting that city with Belleville, Collinsville and other towns as far as Lebanon. Each vestibule has only one door, and these doors are at diagonally opposite corners of the car. The doors in the body ends are of the "semi-accelerator" type, the door being to one side, so that passengers on the platform do not obstruct the passageway from the door. The platform knees are reinforced with angle irons, with the angle irons of the center knees extending 4 ft. 9 ins. back of the body bolster. The lower sashes of the windows drop into the usual pockets, but the upper sashes are stationary. The seats are arranged longitudinally; interior finish is in golden oak; ceilings of birch veneer. The chief dimensions follow: Length over end panels, 28 ft.; over vestibules, 38 ft.; width over sills, including sheathing, 8 ft. 2 ins.; over posts at belt, 8 ft. 4 ins.; side sills, 4¼ ins. x 7¾ ins.; center sills, 3¾ ins. x 5 ins. The trucks are of the No. 27-G1 type with 4 ft. 6 ins. wheel base.



VESTIBULE CAR FOR EAST ST. LOUIS



INTERIOR OF EAST ST. LOUIS CAR

The cars in the other lot measure 30 ft. over the end panels and are fitted with transverse seats. The vestibule doors are of the regular type equipped with vestibule door controller. The truck employed is the 27-E1.

FINANCIAL INTELLIGENCE

Wall Street, April 17, 1907.

The Money Market

There has been no material change in the monetary situation during the past week, rates for all classes of accommodation ruling practically unchanged from those heretofore quoted. The tone of the market, however, has been a shade firmer, especially for time loans. The extremely low rates prevailing for demand money here has ceased to attract any considerable amount of money from outside sources, but at the same time the inactivity in the security market has been reflected in a very material falling off in the demand for funds. Money on call has been in abundant supply throughout the week at rates ranging from 2½ to 1¾ per cent, and averaging a little over 2 per cent. On time, sixty-day money was freely offered at 4 per cent, with little desire on the part of borrowers to do business. Four months' money has been in fair request, and the quotation for that maturity has ruled slightly firmer at 4¾ per cent. For five and six months' accommodation offerings are rather free at 5 per cent, and while bankers and other lenders are not disposed to make concessions, they experience considerable difficulty in placing their funds at that figure. The demand for money from corporations has practically ceased, and it is believed that these requirements have been about satisfied, at least for the present. The foreign exchange market, although somewhat easier, is still at a point which makes gold imports from Europe impossible, and this fact has been reflected in much easier conditions at all of the principal European centers. The Bank of England reduced its discount rate from 5 to 4½ per cent, and in well-informed quarters the belief is entertained that a further reduction in the rate will be made in the near future. The Bank of the Netherlands, at Amsterdam, Holland, also reduced its rate ½ per cent to 5½ per cent. At the close of the week there was nothing in the situation calculated to cause any material change in the market in the near future. Reports from all of the interior points are to the effect that money is in good demand, and that finances at all of the larger cities are in excellent condition. The local banks continue to gain substantially on their operations at the Sub-Treasury, the gain from this source for the week, to date, amounting to about $4,000,000, due chiefly to pension payments and other Government disbursements.

The bank statement published on last Saturday was less favorable than had been generally expected, on account of the heavy expansion in loans, the increase in this item being $36,968,300. Deposits increased $44,948,800. Cash increased $7,648,900, or almost twice as much as the gain indicated by the preliminary estimates, but as the reserve required was $11,237,200 more than in the previous week, the surplus reserve was reduced $3,588,300. The surplus now stands at $15,852,925, as against $4,722,500 in the corresponding week of last year, $9,252,400 in 1905, $27,304,600 in 1904, $6,007,650 in 1903, $6,578,650 in 1902, $7,938,200 in 1901, and $10,950,275 in 1900.

The Stock Market

Although the stock market has been weak, and prices have sustained moderate recessions, the speculative situation is, if anything, better than it was a week ago. The failure of a Stock Exchange firm has cleared the atmosphere and the various disturbing rumors have now ceased to have any adverse influence. With the elimination of this one weak spot there has been something of a restoration of confidence, and while this is not practically reflected in any upward movement, it is shown in a cessation of selling in some of the active stocks. Some corrective influences are now at work which should bring about betterment in the stock market, and one of these is the more liberal policy of the Treasury Department in connection with the money market. Another is the recessionary movement in general trade, which is now beginning to attract some attention and which will count for much in that it will tend to relieve the urgent demand upon the banks for accommodations, and will make available a large amount of capital for speculative purposes. The present season is one in which crop news will count for much, and thus far there have been some disturbing reports regarding the winter wheat crop, but according to recognized experts these have been put out for speculative influence and are not based on any actual damage to the crop. The general situation is such that an irregular and narrow market is indicated for some little time, but in view of the heavy liquidation which took place during the past five months there is little probability of any material decline, and practically all the weak points in the situation have been eliminated. The steel situation continues very satisfactory and the outlook for the stocks of the United States Steel Corporation is regarded much more favorably. The monetary position is very much better, both here and abroad. In fact, the improvement on the other side is much more pronounced that at home, and the stronger position of the Bank of England will tend to give tentative support to our market. The reduction in the Bank of England discount rate is likely to be followed by further decline in the near future, and the fact that London is sending gold to Paris, reflects the stronger position of the former market, and its ability to repay loans made some time ago. The Bank of the Netherlands also reduced its discount rate, and it is expected that the Imperial Bank of Germany will take similar action at an early date.

There has been little of importance in the traction stocks during the week, and traders are holding off for a better line on the future of these shares. These companies are now entering upon the season of heavy business and large earnings, and with the additions to equipment they are in a position to handle the increased traffic in a more satisfactory manner.

Philadelphia

There was a material falling off in the dealings in the local traction issues during the week, and while at times prices developed irregularity, the general tone was rather firmer. Philadelphia Rapid Transit, which was under pressure at the close of last week, displayed strength, the price advancing from 16¾ to 18⅛, a gain of about 1½ points. Other strong features were Consolidated Traction of New Jersey, which sold at 73 and 72½, the latter figure representing an advance of a point, and Philadelphia Company common, which gained a fraction, to 50. Union Traction ruled strong, and near the close it reached 59¼. Philadelphia Traction lost nearly a point to 94⅛ on light transactions. Lehigh Valley Transportation preferred sold at 20, United Companies of New Jersey at 247½, and American Railways at 49⅞ to 50.

Chicago

Trading in the traction issues in the local market was considerably smaller than in the preceding week, there being a disposition to await further developments in connection with the proposed reorganization. Prices, however, were very irregular. Chicago City Railway, which advanced 55 points last week to 205, dropped back to 180, while West Chicago sustained a net loss of about 13 points. Union Traction was steady, with sales at 4⅞ and 5. Trading in the elevated issues was extremely dull, Metropolitan Elevated common selling at 26 for small amounts, while the preferred brought 66, an advance of a point.

Other Traction Securities

The market for tractions at Baltimore was active and very irregular. United Railway issues again furnished the leading features as regards activity, but the price movements were more or less irregular. In the early dealings practically all of these issues made fractional gains, on the publication of the company's annual report, which was considered favorable, but subsequently all of the improvements were lost on realizing sales. The income bonds were very active, upwards of $115,000 changing hands from 56 to 54⅜.. The 4 per cent bonds sold at 88 and at 87¾, and the new funding 5s sold at 84½ to 84⅝. The free stock developed considerable activity, more than 3500

shares changing hands from 14¼ to 13. Other transactions included Washington City & Suburban 5s at 101½ to 101, Norfolk Railway & Light 5s at 96¼, Charleston Consolidated Electric 5s at 92¾ to 93, and Baltimore Traction 5s at 111. The Boston market was fairly active and weak. Boston Elevated, after an early advance to 145, broke to 143, a net loss of a point. Massachusetts Electric common declined a point to 17, and the preferred ran off from 61½ to 59½. Boston & Worcester was steady. Boston & Suburban preferred sold at 50, ex the dividend.

Not much trading has been done in electric railway stocks on the Cleveland exchange the past week. On Tuesday some one sold Forest City stock down a few points, but the price was soon restored, inside interests coming to the rescue. Its high water mark was 99. Some Aurora, Elgin & Chicago and Northern Ohio Traction & Light changed hands during the week, but the prices have remained about the same as in the past. Cleveland Electric has neither lost nor gained preceptibly, standing about where it did a week ago.

Security Quotations

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

	April 10	April 17
American Railways	49½	50
Boston Elevated	143	141½
Brooklyn Rapid Transit	61½	60⅛
Chicago City	a200	180
Chicago Union Traction (common)	4½	4¾
Chicago Union Traction (preferred)	15¾	15¾
Cleveland Electric	58⅛	58¾
Consolidated Traction of New Jersey	72	72
Detroit United	75½	73⅛
Interborough-Metropolitan	26¼	25
Interborough-Metropolitan (preferred)	60	60
International Traction (common)	45	50
International Traction (preferred), 4s	72	72½
Manhattan Railway	137	138
Massachusetts Elec. Cos. (common)	18	16¾
Massachusetts Elec. Cos. (preferred)	60	a59½
Metropolitan Elevated, Chicago (common)	25	24
Metropolitan Elevated, Chicago (preferred)	65	65
Metropolitan Street	94	94
North American	75	73½
North Jersey Street Railway	40	40
Philadelphia Company (common)	45	44½
Philadelphia Rapid Transit	16¾	17¾
Philadelphia Traction	94	94
Public Service Corporation certificates	64	64
Public Service Corporation 5 per cent notes	93	93
South Side Elevated (Chicago)	80	80
Third Avenue	110	108
Twin City, Minneapolis (common)	96	95½
Union Traction (Philadelphia)	57½	57

a Asked.

Metals

According to the "Iron Age," steel in the Central West continues scarce, and efforts are being made by a leading interest to secure billets by going even so far afield as the South. The scarcity is most acute in the trade, which is under great pressure. The structural trade presents a favorable aspect. The New York subway work is looming up. The Lexington and Eighth Avenue lines will need 80,000 tons. The heavy purchases of steel making iron in Pittsburg last week seem to have given a good deal of encouragement to makers of merchant iron of different grades, West and South. A good deal of foreign iron continues to come in.

Copper metal continues firm and unchanged.

PROPOSED LONG ISLAND LINES CONSOLIDATE

It was reported from Patchogue, Long Island, on Monday, that the details had just been completed of a deal for consolidating the South Shore Traction Company and the Cross Island Railway Company, which plans to build to connect Patchogue, Brookhaven, Sayville and Port Jefferson. The South Shore Company has recently received extensions to certain of its franchises and has the consent of the Railroad Commissioners to build, but the Cross Island Company now has an application pending before the commissioners. Nothing of an official nature, however, has been given out regarding the companies. James T. Wood, of Sayville, who is president of the Cross Island Company, so report says, is to be president of the consolidated companies.

CONTROLLING INTEREST IN CHICAGO & SOUTHERN TRACTION COMPANY SOLD TO MICHIGAN SYNDICATE

The Chicago & Southern Traction Company on April 16 increased its capital stock from $2,000,000 to $5,000,000, and the bonded debt from $2,000,000 to $5,000,000. W. S. Reed has sold a controlling interest in the property to a Detroit syndicate, of which C. J. Reilly, C. A. Black, Matthew Slush and J. M. Mulkey, president of Detroit Salt Company, are members. With the increased stock and bonds, it is the intention to extend from the present main line to various points outside the Southern limits of Chicago, and also to extend the line to La Fayette, Ind., to connect there with the Indiana and Ohio lines. The road will be in complete operation as far as Kankakee, Ill., within the next six weeks.

OPERATION FOR THE YEAR IN NEW JERSEY

The State Board of Assessors of New Jersey has just made public the reports of the cable, electric and horse railway companies operating within the State for the year ending Dec. 31, 1906. The comparative statement of gross receipts, expenditures and dividends paid, shows that for 1906 the gross receipts were $12,209,738, as against $11,043,474 for 1905. The expenditures for 1906 were $7,239,409, as against $6,960,570 for 1905. The dividends paid were $885,890 for 1906, as against $803,370 for 1905. Below is given a comparative statement which shows the material increase in the difference between the reports for 1905 and 1906:

	Gross Receipts.	Expenditures.	Dividends Paid.
1906	$12,209,738	$7,239,409	$885,890
1905	11,043,474	6,960,570	803,370
Increase	$1,166,264	$278,839	$82,520

The report also contains a tabulated statement of the miles of track, capital stock issued, capital stock paid up, funded debt, other debts, cost of railroad, expenditure for repairs, superintendence, management, etc., the gross receipts and the dividends paid. Inasmuch as the only operating figures given are the gross receipts, the report is not especially significant. The figures for dividends, however, are interesting and show that among the companies paying returns on the capital stock were the Bridgeton & Millville Traction Company, the Camden Horse Railroad Company, the Camden & Suburban Railway Company, the Consolidated Traction Company, Five Mile Beach Electric Railway Company, the New Jersey & Hudson River Railway & Ferry Company, of Jersey City; the Rapid Transit Street Railway Company, of Newark; the Seashore Electric Railway Company, and the Trenton Street Railway Company. A number of these, however, are leased properties. The total of the several items which the companies report are rather interesting. The track mileage shows that there are 1060 miles of line in operation. The capital stock issued totals to $98,377,880, while the capital stock paid up amounts to $95,895,880. The funded debt totals to $97,158,087. Other debts amount to $28,132,749. The cost of railroads is given as $178,420,773, while the expenditure for repairs, etc., amounted to $7,239,409. The gross receipts as previously given amounts to $12,209,738, an increase is shown in the table at the beginning of $1,166,264. The dividends paid amounted to $885,890. Inasmuch as there are several operating companies in the Public Service Corporation which report separately to the State, the earnings of the Public Service Corporation, as a whole, are not given. The principal operating companies of the Public Service Corporation reporting to the State show earnings as follows: Public Service Corporation, $1,677,798; Jersey City, Hoboken & Paterson Company, $2,575,687; the North Jersey Street Railway Company, $5,614,974.

THE SITUATION IN CLEVELAND

Mayor Tom L. Johnson, of Cleveland, attempted to start his campaign for finances for his low fare companies immediately after the council meeting on Monday evening of last week. He first got a committee together among the friends of his hobby and placed in their hands the task of planning this campaign, with the idea that a still larger committee of both Democrats and Republicans should be made up later on to give the movement a non-partisan appearance. The mayor reasserted his belief that out of $200,000,000 of small savings accounts in the banks in his city, at least $10,000,000 could be secured through sale of stock for building the system.

The first public meeting at which the mayor made a move to secure funds was at the annual entertainment and ladies' night of the Sycamore Club. In a short address the mayor explained what he wanted and had blank applications scattered through the house. He asked that subscriptions in any amount from $10 up be made and impressed it upon the audience that the women should take stock in the experiment, and that parents should subscribe for their children. The assertion was made that the proposed system would be a success and would be owned by the people.

The truce that has existed between the Cleveland Electric Railway Company and the low-fare companies has not been broken. The cars of the Municipal Traction Company are still running from the Superior Avenue viaduct to the Public Square over the Cleveland Electric's tracks and the Central and Quincy Avenue lines are still being operated at a three-cent fare by the old company. The policy of the Cleveland Electric seems to be to oppose the wishes of the people as little as possible and let the administration make the first move in any warfare that may follow the failure to agree.

Some talk has been going the rounds to the effect that the traction matter would be taken into politics, but the better politicians seem to be fighting shy of the proposition. Chairman Price, of the Republican county committee, was called into conference with Mayor Johnson, President Du Pont, of the Municipal Traction Company, and E. W. Doty, secretary of the mayor's bank, a few days ago, but he said that no propositions of any kind were made to him, but that the traction matter was talked over to some extent. This was probably a move toward the non-partisan idea.

The Cleveland Electric Railway Company has begun its campaign for a franchise on the basis of a fare of three and a half cents again. Placards appear in all the cars reading as follows: "3½ cents fare is yours, if Mayor Johnson will let you have it. Speak to your councilman about it." So far this is all that has been done in the publicity campaign.

Several meetings have been held by H. J. Davies, secretary of the Cleveland Electric, and A. B. Du Pont, president of the Municipal Traction Company, to agree upon the amount the company owes the city for the use of Central and Quincy avenues since the franchise expired. Legally, it is said that the company does not owe the city anything, but it is possible that these gentlemen may decide upon an allowance to be paid, in order to carry out the policy of fairness that was adopted by the Cleveland Electric in the beginning.

The Forest City Railway Company has made no attempt to get possession of Central and Quincy avenues, although it is the contention of the officers of the low fare companies that the tracks of the Cleveland Electric have passed from the company's ownership, because they were not removed after the franchises expired. On the other hand, it has been said that neither the city nor the other companies may take possession of this property.

The Cleveland Electric Railway Company sent a communication to the City Council Monday evening, stating that on Tuesday, April 23, at midnight, service on the Central Avenue and Quincy Street lines would be abandoned, as they have been operated since the decision of the Supreme Court at a loss through giving a 3-cent fare. The letter stated that the company would sell the material to any one making application for it at a fair figure. Council adopted a resolution directing the Forest City Railway Company to take possession of the lines and operate them, when the Cleveland Electric ceases, but it is probable that this could not be done, since the company stated that the road would be taken up unless sold and paid for by the time mentioned above.

Council met in adjourned session Tuesday morning, having asked the Cleveland Electric to name a price for the lines on which the franchises have expired. A letter was presented from the company, in which it refused to name a price to that body, for the reason that it could not make the purchase, but saying that figures would be given any bona fide purchaser who had the money to pay for the property.

The Forest City Railway Company has announced that it is ready to enter into negotiations for the purchase of the Central Avenue and Quincy Street lines that are to be abandoned by the old company. A letter was sent to President Andrews to that effect by A. B. Du Pont.

Application was filed with the City Council by the Low Fare Railway Company for a franchise on the West Side, covering the same territory as one granted the Forest City some time ago. This was probably done to get around the financial interest that the Mayor is supposed to have in the Forest City Railroad Company. Substitutes were offered for several franchise ordinances introduced at former meetings and they were accepted.

LEGISLATION IN PENNSYLVANIA

Two bills directly affecting electric railways passed the House of Representatives last week. One was the Homsher bill, granting to trolley companies the right of eminent domain where the consent of 51 per cent. of the affected property owners has been obtained. The other was the Beidleman bill, permitting cities of the third class, such as Harrisburg, Lancaster, Reading, Altoona, York, Chester, Williamsport, Wilkes-Barre, Johnstown, Allentown, Easton and Erie, to tax the real estate of all public service corporations.

Under the Homsher eminent domain bill all trolley companies taking advantage of the new law must become common carriers of express matter and light freight. This is the point battled for by "Farmer" Creasy when the Homsher trolley freight bill was up for consideration, but which was voted down, it being left optional with the companies whether to carry freight or not.

Representative Decker wanted to strike out the provision giving the companies the right to condemn land for car houses and power houses, but the House voted down his amendments. The last amendment offered was to give viewers of land trolley companies wish to condemn $5 per day.

Like the trolley freight, 2-cent fare and railroad commission bills, which have been passed in the House, this eminent domain bill fulfills a pledge contained in the platform of the Republican party.

There was quite a protracted debate over the Fahey bill, providing that the consent of the local authorities of all cities, boroughs and townships of the first class and the Board of Road Supervisors of townships of the second class be obtained before the granting of any street railway charter. Opposition came from the country members, who charged that the measure was drawn entirely in the interest of Philadelphia people and that it allowed street railway companies too much leeway in the country. The bill lacked 13 votes of enough to pass finally. Subsequently the House reconsidered its action in defeating the measure and postponed further action on the bill for the present.

A large delegation of Philadelphia business men appeared before the Governor in opposition to the Fahey trolley bill recently passed, applying to the city of Philadelphia and the Philadelphia Rapid Transit Company. They requested the Governor to veto the bill.

In its report to the Legislature the committee to investigate the cost of living in Pennsylvania, which held sittings in Pittsburg, recommends that trolley companies be given the right to carry freight, which will encourage the production of a larger food supply for home markets and the creation of a railroad commission.

The Homsher trolley freight bill passed the Senate April 15 and now goes to the Governor, who will undoubtedly sign it. An unsuccessful attempt was made to amend the bill by prohibiting freight traffic on Sunday.

The Governor has signed the first and most important of the Fahey bills, permitting the city of Philadelphia to enter into an agreement with the Philadelphia Rapid Transit Company, whereby the franchise can be secured by the city at the end of fifty years. Whenever the stock of the company reaches a 6 per cent dividend basis the company and city are to share equally in the profits. It is believed that the companion measure will likewise become a law.

CHICAGO CITY DIRECTORS VOTE TO ACCEPT ORDINANCES—OTHER MATTERS

The acceptance on April 12 by the directors of the Chicago City Railway Company and of the new control company, the Chicago City Railroad Company, of the ordinances which were approved by the voters of Chicago on April 2 formally opened the way to the work of rehabilitating the Chicago properties. The acceptance of the ordinances, it was announced, would be filed with the city early in the week. In this connection it is of interest to note that the Chicago City Railroad Company, mention of which has just been made, was formed in January, 1907, in anticipation of the approval of the ordinances by the voters, and in accordance with the stipulation which provides that the obligations of the Chicago City Railway Company to rehabilitate its properties may be discharged either by the company itself or by the Chicago City Railroad Company, which assumes all the obligations of the railway company and is responsible for the operation of that company's property in the north and west divisions of the city.

In connection with the financing of the new work it is still persistently reported that the Chicago City Railway Company will authorize $50,000,000 worth of bonds, which will be sufficient to cover the needs of that corporation during the life of its franchise. These bonds it is said will bear interest at 5 per cent, and in effect will be guaranteed by the city. Of this amount it is estimated that about $18,000,000 will be required for the purpose of reconstruction, and that bonds of the par value of this amount will be sold at once. Here again it is pointed out that there is no need of a sinking fund, as the city agrees to pay the cost of improvements made on capital account, or, in other words, for which the bonds are issued. It is pointed out that in paying for the $18,000,000 improvements, therefore, the company will receive from the purchaser an amount equal to the par value of the bonds. The present assets of the Chicago City Railway Company, as agreed in the ordinance, are worth $21,000,000. This price, as has been before pointed out, must be paid by the city or any purchaser of the property. In addition the company has outstanding $3,000,000 in notes. These the ordinance agrees shall be considered in the same manner as assets, and out of the earnings, before any distribution of net profits, 5 per cent must be paid from the amount of the assets plus the $3,000,000 notes, or a total of $24,000,000. One authority says that this $24,000,000 will be immediately capitalized by the issuance to shareholders of $24,000,000 of the $50,000,000 issue. The issuing of bonds merely puts in concrete form the amount of the obligation which the city has agreed to pay.

One of the early moves made by the Chicago City Railway Company last week was the order placed by it for 10,000 tons of steel rails for use in constructing its lines. This order, which was placed with the Lorain Steel Company, of Lorain, Ohio, will provide for the rebuilding of fifty miles of single track.

It was proposed by the City Company and the Union Traction Company to establish through routes at once, but it was discovered that tracks on North Clark and North Halsted Streets are too close together to permit the new cars of the City Railway Company to pass each other. It is proposed to relay portions of this track, and until the work is completed the through routeing of the North Clark and Halsted Street lines will have to be deferred. In addition to the North Clark and Halsted Street lines it was proposed to through route some twenty-one other lines.

On Tuesday of last week Walter L. Fisher, who has been acting as traction adviser to the city, removed doubt as to his continuing that capacity by formally announcing that he would accept the appointment which had been offered to him by the new administration.

It was reported recently that Bion J. Arnold advocated building four-track subways that should extend to the limits on the north, south and west, and that he would submit plans for them along with the plans for the downtown system. In explaining his ideas on the subject he said that fast express trains could be run in such subways, "thus making it possible for the steam railway companies to locate their terminals outside the city and at the same time give the people in the outlying districts and those desiring to get from these railway terminals to the city rapid service to and through the business district."

Under the traction ordinances the city may require the street railway companies to join with each other and the city itself in defraying the cost of subways. The work immediately contemplated is the construction of downtown terminals. The contribution of the companies to this work is fixed at not to exceed $5,000,000. When the system shall have been completed, but not before the expiration of five years from the acceptance of the ordinances, extensions and additions may be required under a joint construction arrangement between the companies and the city.

At a mass meeting the employees of the Chicago City Railway refused to accept the wage increase offered by President Mitten, details of which were given in the Street Railway Journal April 13, 1907. The stand of the employees was that no agreement should be made that would prevent a sympathetic action in the event that the Union Traction or elevated railroad employees become involved in difficulty.

Incidentally, it may be mentioned that the transfer cases were decided in favor of the city in the United States Supreme Court. The decision was by agreement, Colonel Lewis, for the city, and John P. Wilson, for the traction companies, requesting the decree. This is a decision on the cases started some time ago by the city to compel the companies to issue universal transfers. The new traction settlement ordinances provide for transfers to cover the point in litigation.

NO TROUBLE WITH NEW HAVEN LOCOMOTIVES

Various notices have appeared during the past week or ten days in Boston, Connecticut and New York papers alleging that one of the New Haven electric locomotives was sent recently to the Grand Central Station in New York to pull out a Boston express, but that it had been found too light for the task. The story is absolutely without foundation. None of these locomotives has been nearer New York than New Rochelle, and no tests have been made except upon the makers' experimental tracks and on the school tracks of the New Haven Company, near Rye. The line will probably not be opened before June 1, and possibly at a later date.

THE IOWA MEETING

Through the efforts of the officers of the Iowa Street & Interurban Railway Association, the meeting to be held in Clinton, Iowa, on April 19 and 20 gives promise of bringing out some interesting facts on electric railway conditions in that State. The convention will begin on Friday morning, April 19, with an address of welcome by the Hon. H. U. Crockett, Mayor of Clinton, and a response by C. D. Cass, general manager of the Cedar Falls & Northern Railway Company. This will be followed by the address of President F. J. Harlon, the reading of the minutes and the report of Secretary and Treasurer L. D. Mathes. The morning session will be opened by a paper by W. G. Wagenhals, of St. Louis, Mo., on the "Steam Motor—Its Value for Interurban Service." This paper will be found on page 698 of this issue. The afternoon session will be taken up by two papers—one by H. W. Garner, general manager of the Oskaloosa Traction & Light Company, on "Amusements—How Should This Feature be Handled by Operating Companies?" and the other on "Freight Handling by Electric Lines," by P. P. Crafts, general manager of the Iowa & Illinois Railway Company. These papers are printed on pages 696 and 699 respectively, of this issue.

The Saturday morning session will open with a paper on the "Joint Operation of City and Interurban Cars over City Tracks," by Isaac B. Smith, traffic manager of the Cedar Rapids & Iowa City Railway & Light Company. Following Mr. Smith's paper, there will be a discussion on methods of handling peak or rush-hour traffic on city lines. Mr. Smith's paper will appear in the next issue of the Street Railway Journal. The session on Saturday afternoon will start with a paper on "Modern Train Dispatching Methods on Electric Railways," by H. H. Polk, president of the Inter-Urban Railway Company, of Des Moines. This paper is published on page 695 of this issue. After the discussion of this paper, the convention will end with the usual routine closing business of the convention, such as the nomination and election of officers for the ensuing year.

THE REPORT OF THE NEW YORK RAPID TRANSIT COMMISSION

The report of the New York Rapid Transit Commission for 1906 has been submitted to Mayor McClellan. As an introduction the commission indulges in praise of the work it has accomplished and details the trials that have hampered its work. After that it proceeds to consider the Elsberg law, which has curtailed its powers. Objection is made to that provision of the bill which practically gives the board of estimate the same power over rapid transit matters as the commission. The conclusion is as follows:

If the Rapid Transit Board is to continue to exist at all, its work can only be wisely performed by allowing it the initiative in planning both the scope of its undertakings and the manner in which they are to be carried through. The proper function of the Board of Estimate is to examine and criticise these plans when presented—just as it examines and criticises the plans of a Borough President for a section of the city map or his projects for a drainage area.

The Board of Estimate and Apportionment has no special acquaintance with the facts which may make one form of contract more or less expedient in a particular case. That special knowledge the Rapid Transit Board possesses, and in every other part of rapid transit act it is the Rapid Transit Board which is to plan and suggest, and the Board of Estimate and Apportionment which is to approve and authorize. The two sections just referred to are therefore anomalous, and may lead to serious confusion and delay.

Speaking of the delays which have occurred in completing the Brooklyn tunnel, the report has this to say:

By the terms of the contract for the construction of the Brooklyn-Manhattan Road it should have been "completely constructed and equipped ready for immediate, full and continuous operation" by Sept. 11, 1906. At that time the railroad, from the Battery to Brooklyn and through Brooklyn, was very far from completion, and the question arose as to whether, under those circumstances, the city was entitled to recover damages for the delay.

The contractor presented a variety of excuses, arising in part from litigation with property owners, in part from unexpected physical conditions under the East River at both ends, and in part from the change in plan in Fulton Street and Flatbush Avenue, as authorized by this Board and approved by the Board of Estimate and Apportionment.

The changes in plan have involved a great deal of additional work both in Fulton Street and Flatbush Avenue, and have necessitated a change in the orders for the steel used in construction, all of which has led to a very considerable delay. In consequence, the railway from the Borough Hall to the terminus at Atlantic and Flatbush Avenues is still far from completion at the present time, and will be delayed after the rest of the road is ready for operation. It may, however, be said with truth that the contractor's work on this section of the railway has been pushed with most unusual rapidity, and there is no reason to believe there will be any avoidable delay. The Interborough Company, under the contract, pays about four-fifths of the entire cost of the work, and can get no return until the road is in operation, so that it is very much to the contractor's interest to have the work completed at the earliest possible moment.

A very serious cause of delay has been due to the necessity of reconstructing a part of the work in Joralemon Street, and for a short distance under the East River. As early as the beginning of 1904 the engineer of the Board had occasion to criticise the method employed by the subcontractors in tunneling under Joralemon Street, and money was withheld from time to time from the contractor on account of this defective work. In the end it was found that the tunnel had settled in some places so that a uniform grade was not obtained, and if this had not been corrected it would have been difficult to run trains through at a high speed.

The work of reconstruction of the parts of the tunnel thus affected will not delay the operation of the road, because all this work can be done before the tunnels under the East River are ready for the passage of trains.

Of the approved route to Coney Island the board says that the population of the district traversed is growing enormously; that nine-tenths of the residents do business in Manhattan; that they have inadequate means of transit, and that in 1905 no less than 28,000,000 persons visited Coney Island, of whom 94 per cent started from Manhattan.

The proposed "tri-borough" route from Pelham Bay Park through 138th Street, and turning thence under the Harlem River into Third Avenue to the Battery is also commended in the report. This route provides for a track across Manhattan Bridge, under Flatbush and Fourth Avenues, Brooklyn, to Fourth Avenue, with another divergent branch in Brooklyn from Thirty-Eighth Street and Fourth Avenue to Eighty-Sixth Street, and thence as an elevated road to Coney Island. Its possibilities for connection with Staten Island by tunnel under the Narrows are emphasized.

The cost of the existing subway to the end of 1906 is set down as $38,782,276, which includes extra work authorized. This system earned in 1906: Gross, $7,080,507; net, $3,824,985. It has paid in rentals to the city, including interest on bonds and for sinking fund since the opening of the subway, $3,734,627. In 1906 this road was extended, first from 157th Street north to the Harlem Ship Canal, and then by a new bridge to 230th Street.

The commission hopes that the Brooklyn subway will be in operation by July 1.

A NEW TRANSFER SYSTEM FOR BROOKLYN

As the result of the study it has been making of operating conditions in Brooklyn as they affect the issuance of transfers the management of the Brooklyn Rapid Transit Company announced on Tuesday, April 16, a new system of transfers to go into effect May 1, which will limit each passenger to two transfers, and will permit the use of three separate lines to reach a destination. On tendering a cash fare, a passenger will be given a yellow transfer, and if he requires to use a third line the yellow transfer will entitle him to a green transfer, on which no other transfers will be issued.

The company states that its object in introducing the new system is not to abridge the legitimate transfer privileges hitherto accorded to passengers, as all passengers wishing to travel between any two points on the lines of any company can do so under the new arrangement, as easily and in the same manner as heretofore. The main purpose of the change is to eliminate, if possible, the principal abuses that have characterized the operation of the transfer system since the privilege was accorded, on March 30, 1906, of a transfer on a transfer. The new arrangement will not only affect unpleasantly the passengers who have availed themselves of these privileges and abused them to ride indefinitely on the lines of the system, but such passengers as have manipulated transfer tickets in order to make a round trip for a single fare.

Under the new system a passenger will be limited to three separate and distinct rides for a single fare, as before stated, except that at feeder lines an additional, or fourth, ride may be obtained upon a conductor's ticket, or a transfer agent's ticket, without the payment of an extra fare. The privilege of three rides for a single fare does not, however, apply to the two-fare routes, where the additional fare will be collected at the second fare points, as heretofore.

A passenger paying a cash fare, or presenting a white continuous trip ticket from the feeder lines, is entitled to a yellow transfer; a passenger tendering a yellow transfer is entitled to a green transfer; but a passenger presenting a green transfer shall not be entitled to an additional transfer. Under the new arrangement a transfer will only be issued when asked for at the time the fare is paid.

At the top of the yellow transfer are printed in alphabetical order the names and numbers of the lines to which the issuing line directly transfers. Should the destination of the passenger not be included in the list of direct transferring lines at the top of the ticket, it will be found in the second list (on both sides of the ticket in alphabetical arrangement) or under the heading "Important" at the bottom of the back of the ticket, where the feeder lines and optional transfer points are shown. Opposite the name of the line sought in this second list are printed the numbers of the direct transferring lines to some one of which passengers must first transfer by yellow ticket, and thence by green ticket to the line desired. In many cases, though, the issuing line may directly transfer to the line desired, and the conductor upon being informed of the passenger's destination, will be able to indicate a shorter route than by the use of two transfers.

The yellow transfer, which is issued for a cash fare or a white continuing trip ticket, will bear only one punch mark, indicating the time limit of transfer; but the green transfer issued upon the yellow transfer will bear an additional punch mark canceling the number of the line which issued the original yellow transfer. The green transfer will not be accepted by the conductor of the line whose number is punched thereon but will be honored within the time limit by any other line named on the ticket.

The form of transfer to be issued under the above outlined arrangement of transfers will present a novel feature never before used in connection with transfer tickets. The yellow transfer of each line obtained upon the payment of a cash fare contains full information how to reach any point on any other line of the system, and the shortest route there. It also shows clearly the number of rides necessary to reach that destination.

ANNUAL REPORT OF THE BALTIMORE COMPANY

The report of the United Railways & Electric Company of Baltimore for the year ended Dec. 31, 1906, just made public, is generally considered to be very satisfactory. The gross earnings increased $559,404, or 9.29 per cent. Operating expenses, after deducting extraordinary expenses of $929,762 for the year 1905, increased $385,412, or 13.59 per cent. The increase in other income was $2,000, while the increase in fixed charges was $135,520, or 6.8 per cent. The decrease in the amount of surplus for the year was $9,766. The increase in operating expenses is accounted for by the increased car service, to the advance in wages paid employees, and in part to increased cost of material and supplies. The comparative income accounts for 1906 and 1905 follow:

Gross earnings of lines (owned and leased)	$6,583,102	$6,023,698
Operating expenses (including insurance)	3,220,942	3,765,291
Net earnings from operation	$3,362,160	$2,258,406
Other income	4,725	2,725
Total net income applicable to fixed charges, taxes, etc.	$3,366,885	$2,261,131
Fixed charges, including park and other taxes, interest on car trust certificates, etc.	2,365,586	2,230,066
Surplus	$1,001,298	$31,064
Of which there has been credited to extraordinary expenditures	980,000	.....
Balance, surplus carried to the credit of profit and loss	$21,298	$31,064

The president says in his annual report, in part, as follows:

While the earnings show a gratifying increase, as compared with 1905, the unusually frequent and heavy rains, which occurred during the summer of 1906, greatly interfered with excursion travel, the amount of precipitation during the three months—June 1 to Aug. 31—being 19.10 ins.

During the year, as a measure of future economy in operation, large sums were judiciously expended in bettering the condition of roadway, track and power plants.

Your directors have continued the policy which, in their judgment, would best promote the efficiency of the service and economy in operation, it being their purpose to meet the requirements of the public in the matter of increased facilities.

In view of the fact that the financial plan of the company made available a large surplus each year for the next four years, and in view of the increase of gross receipts and the economies to be effected from increased efficiency, it was deemed expedient to continue as rapidly as possible the plans for the improvement of the company's property. The work was greatly facilitated by the open weather prevailing in the spring of 1906.

As a result, the plans of improvement were very materially advanced during the year 1906, much of the work scheduled for 1907 having been completed in the past year.

The increased cost of both labor and material in 1906 was, of course, an important factor in adding to the amount of ordinary operating expenses, extraordinary expenditures, etc.

During the past year, under the advice of expert accountants, in order to preserve in condensed form an accurate record of the cost of rehabilitating the property, there was opened an account referred to herein as "Extraordinary Expenditures," which account includes expenditures for rehabilitating the property distinguishable from the cost of ordinary maintenance and repair under normal conditions of efficiency. The extraordinary expenditures for the year were $1,436,692.98.

Of the total cost of this work, $980,000 has already been charged against the net income of the year and credited to extraordinary expenditures, leaving a balance standing to the debit of extraordinary expenditures on Dec. 31, 1906, of $456,692.98, the final distribution of which will be made by your board of directors. It appears for the present on the balance sheet as a deferred asset, ad interim.

Taxes.—The total amount of taxes, including park tax and the cost of paving streets during the year, was $652,802.67, as against $560,368.96 in 1905, an increase of $92,433.71.

The park tax for the year was $410,308.67, as against $378,658.57 in 1905, that for the last quarter of 1906 having been $107,517.61, the largest quarterly amount ever paid the city.

Tracks.—The Track Department reconstructed during the year, with standard rails, bonding, fastenings and new ties, 31,625 miles of single track.

The company now operates 394,454 miles of main track, of which 171,867 are laid with T rails upon suburban lines, and 172,666 with 9-inch girder rails, while 49,921 miles are made up of various types of smaller sections, the joints upon 40.62 miles of which have been cast-welded."

Cars.—During the year the company has received and placed in service 100 additional double-track 4-motor air-brake cars, 90 of which were bought under Car Trust (Series "C") and 10 purchased outright by the company, from the proceeds of insurance.

A contract was closed by the Maryland Electric Railways Co. on Nov. 24, 1906, for 40 double-truck, semi-convertible, high-speed cars, and on Feb. 1, 1907, an order was placed for 40 additional cars of same type; all to be equipped with multiple-unit control and leased to your company; it being the intention to use these cars in the Bay Shore Park excursion service, to be operated either singly or in trains, as the traffic warrants, thus releasing 40 practically new cars from this service for use on other city and suburban lines.

Ten snow-plows and two sweepers, purchased by the Maryland Electric Railways Co. and leased to your company, were received in time to be of service in clearing the tracks of the heavy snows on Feb. 4 and 5, 1907.

As explained at some length in this report, large expenditures have been made during the year. In consequence, the value of your property has materially enhanced.

Since the great fire of February, 1904, there has been expended for the general betterment of your property by the reconstruction of tracks and power-houses, for the purchase of cars, and for extensions about $6,891,734.21.

The new board of directors of the United Railways & Electric Company organized by electing Wm. A. House president, to succeed the late Gen. J. M. Hood; Frank A. Furst, first vice-president; Thomas A. Cross, general manager; Wm. Early, secretary, succeeding H. C. McJilton, and J. H. Windsor, acting treasurer. Mr. Furst takes the place of George C. Jenkins, who declined a re-election. The second vice-presidency, made vacant by Mr. House's promotion, was not filled. No changes were made in the executive committee.

THE KALAMAZOO STRIKE IN THE LIGHT OF REASON

In the issue of the Street Railway Journal for April 13 the settlement was noted of the strike of the employees of the Michigan United Railways Company's lines at Kalamazoo, which lasted exactly one week and resulted in a decisive victory for the company. The principal demand of the men was for recognition of the union, which was positively refused by the company. Since the strike the opportunity has been taken advantage of by the local press dispassionately to consider the situation and to comment on the outcome. Thus some pertinent remarks are made by the Kalamazoo "Telegraph," which in its issue of April 11 said in part:

The real responsibility for the lawless acts during the strike rests with those persons who, for political purposes, have for two years made the Traction Company a political football. The minds of many, especially the irresponsible, have been inflamed against the Traction Company until many, whose bias is against capital and against corporations, were ready to smash car windows, destroy cars and tear up tracks. For political purposes the "Gazette" and its associates have held up the Traction Company to abuse and ridicule and attack until many thought that it was a monster to be destroyed and annihilated. No opportunity was lost by that paper to tell the people that a strike was imminent when none was contemplated. The people were told that the company was fighting and robbing the city, and that it, the company, ought to be crushed. At the same time the company was spending hundreds of thousands of dollars in the city.

The result was, when a strike did come, these inflamed people were desperate and ready to do anything—even take life if necessary. The resulting lawlessness has given Kalamazoo a bad reputation from which she will not recover yor years.

This comment is not made by way of a defense for the Traction Company, but as a sort of "square deal," which many men preach, but do not practice.

Now, the events of the past week have, we hope, brought the responsibility of lawlessness where it belongs and taught all that it is a dangerous thing to stir up and inflame the masses just for politics. The bill of damages against the city will be heavy, and the cost in reputation and standing can never be adequately estimated.

The Traction Company, presumably, does not claim to be perfect or without fault, but it is deserving of decent treatment at the hands of the newspapers and the politicians who happen to have a little brief authority.

Public sentiment will no longer tolerate this wholesale and political slaughter of an institution that manifestly is trying to give the people good car service. Public sentiment will rise in rebellion against any more games of political shuttlecock with any local institution that serves the public and is spending money to help Kalamazoo. It is neither fair nor just, and a long ways from being a square deal.

Now that the trouble is over, let all be good citizens; let this unceasing political attack on the M. U. R. cease. If that company does wrong, there is always a peaceable remedy for the citizens.

The lesson has been costly, but much has been learned.

We know better who Kalamazoo's real friends are.

SIX TRACKS FOR THE LONG ISLAND FROM LONG ISLAND CITY TO JAMAICA

President Ralph Peters, of the Long Island Railroad, has just announced that the company will build a six-track system from Long Island City to Jamaica, a distance of about 15 miles. This statement is of considerable interest, as the branch for which the improvement is proposed is within the electric zone.

INTER-POLE MOTORS FOR BROOKLYN

The Brooklyn Rapid Transit Company has entered into a contract with the Westinghouse Electric & Manufacturing Company for equipments to be placed on 100 2-motor equipment surface cars and 100 2-motor equipment elevated motor cars. The former will employ 200 Westinghouse 93-A-2 60-hp motors, and 100 sets K-28-B series parallel controllers, and the latter 200 Westinghouse 200-hp commutating-pole or inter-pole motors, and 100 unit switch-group multiple unit control equipments.

DELAWARE & HUDSON SEEKING TO FINANCE CONSTRUCTION OF ELECTRIC PROPERTIES

It is reported in financial circles in New York that the Delaware & Hudson Railroad will raise $10,000,000 on two or three year notes, if favorable terms can be secured. This money, it is said, will be used to provide for the improvement of the Hudson Valley Electric Railway, recently taken over, and will include the payment for the big power plant at Mechanicville and double tracking the entire system, or the divisions carrying the heaviest traffic. These plans are in accordance with the announcement made regarding the continuation of the Rutland and Washington branch of the Delaware & Hudson system from Salem across Washington county to connect with the Hudson Valley lines at Schuylerville.

PREPARING THE PHILADEPHIA & WESTERN FOR SERVICE

The Philadelphia & Western Railroad, extending out of Philadelphia, will be placed in operation very shortly. The finishing touches are being added along the lines, and the cars are being equipped for service. Already twenty cars are on the ground, and the work of installing the motors is being carried out at the company's barn just west of the Philadelphia Rapid Transit Company's terminal at Sixty-Ninth Street, Philadelphia. The cars, which were built by the St. Louis Car Company, are upholstered in olive colored leather. The trimmings are of brass. Arc headlights are used. The work on the equipment, so it is said officially, is so far advanced that the company expect to have the eastern division running for the instruction of trainmen by April 20. By May 30 it is planned to have both the east and the west divisions carrying passengers. On the same day it is probable that Beechwood Park, 5 miles from the heart of Philadelphia, will be formally opened.

FINANCING THE NEW LONG ISLAND ROAD

George Stanley, purchasing agent of the Cleveland Electric, J. R. Nutt, of the Citizens' Savings & Trust Company, of Cleveland, and George Thrasher, manager of the New York & Nassau syndicate, made a record in financing the proposition for the road across Long Island, from Mineola to Port Washington, the organization of which was noted on page 564 of the Street Railway Journal for March 30. Within a week from the time of beginning, these men had $1,000,000 ready to turn over to the Citizens' Savings & Trust Company, most of it having been subscribed by Cleveland men. However, some came from Akron and other places in the northern part of the State.

The work of securing franchises was begun only two months ago and it is understood that these grants have all been made and that there will be no further trouble in that respect. The time set for beginning work was last Monday. The company will have a capital stock of $1,250,000 and will issue bonds to the amount of $1,000,000. It is said that the syndicate managers will receive $250,000 of the stock as a bonus.

PRIZES FOR SAFETY DEVICES

At a meeting of the advisory committee of the American Museum of Security, held April 11, 1907, Charles Kirchoff, of the Iron Age, was elected chairman and T. C. Martin, of the Electrical World, vice-president of the committee. Dr. William H. Tolman, director of the American Institute of Social Service, announced that Francis H. Richards had offered a gold medal worth $75 to be awarded to the best invention to be exhibited at the American Museum of Safety Devices relating to automobiles and motor boats. Action was taken on the award of the annual gold medal offered by the Scientific American for the best safety device, mentioned in a recent issue of this paper. It was decided to have a committee of nine judges of experts prominent in the different industries, and to be appointed by the executive committee of the Institute. Dr. Tolman also announced that Dr. L. L. Seaman had offered an annual prize of $100 for the best essay on the subject of safeguarding life. The subject of quarters for the permanent museum was discussed, and Dr. Tolman announced that several manufacturers had made application for space.

YEAR'S RESULTS AT LIVERPOOL

The annual report on the Liverpool Corporation tramways for the year 1906, by the traffic manager (Mr. C. W. Mallins) has just appeared. The capital expenditure to date is £1,901,997; total revenue last year, £586,619, against £566,628 in 1905; operating cost, £391,282, against £381,378; gross profits, £192,337, against £185,250; interest and sinking fund, £109,508, against £109,291; balance, £82,756, against £75,959; transferred to reserve, renewal, and depreciation, £55,171, against £50,639; transferred to general rate account, £27,585, against £25,319. An analysis of the cost of working shows: Traffic expenses, £148,667, or 2.94d. cost per mile; general repairs and maintenance, £82,366, or 1.631d.; power expenses, £99,918, or 1.980d.; general expenses, £54,452, or 1.079d.; rent of leased lines, £5,876, or .116d.; and interest and sinking fund, £109,580, or 2.171d.; making a total of £500,862, or 9.922d., against car mile earnings of 11.17d.

EXTENDING THE CUMBERLAND VALLEY ROAD

Tracklaying for the extension of trolley service on the Dillsburg and Mechanicsburg branch of the Cumberland Valley Railroad Company from Dillsburg Junction to Mechanicsburg has been almost completed and passengers between Mechanicsburg and Dillsburg will soon be carried the entire distance without the usual long wait at Dillsburg Junction. The Cumberland Valley Railroad Company is so well satisfied with the working of the electric cars on the Dillsburg and Mechanicsburg branch that it purposes proceeding during the year with the electrification of the Waynesboro and South Pennsylvania branches. When the gage on the Chambersburg & Gettysburg Electric Railway (which is controlled by the Cumberland Valley) is changed to conform with the railroad company's gage cars will be run over the trolley track from Chambersburg to West Fayetteville and thence to Waynesboro over the Mont Alto branch. A parallel track will be built along the South Pennsylvania from Chambersburg to Marion. When these improvements are completed freight on these branches will be handled at night by steam locomotives and electric passenger cars operated during the day. The company will convert present combination cars on its main line into trolley cars.

EXTENDING THE TOLEDO, FOSTORIA & FINDLAY LINE TO TOLEDO

F. W. Adams, general manager of the Toledo, Fostoria & Findlay Railway Company, announces that he will start immediately to build an extension of the company's line to Toledo from Pemberville, its present terminus. The road, as already in operation, extends from Findlay, the northern terminus of the Western Ohio property, 34 miles to Pemberville, via Fostoria. An extension of slightly over 15 miles is necessary to reach Toledo. This will result in two lines from Findlay to Toledo, as the Toledo Urban & Interurban already is in operation between the two points. As the two routes are in no sense common, however, except from the termini, practically no competition will result from the new construction. Mr. Adams will have entire charge of the construction; in 1905 he built 18 miles of road and operated cars over it in less than four months, but he thinks that it will take considerably longer to do the present work, owing to the fact that no preliminary work has yet been done. This company is somewhat unique in that none of its securities are on the market, and none will be offered for the purpose of "financing" this work. The company expects to purchase sub-station machinery and six passenger coaches and two express cars complete.

STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 41 Park Row, New York.]

UNITED STATES PATENTS ISSUED APRIL 2, 1907

848,663. Brake Shoe Mounting; Van Buren Lamb, New Haven, Conn. App. filed May 19, 1906. A brake-shoe provided with a protecting tenon, the lateral surfaces of which are undercut, a divided head one end of which fits about one portion of the tenon and the other end of which comprises laterally separable parts, and means adapted to hold said parts together.

848,730. System for Transmitting Electric Currents to Cars; John J. Eagan, San Francisco, Cal. App. filed Dec. 26, 1905. The trolley wires are strung transversely of the track, and a long collector shoe on the car presses the wires upwardly into contact with the current supply.

848,731. Door Opening Device; Oliver M. Edwards, Syracuse, N. Y. App. filed Apr. 9, 1904. Means operated by a foot lever for releasing the trap door, and at the same time giving it a percussion blow in case it sticks as is often the case in damp weather.

848,796. Illusion Car; William H. Winterborne, San Antonio, Tex. App. filed Sept. 6, 1906. A pleasure car in which means are provided for effecting a side-to-side or swaying movement of the car, an up-and-down movement similar to the jolting of a car on an uneven track, and a turning movement to represent the curved portion of a track.

848,958. Selective Signal System; Elmer F. Bliss, Schenectady, N. Y. App. filed July 12, 1906. Relates to a device of the mesenger call type in which semaphore signals are selectively set by a current having a predetermined number of pulsations. The release mechanism is actuated by a current of reversed polarity.

848,959. Block Signal System; Elmer F. Bliss, Schenectady, N. Y. App. filed Sept. 19, 1906. Relates to modifications of the above.

848,993. Slack Adjuster for Brakes; James M. Hines, Albany, N. Y. App. filed Aug. 2, 1906. Relates to slack adjusters for car brakes, and is intended to supply improved means for taking up the slack due to the wear of the brake-shoes and wheels, and the stretching and bending of the brake-operating levers and rods.

849,046. Railway Crossing Signal; Delano J. Brush, Columbus, O. App. filed Oct. 29, 1906. An arm carrying a danger flag is caused to be raised to upright position by the engagement of each car wheel of an approaching train with a lug adjacent to rail. As soon as the wheel passes out of contact with the lug, the flag falls to normal position and is again raised by the next wheel of the train, thus rapidly oscillating the flag.

849,093. Composite Railway Tie; Louis H. Wolff, Indianapolis, Ind. App. filed May 17, 1906. The process of making a composite railway tie which consists first in pressing the external portion into shape, and in subsequently forming and pressing the central portion into place in the external portion for uniting the two portions, and giving to the whole tie substantially the same density and character.

849,157. Engineer's Alarm; Edward McClintock, Merriam Park, Minn. App. filed Nov. 6, 1905. Trolleys laid between the track rails with circuits by which the steam of a locomotive is automatically cut off in case a following train approaches too close to a preceding one.

849,170. Electric Signaling; Jacob B. Struble, Wilkinsburg, Pa. App. filed Dec. 3, 1902. Relates to improvements in electric signaling, and is designed to utilize alternating pulsating or fluctuating currents. Has a translating device responsive to alternating current, but unresponsive to a modification of the alternating current, and means for modifying the alternating current under certain circumstances.

849,171. Electric Signaling; Jacob B. Struble, Wilkinsburg, Pa. App. filed Jan. 17, 1906. Modifications of the above.

849,172. Electric Signaling; Jacob B. Struble, Wilkinsburg, Pa. App. filed Jan. 17, 1906. Additional modifications.

849,173. Signaling System for Electric Railways; Jacob B. Struble, Wilkinsburg, Pa. App. filed Jan. 3, 1907. Further modifications.

849,183. Adjustable Locking Device; William S. Atwood, Montreal, Canada. App. filed Mar. 10, 1905. Means for adjustably locking a brake head in different angular positions upon a brake beam. The brake beam and brake head each embody a sleeve constructed to fit one within the other, one of said sleeves being provided exteriorly, and the other interiorly with a plurality of locking faces, an odd number on one end, and an even number on the other, and a key for forming a locking connection between a pair of said faces.

848,262. Trolley Wheel; George B. Nussbaum, New Philadelphia, O. App. filed Dec. 6, 1906. The trolley harp is pivotally mounted on the pole, and the trolley cord passes from the pole downward through a projection at the base of the harp whereby the wheel may be kept in normal alignment with the pole.

848,313. Car Replacer; Edward H. Best, St. Thomas, Ontario, Canada. App. filed June 28, 1906. Consists of a body having its top inclined downwardly from its center to its ends, ribs upon said body to engage the treads of car-wheels, a guide-rib upon said body, and a swinging deflector point mounted to engage either of said tread engaging ribs, and to form a continuation of said guide-ribs

PERSONAL MENTION

MR. BERTRAM E. WILSON, of the Rochester Railway Company, has been appointed general passenger agent of the Rochester & Eastern Railway, and Mr. C. F. Crane has been made assistant agent and John E. Joyce claims agent.

MR. O. D. COLLINS, superintendent of the Home Gas & Electric Company, of Redlands, Cal., has resigned that position to become superintendent of the Redlands & Yucaipe Railroad. Mr. Collins has been a director in the company since its organization, and was formerly superintendent of the San Bernardino Traction Company.

MR. WILLIAM H. DUNKERLEY, who for several years has been connected with the accounting department of the Utica & Mohawk Valley Railway Company, has resigned to accept the office of auditor for the Rockford & Interurban Railroad, of Rockford, Ill. Mr. Dunkerley formerly was auditor of the Belt Line Company, of Utica, now merged into the Utica & Mohawk Valley Company.

MR. URIAH FOSS has resigned as superintendent of the lines of the Consolidated Railway Company, at New Britain, Conn. Mr. Foss came to New Britain from Bridgeport under the management of the Connecticut Railway & Lighting Company, where he was foreman of the car house. He formerly was connected with the Syracuse Rapid Transit Company.

MR. THOMAS A. CROSS has been elected general manager of the United Railways & Electric Company, of Baltimore, Md., to succeed Mr. William A. House, who has been elected to the position of president to succeed the late Gen. J. M. Hood. Mr. Cross has been with the United Railways & Electric Company a number of years, and has recently been serving as superintendent of overhead construction of the company.

MR. H. A. HAGADORN, who for some time has been employed as superintendent of overhead construction by the Sche-

nectady Railway Company, has resigned from the company to become connected with the electric division of the New York Central Railroad Company in and about New York City. The place made vacant by Mr. Hagadorn's resignation will be filled by Mr. C. E. Clothier, at present in charge of the emergency work.

MR. A. M. HEWES, secretary and treasurer of the Electrical Installation Company, of Chicago, has been elected general manager of the Indianapolis, Crawfordsville & Western Traction Company, to take effect June 1, when the company's line between Indianapolis and Crawfordsville, Ind., will be ready for operation. In this connection it is announced that the Electrical Installation Company has been selected by the Indianapolis, Crawfordsville & Western Company to operate the line, which will be known as "The Ben-Hur Route."

MR. C. S. YOUNG, who had charge of the survey of the New Orleans & Baton Rouge Electric line, and who since the line was taken over by Stone & Webster has been its chief engineer, has been appointed general superintendent of the Stone & Webster electric properties in Texas with headquarters at Dallas, having charge of construction. Mr. Young, after the completion of the survey of the New Orleans & Baton Rouge line, was retained by Mr. W. Osgood Orton, the promoter of the road, as head of the engineering department. Later, when the line was taken over by Stone & Webster, Mr. Young was retained as chief engineer.

MR. THEODORE P. SHONTS has been made chairman of the executive committees of all the subordinate companies of the Interborough-Metropolitan Company. When Mr. Shonts came to New York from Washington it was understood he was to have control of construction and operation of all the lines, with Mr. August Belmont in charge of financial matters. As the company is only a holding company it was found that Mr. Shonts did not have necessary power to act until given the legal right to issue orders to the officers of the underlying companies. He is now in charge of the four systems, the Interborough Rapid Transit Company, Manhattan "L," Metropolitan Street Railway Company and Union Railway Company in The Bronx.

MR. ALEXANDER McIVER, who, as noted in the Street Railway Journal for April 13, has been appointed to an important position with the New York City Railway Company assumed his duties with the company Monday, April 15. Mr. McIver was graduated from Johns Hopkins University in 1895 as an E. E., and soon thereafter entered the employ of the Sprague Electric Company, with which he was connected in the railway department until 1902. In the latter year he entered the railway engineering department of the General Electric Company, at Schenectady, where he remained until July, 1906, when he became connected with the Chicago & Milwaukee Electric Railway Company as master mechanic.

MR. H. E. HUNTINGTON has returned to Los Angeles and resumed his duties at the office in the Pacific Electric building after an absence of more than four months. In speaking of the expansion of his system Mr. Huntington said that with the exception of the completion of the lines to Glendora, Azusa, Covina, Duarta and Pomona there are no plans. Ultimately there will be electric railway communication to Ontario, Redlands, San Bernardino and Riverside. Four tracking of the Pacific Electric to Watts will be rushed, and the rails extended to Long Beach later, and the same number of tracks pushed to Pasadena. So long as the twenty-one year franchise limit is part of the city's charter extensions inside of Los Angeles will not be hurried. Mr. Huntington expects to remain in Los Angeles all summer.

MR. I. R. NELSON, whose resignation as general foreman of the Public Service Corporation of New Jersey was announced in the issue of March 30, has established the firm of I. R. Nelson & Company, of 54-56 Clinton Street, Newark, N. J. This firm will act as specialists in street railway shop work and the economical maintenance of rolling stock, and is prepared to inspect railway systems with the view of recommending and carrying out, if desired, reforms in their equipment, especially so far as shop and rolling stock are concerned. For this work Mr. Nelson's experience eminently fits him, as he has occupied the position of general foreman of rolling stock of the Public Service Corporation for the last three years. His electrical experience commenced with the Brush Electric Company, of Cleveland, from which he resigned to take charge of the armature department of the Little Consolidated Railway of that city. He then went to Detroit as superintendent of the Rapid Railway with Mr. Du Pont. From there he was called to become manager of the Milwaukee, Racine & Kenosha Railway, with which he remained until the road passed into the hands of the Milwaukee Electric Railway & Light Company. He then went to Indianapolis in charge of the electric work of the Indianapolis Street Railway Company, but later was called to St. Louis by Mr. Du Pont to take charge of the rolling stock and electric repairs on that system. From there he went to the Public Service Corporation.

MR. H. N. LATEY, who has just resigned as electrical engineer of the Interborough Rapid Transit Company of New York, to enter the field of consulting and contracting engineering in partnership with Mr. F. R. Slater, was the guest of honor at a banquet held at the Hotel Manhattan in New York on Friday evening, April 12. About sixty were present, including many of Mr. Latey's former associates in the Interborough Rapid Transit Company, Mr. George S. Rice and Mr. D. L. Turner, of the Rapid Transit Commission. Mr. H. G. Stott, superintendent of motive power of the Interborough Rapid Transit Company, acted as toastmaster and referred to the high respect in which Mr. Latey is held by all who know him, and particularly pointed out his eminent services in the field of New York rapid transit. Messrs. E. P. Bryan, president of the Interborough Rapid Transit Company; Frank Hedley, general manager of the Interborough Rapid Transit Company, and L. B. Stillwell, electrical director of the Interborough Rapid Transit Company, who were unable to be present, sent letters which when read caused a veritable storm of applause. All agreed in their high regard of Mr. Latey's abilities, and in their best wishes for success in his new enterprise. Mr. Rice, chief engineer of the Rapid Transit Commission, stated that although Mr. Latey has resigned from the staff of the Interborough Rapid Transit Company, his connections are not entirely severed from the transportation companies of New York, as he, together with Mr. F. R. Slater, has been appointed consulting engineer of the Rapid Transit Commission. Other speakers were Mr. S. L. F. Deyo, chief engineer of the Metropolitan-Interborough Company; Mr. George Pegram, chief engineer of the Interborough Rapid Transit Company; Mr. D. L. Turner, of the Rapid Transit Commission. When Mr. Latey responded in his modest and sincere way to the many wishes for his success, the applause lasted for several minutes.

MR. WILLIAM A. HOUSE, who has been acting as president of the United Railways & Electric Company, of Baltimore, Md., since the death of Gen. J. M. Wood, and who in addition has also served as general manager of the company, has been formally elected president. Mr. House will now relinquish the duties of general manager, and they will devolve upon Mr. Thomas A. Cross, as noted elsewhere in this issue. Mr. House has been connected with the Baltimore company and its constituents for twenty-eight years, for it was in 1879 that he entered the employ of the old People's Passenger Railway Company as an assistant in the accounting department. He served in this and other departments until 1883, when the People's Company was reorganized with Mr. T. E. Hambleton as president, at which time Mr. House was made secretary and general superintendent of the new company. In 1889 the People's Railway Company was succeeded by the Baltimore Traction Company, and soon thereafter Mr. House was made general manager of the combined properties. In this capacity in the year 1892 the work was carried on by him of electrifying the lines in Baltimore. In recognition of his faithful service there came in 1895 his election to the vice-presidency of the company, in addition to his duties as general manager. The following year Mr. House was elected president of the combined properties to succeed ex-Governor Frank Brown. In 1897 another consolidation of Baltimore properties was effected, the City & Suburban and Baltimore Traction Companies being merged into the new Baltimore Consolidated Railway Company, with Mr. Nelson Perin as president. Mr. House was made vice-president and general manager of this company. Two years later there was effected the consolidation which brought into one company all the traction properties in Baltimore. The company that succeeded to the different independent lines was the United Railways & Electric Company, with which Mr. House became connected as second vice-president and general manager. As previously stated, Mr. House has since the death of Gen. Hood last fall been serving in the dual capacity of president and general manager.