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

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor.

Associate Editors:

RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.

News Editors:

G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
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Franchise Negotiations in Toledo

Preliminary negotiations between the city of Toledo and the Toledo Railways & Light Company regarding the terms of the proposed new franchise have led to a point where the personnel of the engineers to be employed in making a valuation is under discussion. Before this stage was reached consideration was given to various points, such as the length of the franchise term, the construction of extensions, control of the city over questions of operation, use of city tracks by interurban cars, relations with employees and right of city to purchase at future dates. On practically all of these vital matters it was decided, after full discussion between the representatives of the city and the company, to defer agreement until later. The tentative franchise which embodied ideas for the proposed new contract has served the purpose of suggesting the most important particulars for further negotiations, although its treatment of these points has been questioned by the representatives of the company. The suggested valuation precedes detailed consideration of the subject of fares, but is a work of such magnitude that its proper disposition will necessarily require some time. Nevertheless all negotiations of the character of those outlined are prolific consumers of both time and money in any city whose public utilities operate under limited-term franchises and, since these conditions prevail in Toledo, the company and the municipality have to accept them. The best hope is that the delay before the final acceptance of a fair ordinance will be short.

Posting Schedules

From the failure of many companies to post their car schedules at important transfer and intersection points it appears that the benefits of such a policy are not fully realized. Without going into the details of the matter, which has more than once been discussed in these columns, we know of no more inexpensive way of holding traffic in a district where competition is sharp than to eliminate so far as possible any sources of dissatisfaction due to long waits at points where a through trip must be broken. As the size of a system increases it becomes more and more difficult to maintain a sufficient number of through routes to satisfy the old demands for continuous trips. Moreover, on account of the operating economies gained by shortening the length of trips outward from the business districts, it becomes more and more necessary to interpolate between the long-route cars others which cover only part of the distance. Hence the time required to traverse a given route may be ten or fifteen minutes longer at one time than at another, on account of the difficulties of making proper connections at the intersection points. These points where posted schedules are desirable are generally in suburban or semi-rural districts, so that the established schedule time can usually be maintained with fair accuracy, and the plan of posting the definite passing times of

intersecting cars does a great deal to promote good feeling. The public naturally prefers through-car service to service involving changes, but where this is impracticable the substitution of definite knowledge of schedules will do much to remove possible dissatisfaction with the necessity of transferring after a delay of greater or less duration.

Fire Risk from Adjacent Structures

The danger of destruction by fire of a building depends not only on the construction of the building and the character of its contents, but also on the distance and character of surrounding structures. In a general conflagration like the Baltimore fire or the more recent Bangor fire even the most modern fireproof buildings were gutted. It is not always possible for the owner of a building to exercise control over all the surrounding buildings as regards methods of fire prevention and protective equipment, but where two or more adjacent structures are owned by the same interests it is money well spent to protect each building against the others by eliminating every possible source of danger from fire in all the buildings. Thus a wooden lumber shed separated by only a few feet from a fireproof carpenter shop building is a constant and unnecessary source of danger. The money spent on the so-called fireproof buildings and an elaborate sprinkler system probably would be wasted if a fire in the lumber shed got a good start. An electric railway in one of the large Eastern cities has just completed an expensive installation of sprinklers to protect a hundred or more cars stored on an elevated structure, but it still utilizes the ground space under the structure as a storage yard for the way department and has piled there several thousand creosoted yellow pine ties. Nothing could save the cars if these ties caught on fire underneath them. Paving blocks or steel rails piled on the ground under the cars would involve no risk, but to pile ties there for the sake of convenience in handling them is tempting Providence.

The Award of the Edison Medal

The award of the Edison medal to Frank J. Sprague on the evening of May 16 was a well-earned and proper recognition of Mr. Sprague's contributions to the art of electric transportation. To him more than to any other inventor, living or dead, the industry owes its advance of the past twenty-five years. In the early days he was the originator of the method now generally employed of flexibly supporting the motor on the car axle, of separating the feeder from the trolley wire, of controlling the speed of the motors by various combinations of the motor circuits instead of exclusively through a rheostat, and of many other features of the standard electrical car equipment of to-day. At a later period he made an equally important contribution to the art in his multiple-unit system for train operation, and still later he, with others, proved that electricity could be successfully applied to railway operations of the first magnitude, through his active part in the electrification of the New York Central and in the development of its under-running third-rail. These services of themselves would be sufficient to justify all of the honor to Mr. Sprague which took concrete expression in the award to him of the Edison medal this week. But they do not comprise by any means the entirety of the indebtedness of the industry to him. He has been from the beginning an earnest, consistent and eloquent advocate of a wider use of electric power for transportation, and has not

hesitated on many occasions in the past to stake reputation and fortune upon the correctness of his engineering convictions. This combination of the inventor and of the man of affairs is rare, but by its possession Mr. Sprague undoubtedly brought about a more rapid adoption of his inventions and engineering ideas than would otherwise have been possible. In awarding to Mr. Sprague a medal for "meritorious achievement in electrical science, or electrical engineering, or the electrical arts," the Institute at the same time honored the industry which he did so much to create.

THE PROGRESS OF POWER TRANSMISSION

The growth of electric power transmission has been so rapid that it is no easy matter to find a viewpoint from which to get a perspective on the power situation. As time has gone on, limits to the possible expansion of the art have begun to appear, while on the other hand some quite serious difficulties have vanished. It is a curious and interesting phenomenon in the progress of power transmission that difficulties once dreaded have faded into insignificance at a closer view. They have been like the indeterminate objects seen through a thin fog which, when one has advanced a few paces ahead, shrink from frightful dimensions to their actual inconsequence. Not many years ago the transmission of 100 miles was looked upon as involving prodigious difficulties from static capacity and from inductance, but a very little experience convinced engineers that these factors in the situation were not of large importance. In the early days it was even believed that on such long transmissions as these it was necessary to drop the frequency perhaps to a very inconvenient degree. In point of fact the very longest systems in operation at the present time are working at 60 cycles. In a similar fashion a voltage of 50,000 or 60,000 ten years ago seemed precariously high, while to-day it is conservative.

Speaking broadly, the difficulties of high-voltage, long-distance transmission have been in fact very much less than was anticipated in the early days of the art. At the present time, however, there is a feeling that voltage and distance have both reached a point where further progress is by no means so easy as it has been up to the present. In fact, so excellent a judge of the situation as Dr. Steinmetz recently expressed the opinion that economic limits of long-distance transmission as such under present commercial conditions have been pretty nearly attained. This is possibly an ultra-conservative view, but it is at least well worthy of consideration. The fact is that at the higher voltages now in practical use, just over 100,000 volts, the insulating properties of the air itself are imperilled. Ionization goes on so rapidly at these extreme pressures that the actual loss from energy dissipated into air threatens to become very serious at the next increase of pressure and is already of a magnitude that causes concern. It would doubtless be practicable with the modern type of suspension insulators, which has made possible the present high voltages, to increase these to a very considerable extent, perhaps to double them, but the air losses would probably be of a formidable character unless in the transmission of a very large quantity of energy. These losses depend upon the voltage and the properties of the line rather than upon the current, so that in the case of a very large transmission, say, several hundred thousand horse-power, with relatively large conductors and very moderate frequency, the

difficulty might be reduced. On the other hand, there is a chance of meeting extreme voltage conditions with ^{from time to time} ~~some~~ ^{plants have} ~~been~~ ^{proposed} for current system, as has ^{been} ~~proposed~~ for extreme cases ^{enough} ~~enough~~ to show the degree of immunity from ~~perzation~~ ^{perzation} difficulties which may be expected from the use of direct current. These somewhat disquieting factors in the power situation need not, however, cause any undue alarm. It is possible with the voltages now successfully in use, and with a very modest expenditure for power, to cover considerably larger distances than now are common. There is a constant tendency to increase these distances, not by transmitting a certain amount of power from the generating station to, let us say, a station 200 miles distant, but by uniting two networks, each covering a radius of perhaps 100 miles, so as to exchange power and operate the complete network as a unit. The more territory covered and the more stations participating in the supply the greater on the whole is the security of the united service.

Lightning, in the past a very dangerous enemy, is now, since the introduction of electrolytic lightning arresters and well-developed guard-wire systems, much less to be feared than formerly. Indeed, as Dr. Steinmetz recently put it, the thing most to be feared is internal lightning in the form of surges. These, fortunately, are less rather than more dangerous as the voltage rises, other things being equal, since their magnitude depends on the current, which for a given amount of energy transmitted decreases with the voltage. With these improvements in line construction and protection against lightning large networks can be dealt with much more successfully than a few years ago, and their increase seems to be a well-marked feature of the present growth of electrical transmission. By uniting systems into huge networks covering many thousands of square miles not only is the power supply more secure as such but the system as a whole can take advantage of the varying hydraulic conditions on several watersheds so that the period of low water at certain generating points may be a period of reasonably great flow at others. For the fullest utilization of the hydraulic sources of the country such a union of systems with storage wherever obtainable is very important. In ordinary operation there would be no considerable transmission over very long distances, since in the main each station would supply its own territory, but in case of need even the most distant stations could be brought into action and the failure of power supply averted, although the temporary losses in transmission might be large.

From the standpoint of the electric railway engineer the evolution of great networks is an important matter, since it not only enables him to secure a power supply at many points along an extended line, but also gives an immunity from breakdown far greater than can be secured in a road supplied from a single power station. There are parts of the country even now where a railway several hundred miles long might be fed at any required number of convenient points by comparatively short branch lines from existing networks. This facility of supply may go far toward settling some of the outstanding problems regarding the methods of electrification to be followed in dealing with long lines. The present outlook is that the development of power transmission within the next few years will be an intensive one directed toward the more complete supply of regions where there is a market for power, toward

physical utilization of contiguous systems to secure the advantages of co-operation, and toward the fuller utilization of all the hydraulic resources of a State or even a group of States by making them all contribute to the fund of power on which the whole region may draw.

MAINTENANCE COSTS OF NEW AND OLD MOTORS

The motor maintenance costs of the Third Avenue Railroad, New York, which are published elsewhere in this issue, should make many a railway company stop and take time for a more or less profitable comparison. These figures are of exceptional interest because they show just what a city railway can expect from thoroughly modern motor equipments in the way of low inspection and repair charges combined with a dependable car service. Practically every active motor on the Third Avenue system is of the interpole type and less than three years old, so that one would be justified in expecting much lower costs than those obtained by the operators of older motors. How far these expectations have been met appears from the fact that for the three winter months quoted in the article the cost of motor maintenance, exclusive of the gearing, was less than 2 mills per car mile.

For purposes of comparison we might say that another company of approximately the same size and character of service, but in another city, has paid an average of nearly 4 mills per car mile for the maintenance of its old types of car motors. It is true that this latter figure has included a great deal of modernization work, like reboring of motor shells, slotting of commutators, application of better brushes, improvement of insulation, etc., but the work has been done under exceptionally good conditions, and it is unlikely that the future cost of maintaining these old motors, as long as they remain in service, will be less than 3 mills per car mile. This would still leave a difference of 1 mill per car mile in favor of the newer motors, which is equivalent to a sum of \$25 per annum per motor, based on a yearly performance of 25,000 car miles. To be sure, the length of time that the later motors would maintain this degree of superiority is problematical, but there is no good reason to suppose that they would deteriorate more rapidly than the rehabilitated motors. Some light on this aspect of the matter is cast by the experience of the Third Avenue Railroad, which estimates that its new motors will not require such important overhauling work as commutator re-turning until they have given ten years' service.

While a saving of \$25 per annum in maintenance per motor is attractive, it is not sufficiently so, at the present prices for interpole motors, to justify the second company in discarding its old equipment. It should be considered, however, that the foregoing cost of 4 mills per car mile is not only low, but that it represents the average of all of the types of motors on the system. Consequently the maintenance cost of some types must be greater than the average figure quoted, while that of others must be less. This fact offers a strong argument in favor of keeping separate maintenance accounts for each class of motor, either permanently or until sufficient data have been gathered to allow the company to determine accurately when certain types of motors should be considered obsolete. In the foregoing comparisons no allowance has been made in favor of the superior service reliability of the new motors, because the old motors have a very good record in this respect.

THE 1200-VOLT EQUIPMENT OF THE SHORE LINE ELECTRIC RAILWAY

CENTRAL SCHEME OF ELECTRIFICATION

The Shore Line Electric Railway follows the Connecticut shore of the Long Island Sound for a considerable portion of its length. Starting from New Haven, Conn., it runs to Guilford over a more or less inland route, but for the entire distance from Guilford to Old Saybrook it follows the shore and from

Old Saybrook it follows the Connecticut River to Essex, continuing to Ivorytown. The whole district between Guilford and Old Saybrook is famous for its summer resorts, as the shores of Long Island Sound are rich in beautiful beaches which attract large crowds to the summer cottages which are so plentiful all along the coast. There is also a steady but smaller winter business which is helped by the presence of numerous small factories along the line.

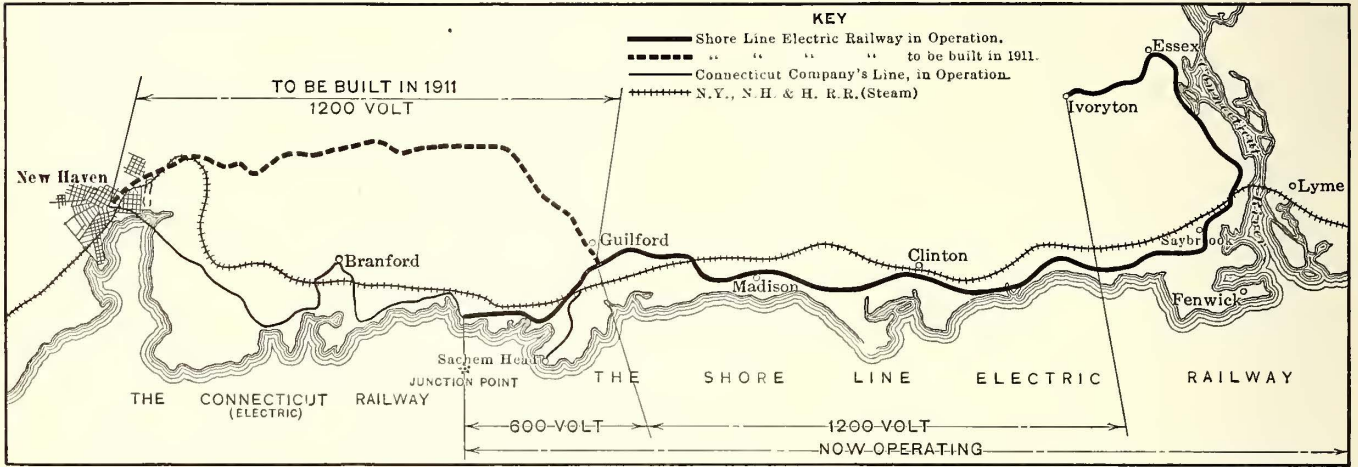


Fig. 1—Shore Line Railway—Map of Route Connection to New Haven

Old Saybrook it follows the Connecticut River to Essex, continuing to Ivorytown. The whole district between Guilford and Old Saybrook is famous for its summer resorts, as the shores of Long Island Sound are rich in beautiful beaches which attract large crowds to the summer cottages which are so plentiful all along the coast. There is also a steady but smaller winter business which is helped by the presence of numerous small factories along the line.

The accompanying map shows the route. At present the road is complete and in operation between Guilford and Ivory-

town, while the portion between Guilford and New Haven will be completed and ready for traffic within a few weeks. The entire road from New Haven to Ivorytown has a 1200-volt trolley. Stony Creek and Guilford are connected by another line, which is operated at 600 volts; this branch connects the existing electric railway lines of the Connecticut Company with the new system.

POWER HOUSE

The power house is built on the banks of the Connecticut River about a mile distant from the town of Saybrook. It is constructed entirely of reinforced concrete. Fig. 2 gives an exterior view of the station and Fig. 3 an interior. From the former it will be seen that coal can be brought right alongside either by rail or water. The station is so planned that it can easily be extended to double its size.

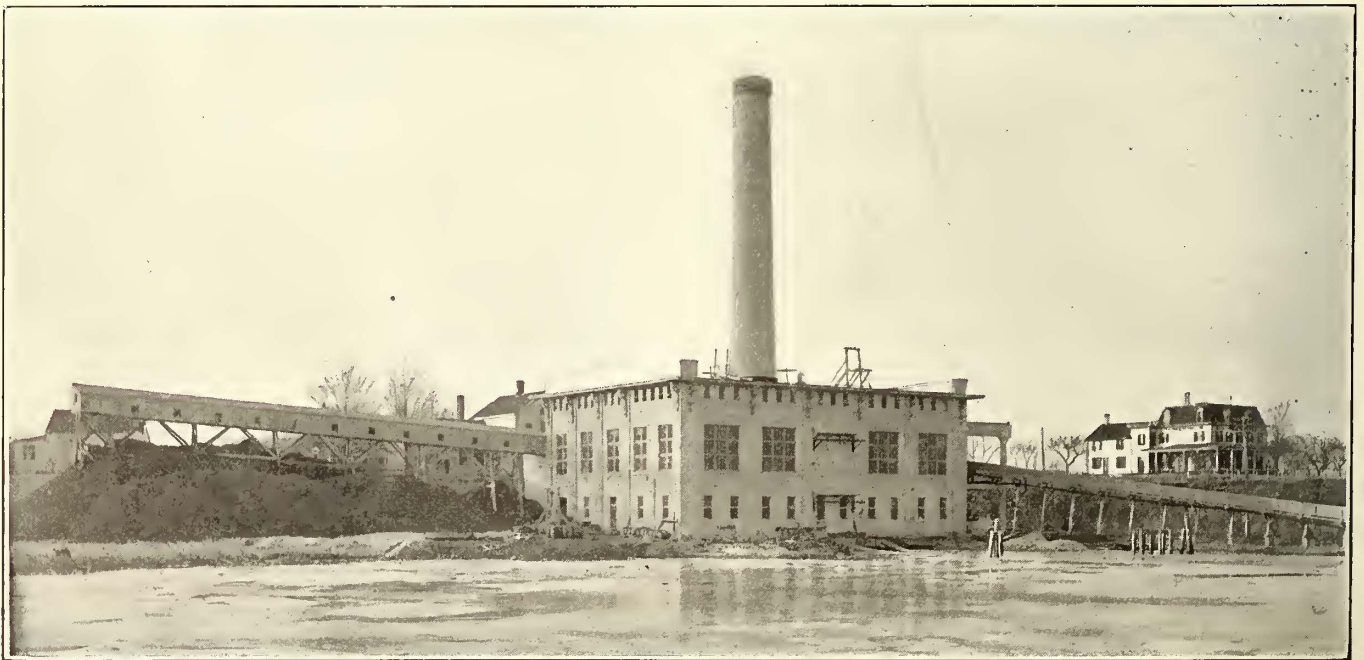


Fig. 2—Shore Line Railway—Exterior View of Power Station and Coal Storage

The boilers and most of the auxiliary apparatus are located on the ground floor while the generators, switchboards and exciters are in the operating room. The prime movers are Curtis steam turbines of the vertical type. At present two such units are installed, each of 1500-kw capacity. They are designed to operate at a gage pressure of 160 lb., and with a vacuum of approximately 28½ in. of mercury. Each machine has four

current at 1200 volts, which latter pressure is used on the trolley.

stages, with two wheels per stage and one row of buckets per wheel. The condensers, which are Wheeler condensers of the surface type, form the base of the turbines, and each has a cooling surface of 4200 sq. ft. The generators are of the ATB type. Each has two poles and is wound for 11,000 volts, 25 cycles, and runs at 1500 r.p.m.

There are two exciter sets, the one a Curtis turbine set and the other a motor generator set. The former, consisting of a type CC two-pole, 35-kw, 125-volt generator, coupled to a Curtis steam turbine unit, runs at 3600 r.p.m. This exciter set operates non-condensing. The other set is composed of a CLB six-pole, 35-kw, 125-volt compound-wound generator direct-connected to a four-pole, 50-hp, 440-volt, form-K induction motor. The speed of this set is 750 r.p.m. Current at 440 volts is supplied to the motor-generator sets through the medium of three type H 20-kw, 11,000/400-volt, 25-cycle, oil-cooled transformers.

The switchboard for the power house consists of a swinging bracket provided with synchronous indicator and voltmeter for the exciter sets, one two-circuit exciter panel, one three-phase induction motor and transformer panel, two three-phase turbo generator panels, two blank panels for future generators, and two three-phase outgoing line panels. Lightning arresters of the electrolytic type are provided to protect the apparatus in the power house. The oil switches are of the K-4 type. All of the electrical apparatus in the power house was manufactured by the General Electric Company.

The boilers are of the water-tube type manufactured by Bigelow-Hornsby; there are three at present and provision is made for a fourth. The normal rating of each boiler is 625 hp, but this capacity can be practically doubled when forced draft is used. They are fed by Taylor mechanical stokers. The working pressure is 165 lb. per square inch. Foster superheaters are employed to give 125 deg. of superheat. The blowers, two in number, for the forced draft are of the rotary type driven by horizontal steam turbines, and the mechanical stokers are driven by chain gear from the shaft of one of these blower sets. Thus the speed for feeding coal and the air pressure are governed by regulating the speed of the blower set.

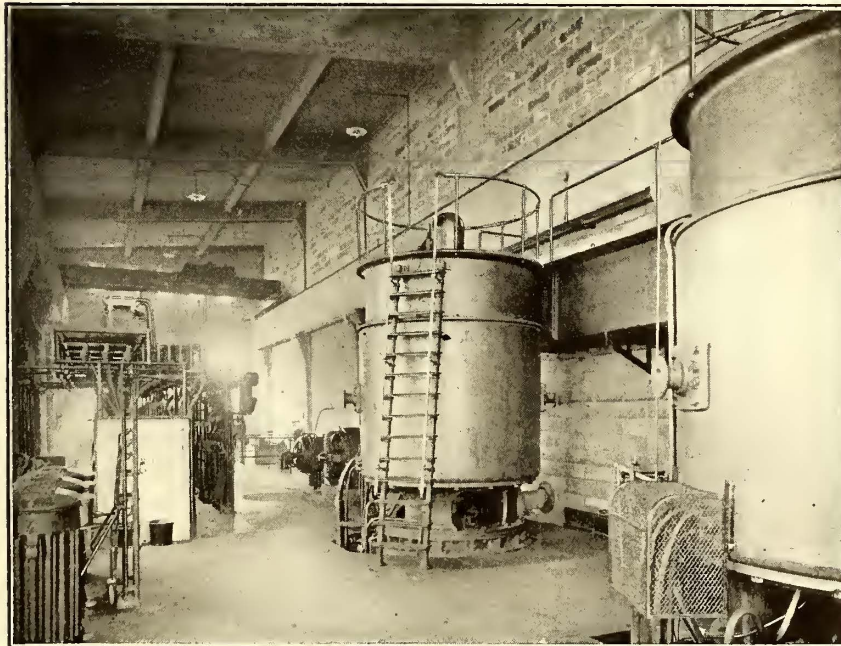


Fig. 3—Shore Line Railway—Interior of Turbine Room

Among the other auxiliary apparatus may be mentioned two horizontal feed pumps built by Davidson; two Wheeler steam-driven centrifugal circulating pumps; two vertical Wheeler steam-driven air pumps of the Edwards type; two horizontal steam-driven make-up pumps built by Davidson; two General Electric duplex step-bearing pumps and two General Electric hydraulic gear pumps. The feed water heater has a capacity of

2000 hp. It is of the Cochrane open type. Provision is made for another heater of like capacity. An air compressor is provided for cleaning the electrical machinery. A 20-ton traveling crane capable of serving the entire length of the operating room is installed and designed in such a manner that it can be run for some distance outside the building on girders to pick up its load from the ground outside and convey it to any part of the operating floor.

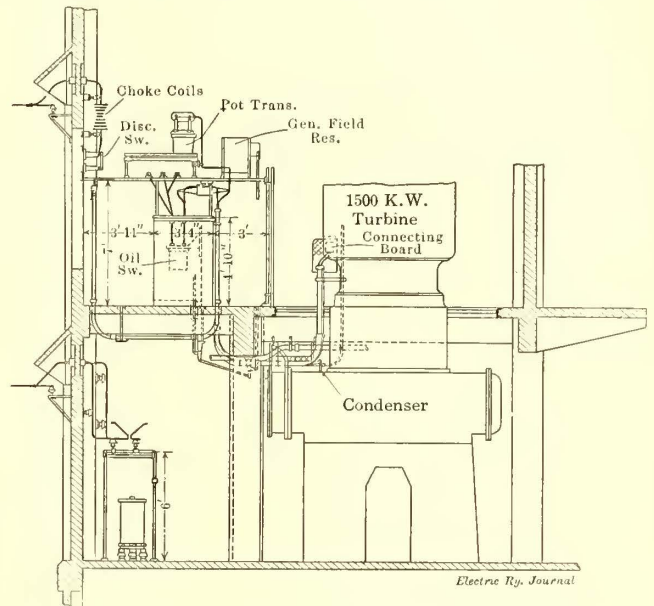


Fig. 4—Shore Line Railway—Section of Turbine Room

SUBSTATIONS AND CARHOUSES, ETC.

There are two substations, one at Saybrook, about one mile from the power station, and the other at Guilford, 21 miles from the power station. The Saybrook substation is included under the same roof as the carhouse, machine shops, office, etc. Very comfortable quarters are provided for the men there, a pool table and reading room furnishing amusement and recreation when they are off duty. The plan of the building is shown in Fig. 6 and an exterior view in Fig. 5. The building is constructed entirely of reinforced concrete and steel. All of the machines in the machine shop are electrically driven. The Guilford substation is in general of the same construction as that at Saybrook, but the adjoining carhouse is smaller and is used only for the storage of cars.

ELECTRICAL EQUIPMENT OF SAYBROOK SUBSTATION

The most important items of electrical equipment at the Saybrook substation are as follows:

Three type TC four-pole, 200-kw, 600-volt rotary converters, insulated for operation, two in series to give 1200 volts. The speed of these machines is 750 r.p.m.

Three HT 160-kw, 11,000/370-volt, three-phase, 25-cycle, oil-cooled transformers.

Three 30-kva oil-cooled reactive coils.

Switchboard with one incoming and one outgoing panel, three a.c. and three d.c. rotary converter panels and three d.c. feeder panels.

Electrolytic lightning arresters are provided for the protection of both incoming and outgoing lines.

An interior view of the Saybrook substation showing the rotary converters, transformers and switchboard is given in Fig. 7. Both the incoming lines and outgoing lines are protected by electrolytic lightning arresters (see Fig. 8). There is one 1200-volt bus and one 600-volt bus and both the negatives and equalizers are taken to the board. There is one panel for

each rotary and each rotary can be thrown on to either side of the three-wire 600 and 1200-volt bus, the operating position of the triple-pole double-throw lever switch determining

volts always being procurable so long as two machines are operative.

The lighting circuits for the substation, carhouse and office are taken from the 11,000-volt bus through expulsion fuses and disconnecting switches to a 10-kw single-phase transformer which gives 110 volts on the secondary side. This is the pressure used on all of the lighting circuits.

The special feature of interest concerning the rotary converters is that they are standard 600-volt machines with extra insulation and extra creepage distances to permit their operating two in series to give 1200 volts. Either machine can be operated on the high side. The flashing distances on the commutator are large and all parts are protected against flash-overs. The speed limit and end play device as well as the field break-up switch have been covered in order to protect the operator. These rotary converters, although of a smaller capacity, are of the same design as those installed on the Milwaukee Electric Railway & Light 1200-volt system, which was fully described in the ELECTRIC RAILWAY JOURNAL for July 16, 1910, so that a further detailed description is unnecessary.

In general the electrical equipment in the Guilford substation is so similar to that in Saybrook that a description will not be

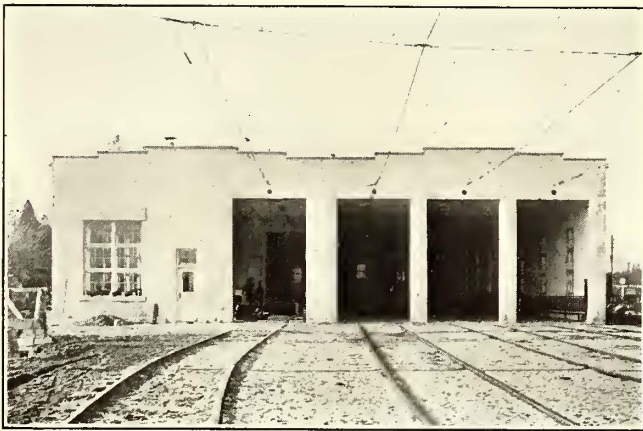


Fig. 5—Shore Line Railway—Exterior of Saybrook Substation and Carhouse

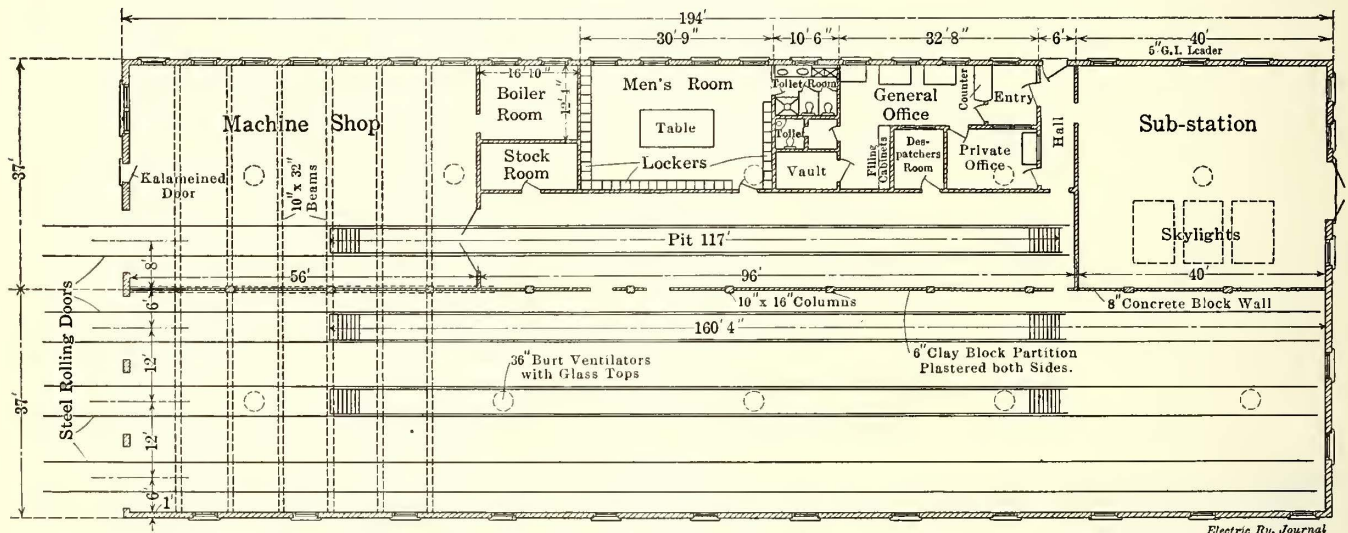


Fig. 6—Shore Line Railway—Floor Plan of Carhouse at Saybrook

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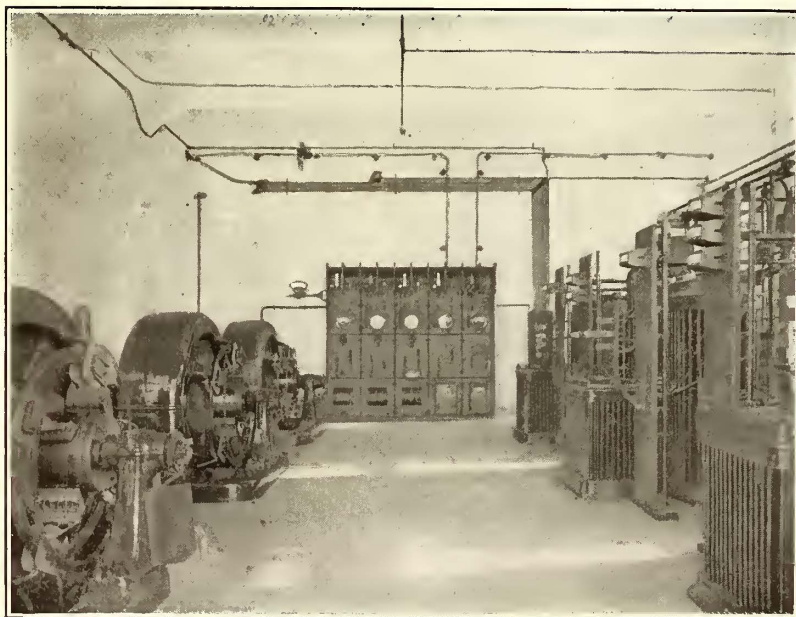


Fig. 7—Shore Line Railway—Interior of Substation at Saybrook

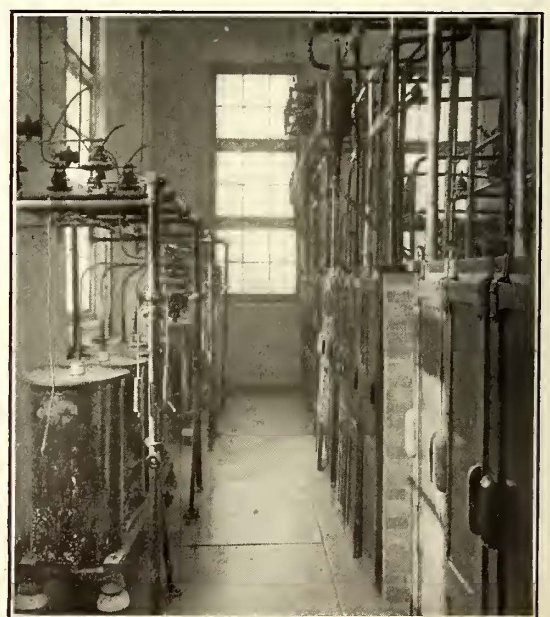


Fig. 8—Shore Line Railway—Electrolytic Lighting Arresters in Saybrook Substation

whether the rotary is on the high-voltage or low-voltage bus-bars. These triple-pole switches will be noticed on the subbase of the switchboard in Fig. 7. This arrangement insures 1200

given. The chief points of difference are that Guilford has no outgoing high-tension transmission line, as at present it is the terminal substation. The Guilford substation has one 600-volt

and one 1200-volt feeder instead of two 1200-volt feeders as at Saybrook.

ROLLING STOCK

The present rolling stock consists of ten combination smoking and passenger cars for the interurban service operated at 1200 volts, two cars of the city type for the Stony Creek to Guilford branch, one box car locomotive and a snow plow. The equipment of all ten combination smoking and passenger cars for

CAR BODY.

	Ft.	Ins.
Length over buffers.....	44	5
Length over car body.....	42	5
Length over passenger compartment.....	26	6
Length over smoking compartment.....	11	11
Length of vestibule.....	4	0
Width over sheathing.....	8	2½
Width over all (over stationary step).....	8	11
Width of aisle.....	21	½
Height under sill to top of roof.....	9	2
Height track to top of roof.....	12	2
Minimum total height.....	12	7½
Between bolster centers.....	30	3
Weight of car body, about.....	23,000	lb.

interurban service is the same. All are furnished with four GE-217 motors which have a rated capacity of 50 hp each and a complete complement of Sprague-General Electric type M non-automatic control. The GE-217 motor is of the commutat-

closing a switch which is situated on the motorman's cab.

The dynamotor has a capacity of approximately 10 kw and is designed for suspension under the car. General Electric emergency straight air brake equipments are provided for all ten

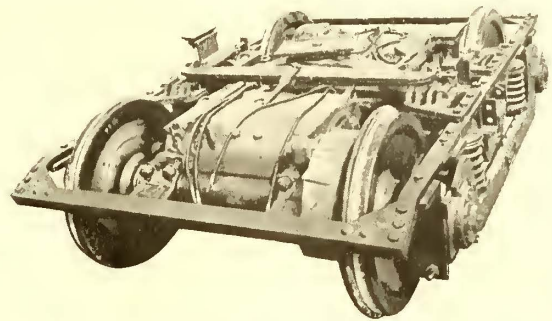


Fig. 12—Shore Line Railway—Two-Motor Truck

equipments and the compressors are of the CP-29 type, designed to operate direct on both 600 volts and 1200 volts. The governors are of the MH type which have been produced for 1200-volt operation. Quick service valves are employed to

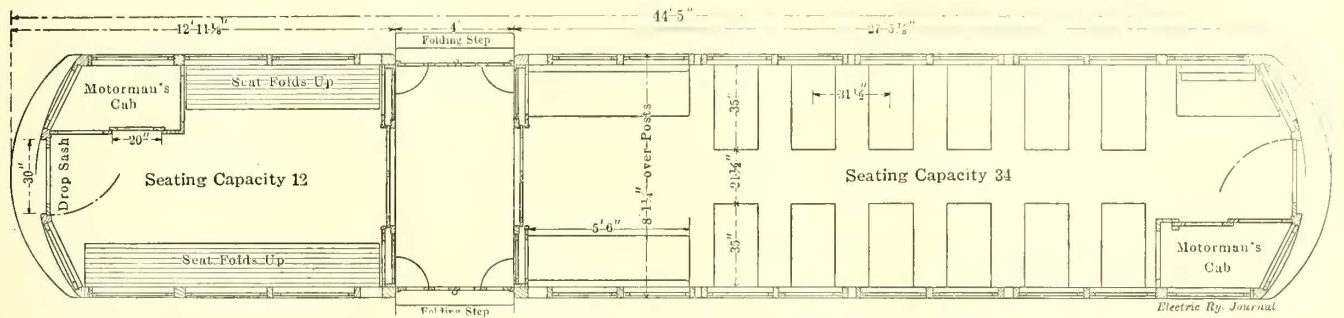
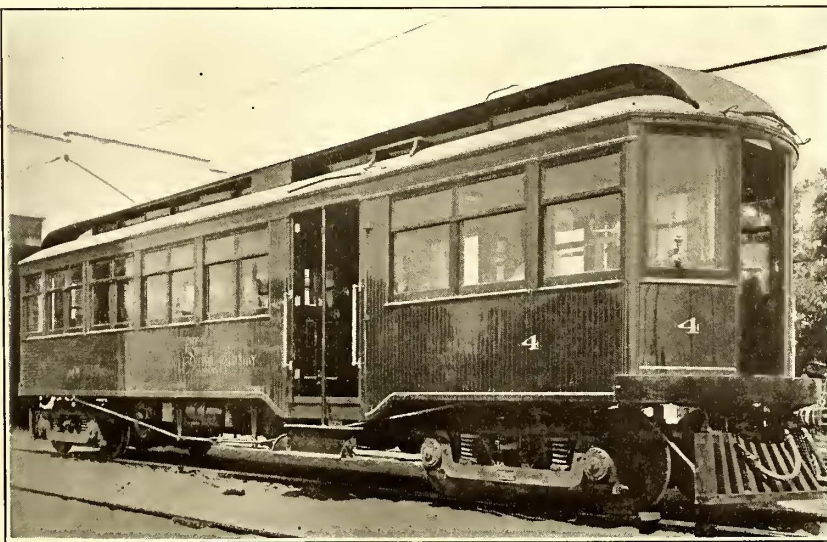


Fig. 9—Shore Line Railway—Plan of Side Entrance Car

ing pole type, is wound for both 600 and 1200 volts operation, is of the box frame construction and is bar-suspended. The cars will operate at 600 volts in New Haven and at 1200 volts on the interurban section. The motor circuits remain the same on both voltages and therefore only half speed is obtained on a 600-volt trolley. The control, car lighting and headlight circuits are fed direct from the trolley on 600 volts and from a

give a quicker application and release of the brakes. There are 16 electric heaters in each car; these are of special design for 1200 volts and are capable of giving three different heats. They were made by the Consolidated Car Heating Company. The headlights are General Electric luminous arc lamps.

The car bodies were constructed by the Jewett Car Company, of Newark, Ohio, and incorporate some very interesting fea-



Figs. 10 and 11—Shore Line Railway—Exterior and Interior of Combination Car

dynamotor on 1200 volts, so that these circuits under any circumstances are never subjected to more than 600 volts pressure. The dynamotor is connected to and disconnected from the trolley and control circuits by a two-position relay. When this relay is in the "gravity" position the trolley is connected to the dynamotor for 1200-volt operation, while on a 600-volt trolley the operating coil of this relay is energized by the motorman

tures of design, the most noticeable of which is the side entrance. The plan given in Fig. 9 will show the general arrangements. It will be noticed that a folding step is provided. The special underframing to accommodate the side entrance is illustrated in Fig. 13. The vestibule is situated between the smoking compartment and passenger compartment, an arrangement which has the great advantage that passengers can enter and

leave each compartment separately, that is to say, without passing through the other. This has been found to facilitate greatly the loading and unloading of the car.

The principal dimensions are given in the table on the preceding page.

The passenger compartment is provided with 12 Hale & Kilburn cross seats and three longitudinal seats and has a seating capacity of 34. The smoking compartment, which has longitudinal seats, has a seating capacity of 12, bringing the total seating capacity of the car up to 46.

The trucks were built by the Baldwin Locomotive Works and are of class 78-20-A, which are designed for a maximum center pin load of 20,000 lb. They were described in the issue of this paper for Oct. 22, 1910. The wheelbase of each truck is 75 in., and the wheels are standard rolled-steel wheels of 34-in. diameter. The weight of each truck, not including motors, is 7500 lb. Fig. 12 shows a view of one of these trucks equipped with two GE-217 motors.

The weight of the car and equipment is as follows:

TOTAL WEIGHT OF CAR.	
	Lb.
Car body.....	23,000
Two trucks.....	15,000
Four motors.....	12,920
Control equipment.....	5,500
Air brake equipment.....	2,900
Couplers.....	180
Total.....	59,500

This gives a car weight of 1443½ lb. per seated passenger. The maximum speed which the trucks and cars were designed for was 42 miles an hour. An interior and an exterior view of one of these cars are shown respectively in Figs. 10 and 11.

The foregoing remarks apply to the cars used in the interurban service. The two equipments employed between Stony Creek and Guilford are similar to the New Haven city cars, with the exception that they operate on 600 volts only and are equipped with GE-216 commutating pole motors. These motors are 40-hp units and are equipped with type K control. The air-brake equipment on these cars is of the General Electric straight air-brake type.

The equipment of the box-car locomotive and the snow plow are substantially the same as those already described on the interurban cars, that is to say, they are capable of operating on both 600 volts and 1200 volts. Both the locomotive and the snow plow are equipped with four GE-205 motors, which are commutating pole motors rated at 75 hp each. The control is the Sprague General Electric type M.

OVERHEAD CONSTRUCTION

The construction of the overhead trolley system is of peculiar interest owing to the many features incorporated to give a maximum flexibility. The catenary type of construction has been adopted with the three-point suspension and the poles are spaced 150 ft. apart. The messenger wire, which is of Siemens-Martin steel built up of seven strands, is 7/16 in. in diameter and supports a grooved copper trolley wire of No. 000 capacity. The insulation is, of course, for 1200 volts.

Among the new features of construction the loop hangers, the flexible pull-offs, the flexible anchor arrangement and the method adopted of supporting large radius curves by the use of extension brackets are of special importance.

One of these loop hangers is illustrated in Fig. 14. It is made up of a flat stool strap 1/8 in. by 1 in. with a loop formed at the top to allow the trolley wire a vertical movement of about 2 in. play before any pressure is brought to bear on the messenger cable. The trolley wire clamp is built of two malleable-iron interchangeable castings and the bolts are of standard machine type.

The form of pull-off adopted is seen clearly in Fig. 15, a photograph taken between Guilford and Saybrook. These pull-offs consist of a single curve yoke attached to a curve car of similar design to the straight line car excepting that it is 10 in. long and a separate sister hook casting for the messenger



Fig. 14—Hanger

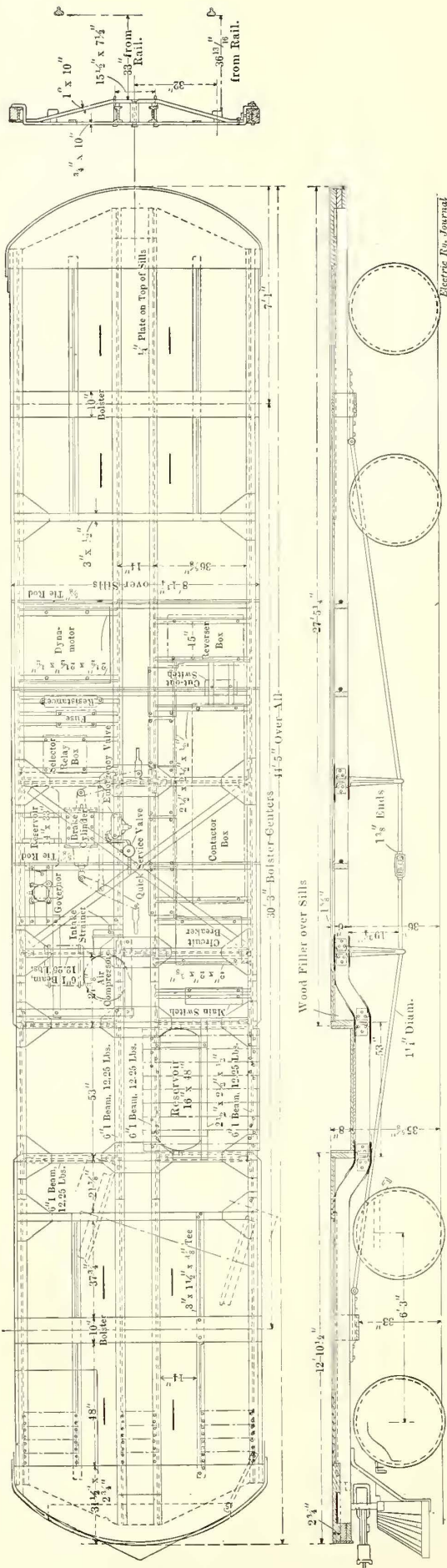


Fig. 13—Shore Line Railway—Plan and Side Elevation of Floor Framing, Showing Bent Sill for Side Entrance and Location of 1200-Volt Equipment

cable. The distance between the trolley and messenger is maintained by a strut as shown. This arrangement is very flexible and has been found to eliminate the pounding of the trolley wheel at suspension points and the effect of the trolley wheel on the wire, and the reduction of trolley trouble to a minimum has been very marked on this particular road.



Fig. 15—Shore Line Railway—Pull-Off Construction on Curve Between Guilford and Saybrook

The anchor arrangements include separate clamps for messenger and trolley wires. These are attached to the brackets and the brackets are in turn guyed to the adjacent poles. The messenger clamp is located, as a rule, at the distance of approximately 10 ft. from the bracket; in this form of construction all the strain is relieved from the messenger cable and is taken on the anchor guy. The trolley clamps for anchor ears are

rent collector passes these points. A typical anchorage is shown in Figs. 17 and 18.

The brackets are standard 2½-in. by 2½-in. by 5/16-in. galvanized T-irons with a guy rod ½ in. in diameter. The fittings are of malleable iron, both insulators and anchorages being attached with 5/8 hook holes. The porcelain insulators are

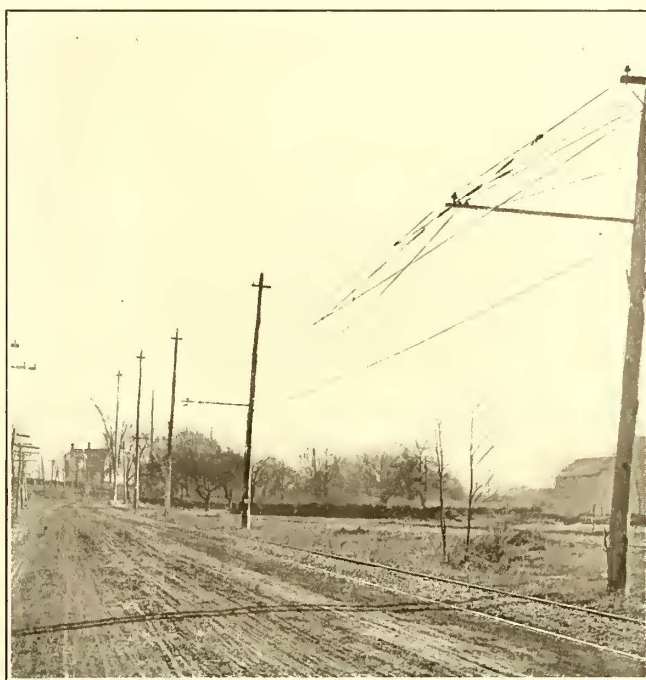


Fig. 17—Shore Line Railway—Overhead Construction at an Anchorage

standard. They are 3½ in. in height and 4½ in. in diameter.

HIGH-TENSION TRANSMISSION LINE

The high-tension transmission line extends from the power house at Saybrook to the Guilford substation, being tapped en route at the Saybrook substation. The working potential is 11,000 volts and the energy is transmitted three phase at 25 cycles. It is a single transmission system, that is to say, there

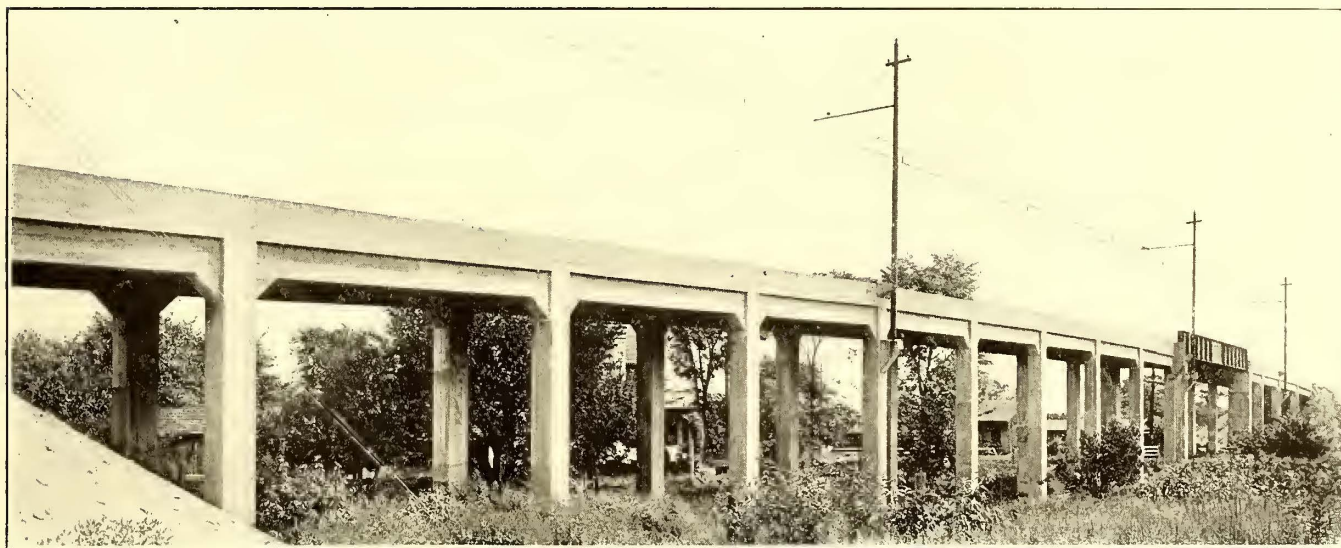


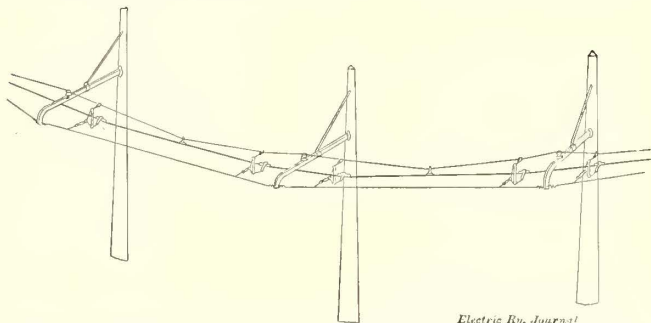
Fig. 16—Shore Line Railway—Concrete Approach and Viaduct Over Track of New York, New Haven & Hartford Railroad

located approximately 25 ft. or 30 ft. from the bracket so as to overcome the tendency to lift the trolley wire above its normal position. A turnbuckle is used on both the messenger and trolley anchors to permit the adjustment of slack between separate anchorages. This arrangement forms a very flexible anchorage and no pounding or shock is suffered when the cur-

are only three wires. These are No. 2 B & S copper wires. For the greater part of the distance the transmission line is carried on the same poles as the trolley wire, which are spaced 150 ft. apart. In some cases a pole as high as 75 ft. has to be employed to carry the line over the trees, as permission could not be obtained to cut the old elm trees for which the locality

is famous. The insulators are of standard single-petticoat type made by the Ohio Brass Company. They are supported on 9-ft. standard wooden screw pins.

Fig. 19 shows some interesting details of construction where the transmission line crosses the tracks of the New York, New Haven & Hartford Railroad. Here semi-hard drawn standard wire has been used and the minimum and maximum sag have been confined to 6 in. and 20 in. respectively, and the maximum tension has been limited to 30,000 lb. The wooden strain in-



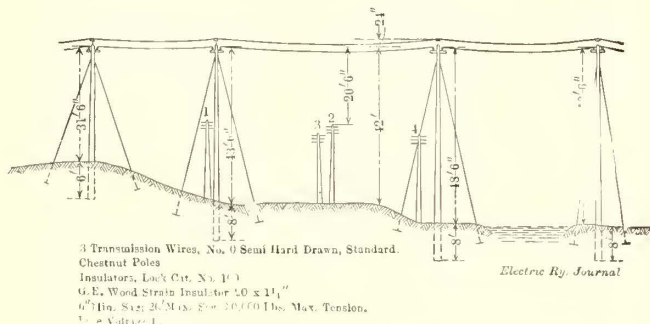
Electric Ry. Journal

Fig. 18—Shore Line Railway—Single-Track Catenary Curve with Extension Bracket

sulators are 20 in. by 1 1/4 in. diameter and were made by the General Electric Company. The height of the poles is shown in the drawing.

TRACKS, ETC.

There are some quite notable civil engineering features in the construction of the Shore Line Electric Railway, mostly in the form of reinforced concrete structures. The smaller bridges and culverts are quite numerous, as the road traverses some marshy stretches of country. The viaduct over the track of the New York, New Haven & Hartford Railroad, illustrated



Electric Ry. Journal

Fig. 19—Shore Line Railway—High-Tension Transmission Line Crossing Over Steam Railroad Tracks

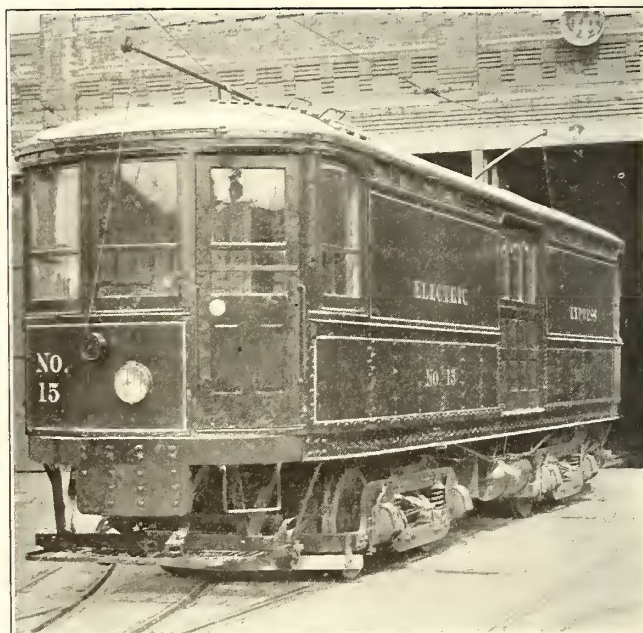
in Fig. 16, is a good example of the type of construction employed. The curves, which are fairly numerous, are all super-elevated to permit a high speed and in some places the grades are fairly heavy. For instance, there is a 5 per cent grade for about 1000 ft. at Signal Hall and where the electric line crosses the tracks of the New York, New Haven & Hartford Railroad, but, on the other hand, there are some long straight stretches of track that are practically level. The roadbed is for the major part made of crushed rock. The tracks are standard gage, namely, 4 ft. 8 1/2 in. The road is single track throughout, but exceptionally long crossovers and turnouts are provided which would accommodate trains of any length likely to be operated over the system. The rails are of the A.S.C.E. standard and weigh 70 lb. per yard. The bonds are of twin terminal type

Dartmouth College, through its school of business and administration, the Amos Tuck School of Administration and Finance, announces a conference of scientific management for the benefit of the manufacturers and business men of New Hampshire and the neighboring States to be held at Hanover, N. H., Oct. 12, 13, and 14, 1911.

NEW EXPRESS CARS OF THE OLD COLONY STREET RAILWAY

The Old Colony Street Railway, Boston, Mass., has recently received from the builders, the Laconia Car Works Company, four semi-steel, high-speed express cars to be used in the territory south of Brockton, Mass. The cars were designed by E. W. Holst, superintendent of equipment Old Colony Street Railway, and were assembled and equipped at the Campello shops of the company. They have a number of interesting and unusual features, among which may be mentioned the long overhang beyond the bolsters, the arched roof construction, reinforcement in the end and side framing to prevent telescoping, and the use of movable slat ventilators along the eaves.

The cars are 39 ft. long over bumpers, and although the superstructure of the vestibules at each end is framed separately from the body the underframe is continuous and the floor of the vestibules is on a level with the floor of the car. The distance between bolster centers is only 18 ft., so that the overhang at each end is slightly greater than half the distance between supports and an equally balanced cantilever effect is obtained. The longitudinal members of the underframe consist of two 6-in., 12.25-lb. I-beam center sills and 8-in., 18-lb.



Old Colony Street Railway—Semi-Steel Express Car

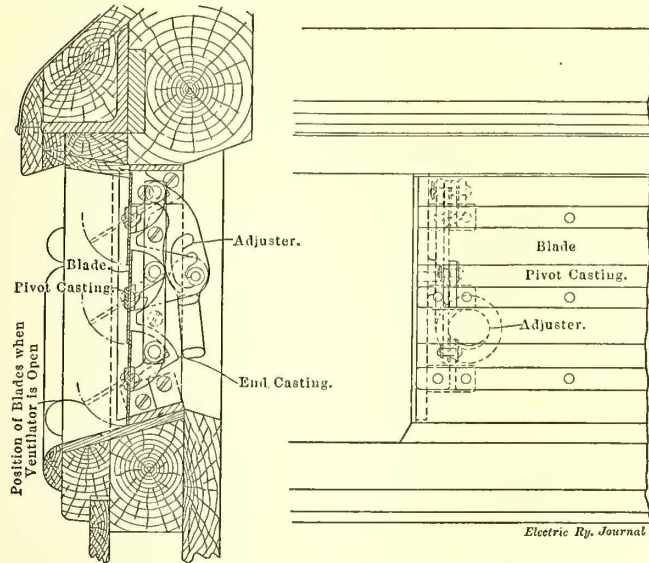
I-beam side sills. The center sills are continuous from bumper to bumper, but beyond the body end sills they are spread apart a distance of 2 ft. 10 in.. Light angle corner braces extend back to the end sills and stiffen the connections of the center sills and the bumper. The side sills extend out 28 in. beyond the end sill and the 3-in. x 7-in. angle-iron bumper is riveted to them.

The end sills are formed of 4-in. I-beams reinforced by 3-in. x 3 1/2-in. x 1/4-in. angles riveted to the bottom flanges of the longitudinal sills. The bolsters are of the built-up type with top and bottom plates 1 in. x 10 in. Between the bolsters the longitudinal sills are tied together with two 4-in. I-beam cross-ties and two 2 1/2-in. x 1/2-in. diagonal braces. Angle-iron needlebeams are riveted under the longitudinal sills 24 in. on each side of the center of the car to support the body truss rod queen posts. The two truss rods are 1 1/8 in. in diameter and are anchored on top of the bolsters. They are tightened with turnbuckles inserted between the queen posts and have a drop of 9 in.

The framing of the superstructure is a combination of wood and steel members. The main side posts over the bolsters and

at the door openings are 4-in. 5.25-lb. channels, and the body corner posts are 6-in. x 6-in. x $\frac{3}{8}$ -in. angles. The posts on each side are tied together at the top by a 2½-in. x 2-in. x $\frac{1}{4}$ -in. angle and they are also stiffened by double diagonal braces of 2½-in. x $\frac{1}{4}$ -in. strap iron in each panel. A 2-in. x $\frac{3}{8}$ -in. over-

The roof is formed in a flat arch and the framing consists of 3-in. channel main carlines resting on the main posts, together with compound wood and steel intermediate carlines. A layer of ½-in. wood sheathing is placed on the carlines and over this a layer of roofing canvas is applied.



Cross Section.

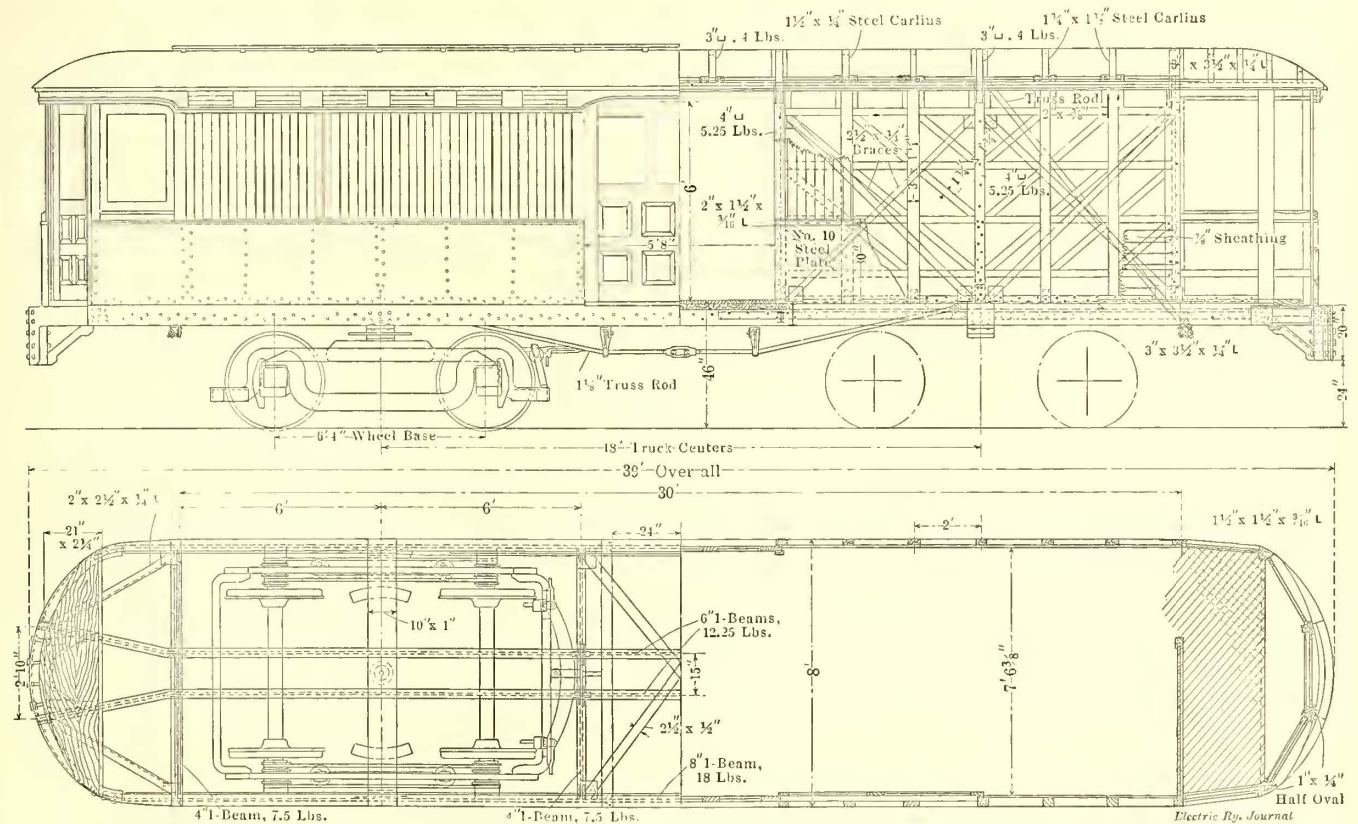
Old Colony Express Car—Details of Ventilation

hang truss rod is anchored under the end sill at each end of the car and passes over the tops of the bolster posts. In the panels formed by the main posts are inserted two 3-in. x 1¾-in. wooden posts and four rows of horizontal furring strips to which the sheathing is fastened. The bottom half of the car

The vestibule framing consists of wooden posts and horizontal furring strips for the steel plate dasher. An end door is built in the left-hand side of each vestibule and the two door posts are reinforced with angle corner irons. The two posts on the right-hand side are reinforced with strips of half-oval iron, 1 in. x $\frac{1}{4}$ in., in order to prevent splintering of the posts in the event of minor collisions.

The special equipment of the cars includes four GE-80 motors with a gear ratio of 19:67; K-35-L double-end control; General Electric air brakes with CP-27 compressor; Root snow scrapers; Standard trucks with a wheelbase of 6 ft. 4 in. and 34-in. steel-tired wheels; Peacock hand brakes; Kilbourn sanders; Pfingst fenders and Consolidated heaters. An interesting detail is the drop bumper plate, 20 in. deep and 34 in. wide. This is made of ¼-in. steel plate and is strongly braced. Projecting square-head bolts are used to fasten the braces. These bolt heads, it is thought, will tend to prevent overriding in case of a collision. Another unusual feature is the use of circuit breakers at each end of the car, both of which are in series with the main motor circuit at all times. The conductor can open the circuit breaker at the rear end and shut off the current in case of emergency. The light weight of the cars is in the neighborhood of 25 tons.

These cars are equipped with special ventilators, which were designed by the equipment department. Twelve of these ventilators are installed on each side of the car in the space which otherwise would be occupied by the letterboard. The openings are 6 in. x 15½ in., and are closed by three steel blades, which are horizontally pivoted. These blades overlap when closed



Old Colony Express Car—Plan and Side Elevation, Showing the Principal Dimensions, the Sizes of the Main Members of the Framing, Side Sheathing, Truck Wheelbase, Etc.

side is formed of No. 10 gage steel plates, while the upper part is sheathed with wood ½ in. thick. On the inside of the car 7/8-in. wood sheathing is carried up to line 24 in. from the floor.

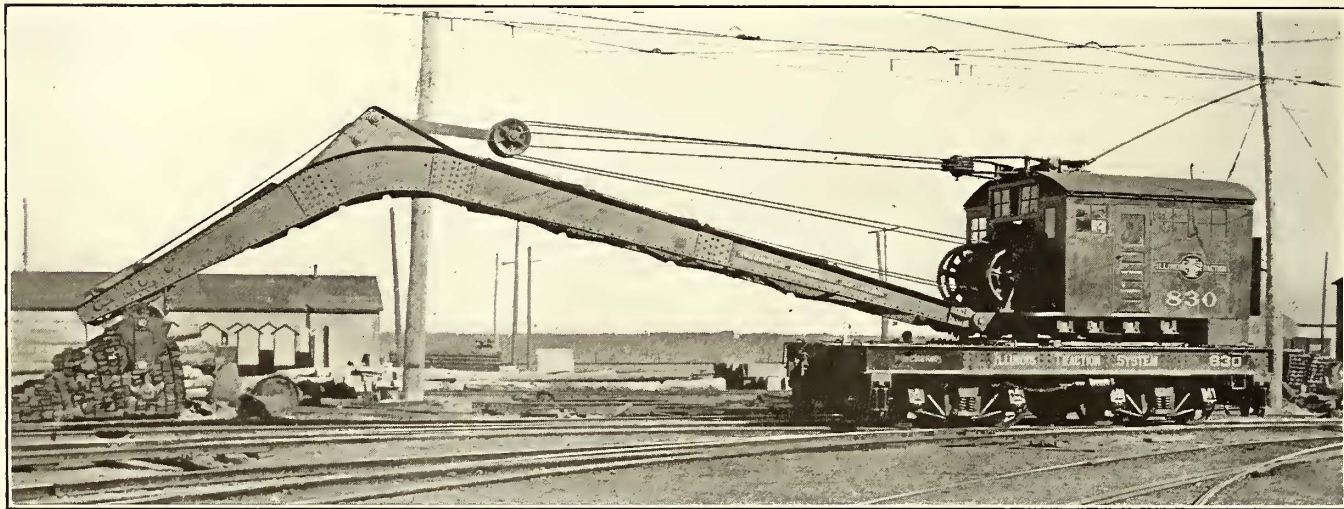
and when opened assume an inclined position which prevents the admission of rain while permitting the free passage of air. The details of this ventilator are shown in the accompanying drawing.

NEW WRECKING CRANE FOR THE ILLINOIS TRACTION SYSTEM

The Illinois Traction System has just equipped for service a No. 3 electrically operated wrecking crane built by the Browning Engineering Company, of Cleveland, Ohio. This crane has a capacity for handling the following loads: 10-ft. radius, 43,500 lb.; 25-ft. radius, 13,400 lb.; 40-ft. radius, 7100 lb.

which would be reliable under severe service. The bevel gears are cut from steel castings and the worm gear for raising the boom is made of bronze. The main casting which carries the turntable weighs 16,000 lb.

The second view shows a yard crane also used by the Illinois Traction Company and built by the Browning Engineering Company. This crane is fitted with a long boom so that it may be used for handling material around the storehouse and shop



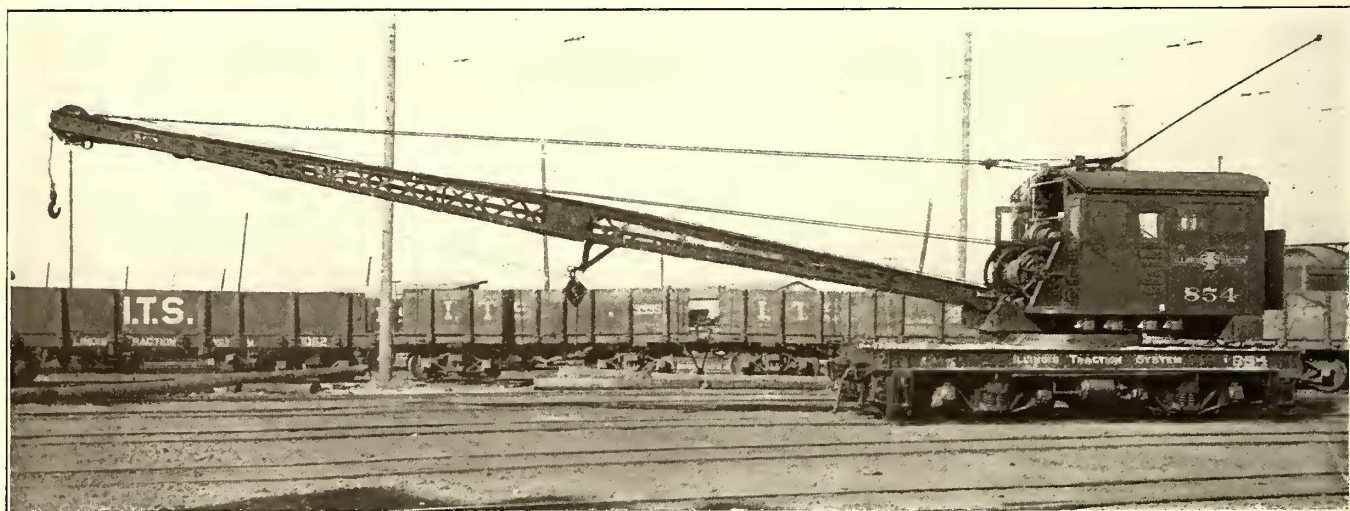
Wrecking Crane for the Illinois Traction System

The frame supporting the crane and the cab inclosing the machinery are made of steel. A single Westinghouse No. 303 railway motor of 100-hp capacity furnishes power for performing all the operations of the crane. The motor is controlled by an R 32-G reversing controller. The armature of the motor has two pinions which mesh with the gears of a main driving shaft. From this shaft, by means of clutches and bevel gears which are interlocked to provide against accident in case of confusion on the part of the operator, the power for the motor is distributed for performing the operations of swinging and lifting the boom and its load and for moving the crane car. The car is propelled along the track

yards or to reclaim coal from the submerged coal pits described in an earlier issue. The driving mechanism of this crane is similar to that of the wrecking crane. Practically the only difference is in the length and design of the boom.

THE LITTLE ROCK RAILWAY & ELECTRIC COMPANY

The Little Rock Railway & Electric Company, Little Rock, Ark., has announced a number of changes in the personnel of the lighting department of the company. C. E. Rose, who has been superintendent of lighting and sales departments, has



Yard Crane for the Illinois Traction System

through bevel gears connected to one of the axles. The speed of travel is 10 m.p.h.

The first engraving shows this wrecker and its boom. The boom is equipped with a main hoist and an auxiliary high-speed hoist. Outriggers and track anchors are provided for steadying the wrecker when the boom is swung to one side. The workmanship on this crane is said to have been very carefully executed with the idea of obtaining a mechanism

resigned to become vice-president and general manager of the Arkansas Cold Storage Company. Arthur E. Smith has been appointed superintendent of the sales department of the company to succeed Mr. Rose. Matthew J. Kenney has been appointed superintendent of the lighting department of the company to succeed Mr. Rose. Mr. Kenney has been in charge of lines and cables of the company for the past three years and an employee of the company for twelve years.

REPORT OF MARYLAND COMMISSION

A report of the Public Service Commission of Maryland for the eight months ended Dec. 31, 1910, reviews the preliminary work of the commission. In reference to the difficulties which arose from the fact that three important matters were brought before the commission at the outset the report says:

"In most of the States which have enacted public service commission laws a beginning has been made affecting only one or two classes of corporations, and from time to time other corporations have been brought under the operation of the law as the necessity arose and the advantages of this kind of supervision and control were disclosed by actual administration. In New York several commissions, with more or less complete organizations, were consolidated in the Public Service Commissions under the law of 1907. Even under these conditions the commissions in other States found difficulties in the way of proceeding immediately with all of their departments in full operation. The Maryland law is very broad and comprehensive, covering every class of public service corporation, and independently of the difficulties mentioned the commission soon reached the conclusion that it was impracticable to put all of the departments into active operation at once. Obviously, its first duty was to obtain all the information possible from the corporations under its jurisdiction, and by means of orders and circulars a large number of reports have been received. The commission was under the further obligation to the State to employ for the important work intrusted to it the best equipped men obtainable. This is a difficult task under the most favorable circumstances. In the meantime, the organization has been extended as occasion required in those directions in which supervision and inspection seemed of immediate importance, and many matters of varied interest and importance have engaged the serious attention and study of the commissioners."

Included in the list of companies under the jurisdiction of the commission are twenty-nine electric railway companies, with \$38,936,700 capital stock and \$81,318,618 bonds, a total of \$120,255,318. The report says in part:

"In all cases where stock and bonds are authorized the commission requires periodical reports, under oath, of the amount of sales or other disposition of the issue, and of the use made of the proceeds of such sales.

"Most of the cases of this class so far disposed of by the commission affected corporations in existence before the enactment of the Public Service Commission law, whose schemes of financing were in some instances already operative, and in others all of the plans had been agreed upon and construction work had actually begun. It was, in a few cases, a question of halting needed utilities upon which large expenditures had already been made, or trusting to supervision to improve conditions, and the latter view was adopted as promising the best results to the communities affected.

"Very few new corporations have asked approval of plans of construction or of the issue of stocks and bonds, but this class of cases may be expected to increase materially in the near future. Electric railroads and electric light and power plants are projected in many parts of the State, and will call for a large aggregate capital outlay for their development. The tendency to extend these utilities into farming sections is becoming very pronounced, and the supplying of electric power especially promises to solve many of the difficulties which surround modern farm life. The probable extension of utilities along these lines will vastly increase the number of people affected by them, and offers a safe field for the investment of capital, provided the management is intelligent and conservative and the supervision of public service commissions is alert and thorough. All that the commission can accomplish with respect to companies established and operating before the law was passed is to bring them by degrees to a satisfactory physical and financial condition.

"It is in this class of cases that one of the most delicate and important duties of the commission arises. We feel that we

should encourage, as far as possible, new enterprises which promise facilities for the use of the people, but the law imposes upon us the duty of seeing that such enterprises are feasible, that the plan of financing them is sound, that the nominal capital represents actual investment and not a fictitious basis for the establishment of rates, and that the properties are maintained at a proper standard of efficiency.

"The operation of electric railways has been the subject of much anxious consideration upon the part of the commission. Up to the present time attention has been given mainly to the city and suburban lines operated by the United Railways & Electric Company of Baltimore. By consolidation, lease or stock ownership this company operates under about seventy-five charters granted from time to time by the General Assembly or under the general corporation law of the State, and it has no competitor in the field occupied by it. It furnishes a unique example of the unwisdom of hasty and ill-considered plans of rival interests to establish public utilities, the lack of system in the location of lines of traffic which is finally imposed upon the community by such methods, the necessity of consolidation in the interest of economy and efficiency which ultimately arises, and of the enormous capital which results from the efforts of original investors to save themselves from loss. The existing condition was established long before the Public Service Commission was created and the commission has to deal with a situation which it found and not with one which it would have approved as an original proposition.

"The commission has endeavored to become informed of the appliances adopted by the company for the safety and convenience of the public. At a very early period the condition of the car fenders attracted attention, and through reports of its inspector and conferences with officers of the company a decided improvement is noticeable in the maintenance and efficiency of this safeguard against accident. But the fender is far from being the last word on the subject of safety appliances as it affects the great number of people who occupy the streets and cross the rights-of-way of the company. A careful study of devices and of the requirements and practices in other large cities in the United States and in other countries convinces us that something more can be done in Baltimore. But grades, character of street paving, types of cars, general traffic conditions and other matters all have a more or less important bearing upon the kind of appliance to be adopted. As to these things Baltimore presents some difficulties. There is scarcely a line of electric railway in the city which does not pass over every kind of street pavement, and in the course of its passage almost every car will meet different and widely varying conditions for the operation of safety appliances. The wheelguard, where it can be operated in connection with the fender, has been found a reliable and efficient instrument in saving the lives of pedestrians, and the commission is impressed with its value. The authorities of the United Railways are very decided in the opinion that it cannot be successfully operated in Baltimore, and the commission has not felt warranted in ordering its use until a careful inspection of track and traffic conditions in the city could be made by a competent engineer. The reasons why such inspection could not be made heretofore have been already detailed.

"Car service and schedules, also, have been under observation. As this is a subject in which a very large part of the population of the city is interested the commission has made a study of it in some parts of the city. The reports of public service commissions in other States disclosed many difficulties in the way of maintaining a regular time schedule and also in the way of preventing the overloading of cars, and it was to be expected that their experience would be repeated in Baltimore. Two series of observations were made—the first in July and August, the second in November and December. During the first period the cars, with very few exceptions, were of the open type with transverse seats, which have no standing room except between the seats and on the footboards. The results of thirty-four observations during July and August are given, and it is proper to state that every precaution was taken to insure

accuracy both as to the number of standing passengers and the intervals of time between cars, and that the observations were made at various points within what may be termed the crowded section of the city. They cover both morning and evening traffic and were designed to test the conditions at the rush hour in each direction. The average period of observation was one hour and forty-five minutes. The total number of cars observed was 1077, of which 326, or 30.27 per cent, contained standing passengers. The total number of standing passengers was 2478, of whom 1352, or 54.6 per cent, were standing between seats or in aisles, and 1131, or 45.4 per cent, on footboards. The average number of standing passengers for all cars run was 2.47, and for the cars with standing passengers 7.6. The greatest number standing in one car was 37 and the number exceeded 30 in two other instances. The morning and evening traffic does not vary materially in point of numbers, but the peak of traffic extends over a somewhat longer period in the evening than in the morning—the time being about one hour in the former and forty-five minutes in the latter. The average time between cars was 3.68 minutes, but this includes one tie-up of forty-seven minutes, which unduly increases the average.

"The winter conditions, with closed cars under observation, give a general car service practically the same as the summer schedule, the average interval between cars being 3.6 minutes. Of 850 cars observed 655, or 78.23 per cent, carried passengers standing in the aisles and on platforms. An aggregate of 11,704 standing passengers was counted in the 850 cars, of whom 6295, or 53.78 per cent, were in the aisles and 5409, or 46.22 per cent, were on the platforms. The average for all cars run was 13.4, and for cars with standing passengers 16.6. In seventy-seven instances the number of standing passengers exceeded the seating capacity of the cars.

"Car crowding is, as already stated, a difficult matter to deal with. The waiting passenger insists upon taking the first car that arrives, no matter how full it may be. Instances were frequent where an overloaded car was followed within half a minute by one which must have been in sight, but the full car was invariably taken in preference to a wait of thirty seconds. To some extent and in some aspects, therefore, the matter of overloaded cars is one which the public, rather than the company, can control.

"One matter may be mentioned, however, which bears directly and to a very considerable degree upon the subject of rapid transit, and which appears to the commission to be a removable cause of delay. Reference is made to the almost universal custom of using the car tracks by teams drawing heavily laden wagons. There are some localities where the practice is unavoidable, and in many places a vehicle drawn up to the curb forces passing vehicles to the car tracks, but there is no good reason why they should remain there. That the tracks provide smooth travel and somewhat relieve the burden of the horses is beyond question, but drivers should not be permitted for that reason to interfere with the movement of cars. The average driver, it has been observed, is very deliberate, if not intentionally obstinate, when it comes to getting out of the way of the cars, and a much more satisfactory service would be maintained if this cause of delay could be removed. It is a matter over which the commission has no control, falling, as it does, within the power of the municipality to regulate the use of the streets."

Ross J. Hazeltine, United States Vice-Consul at Tenerife, Canary Island, in a report to the Bureau of Manufactures of the Department of Commerce and Labor says: "The electric tramway which extends from Santa Cruz, Tenerife, to Tacoronte, installed several years ago, is still operated by a Belgian syndicate, which has a franchise for fifty years, expiring in 1945. The local government takes 25 per cent of the gross earnings of the company. The electric light and tram companies are affiliated and operated under the same name, *Compañía Electrica Industrial de Tenerife*."

METROPOLITAN STREET RAILWAY REORGANIZATION PLAN

At a hearing before the New York Public Service Commission, First District, on May 9 in regard to the bondholders' plan for reorganization of the Metropolitan Street Railway testimony was offered by H. Hobart Porter, James G. White, Charles F. Uebelacker and J. L. Quackenbush. Commissioner Milo R. Maltbie presided.

TESTIMONY OF H. HOBART PORTER

H. Hobart Porter, of Sanderson & Porter, was recalled to the stand and testified regarding the estimate, made by F. R. Ford, of \$18,097,654 for expenses of the development period. He said that on the assumption upon which the estimate had been built up, namely, that the property was to be created absolutely new and not upon the structure of previous horse car or cable lines, the percentage of the total represented by the \$18,000,000 item would probably be inadequate to produce the results. He could only base his opinion of the amount which would be proper upon experience in the organization and financing of new properties, none of which, of course, was a street railway constructed new in a large city absolutely without street railway facilities. But from the results in small cities and judging from the difficulty experienced in raising large amounts of capital for smaller enterprises he was led to the conclusion that the probable total cost would be at least 20 per cent of the total cost of the property. The cost of obtaining the capital for construction was as much a cost of the property as the cost of obtaining any of the physical portions that entered into it. Frequently bonds were not salable on property that had not yet been created and large amounts of money had to be obtained during construction and prior to the sale of the bonds. Such a condition required that the funds be obtained from bankers or syndicates and underwriting fees for capital for new properties were very great. Mr. Porter would allow in the cost of the property whatever sum was necessary to raise the money most economically. The fair value of the property went up or down as the cost of all things that entered into it moved.

TESTIMONY OF JAMES G. WHITE

James G. White, of J. G. White & Company, Inc., testified that the allowance of 8.8 per cent for incomplete inventories and incidentals was entirely reasonable. His general rule for work of this character would be an allowance of 10 per cent on estimates. The allowance of 10 per cent for contractors' profits would be the usual fee, but in work of this kind probably one-half would be used for general expenses and one-half would be profit. If the work was to be done by a lump bid, Mr. White would probably estimate more than 10 per cent and allow pretty liberally for contingencies, possible accidents and other unforeseen items. The allowance of 5 per cent for engineering was reasonable and the usual average cost. Under existing conditions in New York, 10 per cent was entirely reasonable for interest and taxes during construction.

There were two ways in which to arrive at a fair development cost. One was to make detail estimates, as had been done apparently in this case, and the other was to follow general experience and take the particular conditions into account. Twenty per cent was moderate and entirely reasonable in this case. There were many instances where total development charges exceeded 50 per cent. If paid in securities these charges sometimes ran up to several hundred per cent. A construction period of five years was reasonable.

TESTIMONY OF CHARLES F. UEBELACKER

Charles F. Uebelacker, chief engineer of Ford, Bacon & Davis, was recalled and testified that the engineering cost on the New York subway was 7.9 per cent. In engineering a project provision had to be made not only for the route adopted, but also for many alternate routes. He had known a great many instances where the engineering cost was 7½ per cent or more. Engineering included the preparation of working drawings, inspection and mill inspection. The estimate of 5 per cent in the exhibit was insufficient.

Mr. Uebelacker submitted an addition to the exhibits presented in the case previously, and published in the *ELECTRIC RAILWAY JOURNAL* of April 22, 1911, page 708. This showed estimated sub-contractors' profits of 7½ per cent, but Mr. Uebelacker thought that 10 per cent would be nearer an average.

Testifying as to value, Mr. Uebelacker said generally that it was the ability to produce which gave value and so long as a property would turn out 100 per cent of its original product it had 100 per cent of its original value. If the property was not run it would not have any value except as scrap. Conclusions could be drawn as to the physical life of any article, such as a rail, but none could be drawn from past experience as to the rate of obsolescence, because that changed continually.

A statement was presented by Mr. Uebelacker giving the age of different classes of property, as shown by the records of the company, taken from the records of M. G. Starrett, the consulting engineer, and the corresponding depreciation figured on a 5 per cent sinking fund basis. Mr. Uebelacker, however, did not testify that he considered this a proper basis on which to calculate depreciation. The figures included a little more than the depreciation due to age. Cars could be maintained for more than thirty years, the age set in the statement, so that to the

expense for the claim and legal departments, the total for the period during which the road was operated by the receivers of the New York City Railway would be 7½ per cent. The amount expended for the nine months ended March 31, 1911, for settlements of all kinds was 3.8 per cent of the gross and the expenses were an additional 2 per cent, making a total of 5.8 per cent.

In speaking of wheel guards, Mr. Quackenbush said that their effect, in his judgment, had been to decrease the seriousness of those accidents which were not fatal rather than greatly to reduce the number of fatalities. He thought that the wheel guards had saved some lives on all of the lines, but he would not say that they had been a very great factor in this respect, because fatal accidents were usually caused by the skull of the pedestrian being crushed by a blow received from either the car or the pavement, and the wheel guard did not come into action. It was more effective in saving limbs. The introduction of wheel guards, pay-as-you-enter cars and various mechanical improvements which had been made in the equipment had an indirect as well as a direct influence in the reduction of accidents. The improved personal equation of employees and public was also a favorable factor. The degree of care exercised

METROPOLITAN STREET RAILWAY SYSTEM—DEPRECIATION AND PRESENT VALUE.
SUBMITTED BY C. F. UEBELACKER, OF FORD, BACON & DAVIS.

Item.	Cost New.	Salvage Value.	Wearing Value.	Life, Years.	Age, Years, to Jan. 1, 1910.	Five Per Cent Sinking Fund Depreciation to Oct. 1, 1910.	Present Value Oct. 1, 1910.
Track—Electric.							
Removal of obstructions, including paving.....	\$3,209,922	\$3,209,922	Nothing	+	..	..	\$3,209,922
Foundation and excavation.....	7,282,117	419,042	\$6,863,075	5	11.4	\$528,457	6,753,660
Paving in track.....	2,081,193	Nothing	2,081,193	14	7.4	1,030,191	1,051,002
Tram rail in straight track.....	1,540,633	276,347	1,264,286	14	7.9	673,864	866,769
Slot rail.....	545,785	145,845	399,940	25	11.0	129,181	416,604
Conductor lines.....	483,607	53,888	429,719	10	4.1	180,482	303,125
Special work and paving.....	1,159,594	128,000	1,031,594	5	1.6	467,312	692,282
	\$16,302,851						
Horse track and special work.....	1,317,657	71,246	1,246,411	25	8.0	276,703	1,040,954
Ducts.....	2,344,023	Nothing	2,344,023	50	11.4	180,490	2,163,533
Cables.....	3,524,468	1,005,035	2,519,433	33½	9.3	387,993	3,136,475
Power plant and substation.....	4,256,939	851,400	3,405,539	25	6.3	582,347	3,674,592
Buildings.....	8,157,900	Nothing	8,157,900	50	7.4	375,263	7,782,637
Equipment of buildings.....	608,609	121,722	486,887	33	*7.4	57,940	550,669
Rolling stock, electric.....	8,148,019	7,832,319	30	7.9	1,229,643	6,918,376	
Rolling stock, horse.....	710,399	5,505	704,894	33½	29.6	583,652	126,747
Fixed tools and appliances.....	221,013	44,202	176,811	20	4.0	27,583	193,430
Fourth avenue tunnel.....	466,356	Nothing	466,356	+	..	..	466,356
Incidentals.....	3,901,024	3,901,024	33½	8.5	542,242	3,358,782	
General contractor.....	4,995,926	"	4,995,926	+	..	..	4,995,926
Engineering.....	2,747,759	"	2,747,759	+	..	..	2,747,759
Interest and taxes.....	7,333,723	"	7,333,723	+	..	..	7,333,723
Stores and supplies.....	1,518,512	"	1,518,512	+	..	..	1,518,512
Office furniture, etc.....	170,953	"	170,953	20	*5	33,165	137,788
Floating tools.....	131,886	"	131,886	15	*5	39,170	92,716
Incidentals.....	15,142	"	15,142	18	*5	3,452	11,690
Add renewals 1/1/10 to 10/1/10.....	.....	.....	.....	..	..	.....	563,944
Total construction.....	\$66,873,159		\$60,225,305	..	..	\$7,329,130	\$60,107,973
Permanent organization.....	732,250		.....	..	..	.....	732,250
Franchise security deposit.....	740,000		.....	..	..	.....	740,000
Real estate.....	13,808,987		.....	..	..	.....	13,808,987
Working capital.....	1,182,434		.....	..	..	.....	1,182,434
	\$83,336,830		.....	..	..	.....	\$76,571,644

*Assumed. †Infinite.

extent to which their actual physical life would exceed that period he had allowed for inadequacy and change of style.

TESTIMONY OF J. L. QUACKENBUSH

J. L. Quackenbush, general attorney of the Metropolitan Street Railway, said that some years ago the cost of accidents on the system reached 12 per cent, 13 per cent, 14 per cent or 15 per cent of the gross receipts. The average for the fiscal year ended June 30, 1904, was 10.225 per cent; for the year ended June 30, 1905, 9.505 per cent; for the year ended June 30, 1906, 9.287 per cent; and for the year ended June 30, 1907, 11.33 per cent. The expenditures in the latter period were large because on Jan. 1, 1907, the judiciary was very largely increased and the progress of litigation expedited. The receiverships in September and October put the matter on an entirely different basis, sending the pending litigation into liquidation. The disbursements in the payment of claims, settlement and compromise of actions and satisfaction of judgments during the period of operation of the New York City Railway receivership, excluding expenses of the claim and law departments, were under 5 per cent. If 2½ per cent was allowed as the fair

by the platform men was much greater than formerly. The policy of making very prompt settlements of claims and of avoiding litigation and trials, and the change in the attitude of the entire public toward the corporations, induced by the opinion that the methods employed in conducting the litigation were honest and aboveboard, had taken away the prejudice that juries had been known to show sometimes and had resulted in keeping verdicts down.

Assuming that conditions of operation and management and the local conditions in the courts and community remained fairly constant, 8 per cent of the gross was an absolutely safe sum to reserve. Mr. Quackenbush thought that 7 per cent would be ample, and that through a period of ten years the average ought to be under that. He did not believe that with surface operation on Manhattan Island less than 6 per cent could ever be expected, unless the speed of cars should be lessened and the platforms fitted with doors and folding steps to prevent passengers from boarding and alighting from cars in motion.

HEARING ON MAY 12

At a hearing on May 12 Schuyler C. Stivers, accountant

Ford, Bacon & Davis, testified regarding the liabilities of the Metropolitan system and the receivers in order to indicate how it was intended to transfer the property to the new company.

Commissioner Maltbie asked about an item of three-year notes.

Joseph P. Cotton, Jr., for the joint reorganization committee, stated that \$8,000,000 of these notes were issued on May 22, 1907, and delivered to the New York City Railway. On the same day they were delivered in turn to the Metropolitan Securities Company, the Interborough-Metropolitan Company and the Mercantile Trust Company of New York. Half of the notes are held by the trust company and the balance were the notes on which the receiver of the New York City Railway sued and recovered a large cash judgment.

Charles F. Mathewson, counsel for the committee, said that any recognition of the notes in the reorganization was entirely voluntary.

Mr. Mathewson stated in reference to the tort claims that the theory upon which they were included was that the obliga-

ELECTRICAL MAINTENANCE COSTS OF THE THIRD AVENUE RAILROAD, NEW YORK

During the past three years the Third Avenue Railroad, New York, has gradually taken its Westinghouse Nos. 56 and 68 motors out of active service and replaced them by Westinghouse No. 310 and GE-210 two-motor equipments. The adoption of these modern motors has led to a most gratifying improvement in service and to very reasonable maintenance charges. Motor defect failures have been practically eliminated and, in fact, not more than half a dozen armatures have been rewound during the past two years. The low maintenance costs are shown in the accompanying table, which presents the labor and material items for the first three months of the current year as made up from monthly material charges and the weekly payrolls. During this period 2,747,093 car miles were operated for a maintenance cost of 0.408 cent per car mile covering all electrical car equipment whatsoever except lighting, heater and push-

CAR EQUIPMENT MAINTENANCE COSTS ON THE THIRD AVENUE RAILROAD, NEW YORK, FOR THREE MONTHS OF 1911.

Class of Equipment.	JANUARY			FEBRUARY			MARCH		
	Material.	Labor.	Total.	Material.	Labor.	Total.	Material.	Labor.	Total.
Armatures, fields, brush-holders, bearings, etc., of G. E., 210 motors.....	\$132.50	\$74.60	\$207.10	\$99.40	\$74.20	\$173.60	\$318.78	\$78.80	\$397.58
Armatures, fields, brush-holders, bearings, etc., of Westinghouse No. 310 motors.....	228.75	234.23	462.98	297.90	199.45	497.35	302.80	241.06	543.86
Armatures, fields, brush-holders, bearings, etc., of miscellaneous motors.....	78.75	3.12	81.87	27.54	36.86	64.40	19.67	1.50	21.17
Controllers, rheostats and circuit breakers.....	225.98	491.32	617.30	192.56	495.88	688.44	173.09	564.97	738.06
Gears, pinions and gear cases.....	152.81	22.63	175.44	514.74	19.65	534.39	336.68	14.50	351.18
	\$818.79	\$825.90	\$1,544.69	\$1,132.14	\$826.04	\$1,958.18	\$1,151.02	\$900.83	\$2,051.85
Total mileage for three months.....									2,747,093
Total labor and material cost for three months of all electrical equipment as listed.....									\$11,209.44
Total labor and material cost for three months for motor equipments, exclusive of gears, pinions and gear cases.....									4,899.82
Labor and material cost per car mile of all electrical equipment as listed.....									0.00408
Labor and material cost per car mile of motors, exclusive of gears, pinions and gear cases.....									0.00178

COMPARATIVE STATEMENT OF CARHOUSE COSTS FOR MARCH, 1911.

Acct. No.	Classification	THIRD AVENUE RAILROAD.													
		Third Avenue Division		Forty-second Street, Manhattan and St. Nicholas Avenue		Dry Dock and East Broadway Division		Grand Street Carhouse		UNION RAILWAY.		Bronx River Carhouse			
		Total Cost	per Car	Total Cost	per Car	Total Cost	per Car	Total Cost	per Car	Total Cost	per Car	Total Cost	per Car		
107	Car bodies.....	\$245.80	\$1.05	\$176.80	\$1.18	\$52.90	\$0.94	\$475.50	\$1.08	\$341.90	\$1.77	\$127.95	\$1.69	\$469.85	\$1.75
107C	Fenders.....	48.10	.20	69.50	.46	12.96	.23	130.56	.34	33.28	.17	57.85	.77	91.13	.35
107D	Trucks.....	125.00	.53	59.10	.39	41.10	.73	225.20	.51	148.58	.77	140.35	1.87	288.93	1.07
107E	Wheels.....	22.80	.10	28.40	.19	6.95	.12	58.15	.13	74.57	.38	9.65	.14	84.22	.32
107F	Brakes (hand).....	164.20	.70	196.80	1.31	61.80	1.10	422.80	.96	296.10	1.53	209.78	2.81	505.88	1.88
107G	Brakes (air).....	65.15	.28	72.10	.48	35.00	.63	172.25	.39	4.30	.02			4.30	.02
107H	Heat and light.....	59.60	.26	39.60	.26			99.20	.22	71.93	.37	33.08	.44	105.01	.39
108	Horse cars.....					7.25	.13	7.25	.02						
109	Service cars.....									3.30	.01	1.75	.03	5.05	.08
110	Motors.....			46.45	.31	26.28	.48	73.25	.16	190.29	.97	71.04	.96	261.33	.97
110E	Control'rs, rheos., etc.....	129.65	.55	85.20	.57			274.85	.50	183.31	.94	59.77	.80	243.08	.90
110F	Plows.....	79.85	.34			32.10	.57	111.95	.25						
110G	Gears and pinions.....	2.60	.01			5.00	.10	7.60	.02	28.14	.15			28.14	.10
110H	Wiring contr. cirts.....	3.90	.02					3.90	.01	125.25	.65	62.76	.83	188.01	.70
311A	Carhouse foremen.....	312.00	1.33	325.00	2.17	169.00	3.02	806.00	1.82	428.28	2.27	177.50	2.36	605.78	2.27
311B	Carhouse employees.....	412.00	1.81	182.20	1.22	65.80	1.17	660.00	1.50	346.14	1.79	41.50	.55	387.64	1.46
311C	Car shifters.....	573.00	2.45	355.16	2.37	64.95	1.16	993.11	2.26	180.28	.93	29.55	.39	209.83	.78
311D	Car cleaners.....	1,092.90	4.69	640.10	4.27	230.00	4.11	1,963.00	4.46	666.85	3.45	170.10	2.26	836.95	3.12
	Total.....	\$3,336.55	\$14.32	\$2,276.41	\$15.18	\$811.61	\$14.49	\$6,424.57	\$14.63	\$3,122.50	\$16.17	\$1,192.63	\$15.90	\$4,315.13	\$16.10
	Cost per car.....	\$14.32		\$15.18		\$14.49		\$14.63		\$16.17		\$15.90		\$16.10	
	Mileage.....	559,669		303,836		122,546		986,051		599,127		282,027		841,154	
	Cost per mile.....	\$0.006		\$0.0074		\$0.0066		\$0.0065		\$0.0056		\$0.0042		\$0.0051	
	Type motor.....	Westinghouse No. 310		Westinghouse No. 310 and GE-210		GE-210		GE-210 and GE-57		GE-210		GE-210			

tions rested really upon the estate and the property ought to bear obligations of this character, because the injuries arose from its use.

It is reported that the Budapest-Czinkota-Gödöllő suburban line has recently been converted to electric traction, this being the preliminary to the conversion of all the lines in the vicinity. The length of this section is about 20 miles, and it is double-tracked throughout. Three-phase current at 10,000 volts is generated in a station at Czinkota, where two 2200-hp steam turbines are at present erected. The three-phase current is converted in substations to direct current at 1000 volts. The cars are fitted with 160-hp motors and run at over 30 m.p.h.

button circuits. The cost of motor maintenance alone, exclusive of gear cases, was 0.0178 cent per car mile. The apparatus used during the period named in the table consisted of 301 Westinghouse No. 310, 131 GE-210 and nine miscellaneous equipments—all two-motors per car. These costs are given for all motors together as no mileage record is kept of motors according to type.

One of the most satisfactory developments has been the continued absence of visible commutator wear after three years' service. According to present appearances, the commutators should not require turning oftener than once in ten years. These excellent conditions are due in part to the use of modern motors and in part to high-grade carbon brushes applied at a ten-

sion of about 5 lb. With few exceptions, the original Le Carbone "G" brushes are still in the motors. Beginning in January, 1909, the company installed at various times some fifteen types of carbon brushes for test. These brushes as measured on March 10, 1911, showed some remarkable differences in wear and general behavior. The least wear, 0.0021 in. per 1000 miles, was shown by a brush which unfortunately was hard on the commutator. The best wear of the brushes which did not injure the commutator was 0.0044 in. per 1000 miles. Nearly one-half of the brushes were removed long before the end of their theoretical life on account of chipping and breakage at the top.

Probably the best index to the motor conditions of the Third Avenue Railroad is afforded by the armature and commutator shop. Formerly this shop had eighteen to twenty men constantly employed on repairs. Six of these men were armature winders and three were helpers. To-day only one man is occasionally required for railway armatures while not one commutator has been repaired in two years. With few exceptions, the original armature bearings have not been relined and most of the axle bearings have been relined only once.

MONTHLY COMPARISONS OF CARHOUSE LABOR COSTS

A feature of the organization of the car equipment department is the comparative record of carhouse labor per car and per car mile which is sent monthly to all the foremen. The cost per car would not give a fair comparison inasmuch as the average mileage per car varies considerably at the different carhouses. Thus one of the carhouses named in the accompanying table had a monthly labor cost of \$14.32 per car and \$0.006 per car mile, whereas another carhouse spent \$15.90 per car but its mileage per car was so much larger that the cost per car mile was only \$0.0042. The table shows that in March, 1911, 439 cars on the Third Avenue Railroad were maintained for \$14.63 each, or at \$0.0065 per car mile. During the same month the Union Railway, which is under the same management, operated 268 cars at a carhouse labor cost of \$16.10 per car, or \$0.0051 per car mile. The table also shows the character of equipment used on each system. In the records of the company special subdivisions, No. 107 GA and No. 107 GW, are provided to cover the two different types of air brakes used and likewise account No. 110 is subdivided into "A," "B" and "C" for three different classes of motors, in addition to the other electrical subdivisions shown in the table.

The accounts covered by the general title of carhouse costs relate to the following: carbodies, fenders, trucks, wheels, air and hand brakes, heating and lighting, service cars, horse cars, motors, controllers, rheostats, plows (or trolleys), gears and pinions, control wiring, carhouse foreman, carhouse employees, car shifters and car cleaners.

THE USE OF ELECTRICITY ON ITALIAN RAILWAYS

The report of the Italian State Railways for the year 1909 contains some interesting information with regard to the electrified steam lines and to the use of electricity on steam cars. The Busalla-Pontedecimo section of the Genoa-Busalla line was completed in January, 1910, and after a number of experimental runs regular train service was instituted in July with Westinghouse locomotives. The train weights were gradually raised to 400 metric tons and the speed to 45 km per hour (27.9 m.p.h.). Progress is reported in the electrification of the Bardonecchia-Modane section of the Mont Cenis Railway. A contract was made with the municipality of Turin whereby the latter will furnish 3000 kw for three years and, if necessary, for four years to the line named. Negotiations are under way looking to the purchase of power in case the Turin-Pinerollo line is electrified, which has been considered for single-phase operation. The Lecco-Calolzio Railway was also placed in service during the year.

On June 30, 1910, 4900 steam cars were equipped with electric lighting systems as compared with 1300 in June, 1905. During the same period the number of car storage batteries increased from 3800 to 16,200.

ANNUAL MEETING OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

The annual meeting of the American Institute of Electrical Engineers was held in New York on Tuesday evening, May 16. The principal business was the election of officers for the year beginning Aug. 1, 1911, the presentation of the Edison medal to Frank J. Sprague and the reading of three addresses relating to electric railways and one entitled "Electricity in the Navy." The last paper was presented by Commander S. S. Robison, Bureau of Steam Engineering, Navy Department. Five musical numbers formed a very enjoyable part of the proceedings.

Gano Dunn, vice-president and general manager of the Crocker-Wheeler Company, was elected as president for the ensuing year. After the reading of the annual report of the secretary and treasurer, Prof. Elihu Thomson, chairman of the Edison Medal Committee, announced that in accordance with the conditions of the bequest a gold medal would be presented to Frank Julian Sprague for his services in both horizontal and vertical transportation. Professor Thomson then recited the conditions under which the Edison Medal award came into existence. It was originated by a number of Mr. Edison's friends in commemoration of the twenty-fifth anniversary of the successful introduction of the incandescent lamp. The original organization for this purpose was founded Feb. 11, 1904, on the fifty-seventh birthday of Thomas A. Edison. The first recipient of the medal was Professor Thomson. In presenting the medal, President Jackson said that the name of Edison was one of the few that were destined to be linked with those of Watt and Stephenson.

Mr. Sprague acknowledged the gift of the medal in a happily worded address. He said that he was deeply moved by the cordial appreciation of his confrères in conferring upon him such an exceptional and almost unique distinction. He confessed that not alone was he honored but that he was also very glad to get the medal. He realized that he and Professor Thomson were members of a very select and limited society. Mr. Sprague then gave a witty account of his early connection with Thomas A. Edison, to whom he referred as the beloved Nestor of the electrical profession. In conclusion, Mr. Sprague paid a hearty tribute by name to many of his associates of pioneer days who had shown so much courage in entering the then undeveloped field of the practical application of electricity.

The first of the three addresses on electric railway subjects was the "Development of the Electric Railway," by W. B. Potter, chief engineer railway department, General Electric Company. Mr. Potter reviewed chronologically the progress of electricity from the first experiments with amber by the Greek philosophers up to the developments of the present day. The two great improvements which had accelerated electric railway progress to the greatest degree were the adoption of single reduction gearing for motors and the invention of multiple unit control. Mr. Potter also described the principal inventions of Mr. Sprague in other electrical fields.

Mr. Potter was followed by Franklin H. Giddings, professor of sociology, Columbia University, who delivered an address entitled "Social Results of the Introduction of the Electric Railway." Professor Giddings said that the real test of the efficiency of the electric railway was the result that it was producing in the social realm. One of the foolish prophecies which had been made about the electric railway was that it would relieve congestion in cities. It was true that it had done so in some cases, but on the whole it had not. What the electric railway had done was to redistribute the population in a way that promised interesting social consequences. Formerly men had to stay where they were put, even after the invention of steam railroads, and they did not travel every day. It was the electric railway which had changed the habits of a great many human beings in this respect. It had not had the effect of

destroying the country store, for while the department stores had drawn rural business, the country stores in turn had also come into contact with new fields of trade. The electric railway was sifting out people into three classes—those who want to be at the center of things in town, those who want to be reasonably near their business and those who want to be on a farm in the country. From this time on the population of the country districts would not be composed of those who were born on the spot and obliged to stay there, but of those who really preferred to live there. Thus the electric railway was making it possible for each person to live where he wanted to live. This was the most definite social aspect that could at present be ascribed to the electric railway. Another curious characteristic in the distribution of population brought about by the electric railway was that it made it possible for the inhabitants of rural districts to participate to a great extent in the things which formerly were enjoyed only by people living in more densely populated zones. The tendency of this was to make the population of our country more alike throughout. Professor Giddings thought that the peculiar distribution of population effected by the electric railway also tended to maintain the present political predominance of the middle class on which, he held, depended the stability of American institutions.

The last speaker on railway matters was George F. Swain, professor of civil engineering, Harvard University, who spoke on "The Relation of Government Control to the Development of Electric Railways and the Electrification of Steam Lines." The first part of Professor Swain's address was devoted to a historical review of the development of the electric railway, which he divided into three divisions—the introduction of electricity for propelling single cars, the application of the multiple unit system for train control, and, finally, the electrification of steam railroads, which was now the most active problem. The introduction of electricity on steam railroads would not show all the benefits possible until it was extended to at least the length of an engine run. Where the electrification was practically a question of terminals in big cities, the expense was too much out of proportion to the possible increase in business and in operation. It was plain that the electrification of steam lines was physically possible but the question was financial and economic rather than one of engineering. After discussing the question of government regulation in general, he said that there could be no objection to a wise regulation of public utilities; the only question was how far should such regulation go. It was for the public interest that these utilities should be monopolistic, but for that very reason also they should be subject to public supervision. The nearer a public utility approached to being a public necessity, the more urgent did the need for public control become. This control should be limited to insuring conditions that would give reasonable service, reasonable safety to the public and to the employees, and also reasonable charges with no discrimination. Everything else should be left to the individual initiative of the operators and owners of the properties. The public could well afford to pay very large profits to the men who had given it such great conveniences. Professor Swain was much opposed to the legislative attempts being made to compel electrification of steam railroads. He said that the history of electrification showed that there was no necessity for using force, and in any event the public would have to pay for the change. The electrification of steam lines was usually a luxury and it was wrong to force a company to spend vast amounts of money which could bring no adequate return.

The report of the New York Public Service Commission, Second District, on the record of passenger train performances on the steam railroads of the State for March shows that the number of trains run was 63,512. Of this number 88 per cent were on time at the divisional terminal. The average delay for each late train was 26.2 minutes and the average delay for each train run was 3.3 minutes.

MEETING OF COMMITTEE ON POWER DISTRIBUTION

The committee on power distribution of the Engineering Association held a meeting in New York on May 17. Those present were: A. F. Hovey, Interborough Rapid Transit Company, chairman; E. J. Dunne, Public Service Railway; William Roberts, Northern Ohio Light & Traction Company; Prof. A. S. Richey, Worcester Polytechnic Institute; S. D. Spring, J. G. White & Company, and G. W. Palmer, Boston & Northern Street Railway.

The first subject taken up was the specifications for crossings of trolley wires over railroads, prepared by a sub-committee of which Professor Richey is chairman. Tentative specifications were presented and approved by the whole committee. It was agreed that these specifications should be submitted in conference to a committee of the American Railway Engineering & Maintenance of Way Association for approval before submitting them to the Engineering Association for final adoption.

The next specifications submitted were those covering crossings of foreign wires over the trolley wires of electric railways. These specifications are substantially the same as the specifications for overhead crossings of power wires at steam railroad crossings with the exception that the clear head room between the foreign wire and the street railway company's rails is made not less than 30 ft. Mr. Palmer thought this requirement could not be enforced in the case of single pair telephone service wires. Professor Richey thought that if necessary an exception could be made for wires of this class provided that such wires could cross above trolley span wires at a lower height. The span wire would take the blow of a trolley pole which was off the trolley wire. It was agreed that these specifications should be submitted in conference to the National Electric Light Association, the American Railway Engineering & Maintenance of Way Association and representatives of the American Telephone & Telegraph Company for joint approval before adoption by the Engineering Association.

Professor Richey then presented proposed standard specifications for the joint use of poles. These cover the joint use of poles for wires and cables of electric railways, electric light and power wires, and telephone wires and cables. They differ in many respects from the proposed standard specifications of the National Electric Light Association, which consider railway wires and cables as a side issue only. The proposed Engineering Association specifications fix the location and attachments of electric power, electric light, telephone and railway wires on the poles, beginning at the top, and consider lead-covered telephone cables as bare ground wires which should be supported by insulators on cross-arms the same as negative feeders of railways.

The consensus of opinion of the committee on power distribution was that this subject was most important and that every effort should be made to secure the joint approval of fair and reasonable specifications by all of the telephone, electric light and railway interests concerned. The chairman was instructed to write to the president of the National Electric Light Association and to representatives of the American Telephone & Telegraph Company asking for a joint conference on both the specifications for overhead crossings of foreign wires and joint use of poles, this conference to be held at the earliest possible moment, with the view of reaching an agreement on specifications which would be satisfactory to all interests.

GROOVED TROLLEY WIRE

Mr. Dunne presented a memorandum on this subject stating that several manufacturers of trolley wire were making No. 00 and No. 000 grooved wire having exactly the same groove as the No. 0000 standard grooved wire. He stated that at least one manufacturer was making hangers and ears which could be used interchangeably with any of the three sizes of wire.

SPECIFICATIONS FOR HARD-DRAWN COPPER TROLLEY WIRE

Mr. Dunne read extracts from letters from a number of railway companies suggesting clauses to be used in a proposed standard specification for hard-drawn copper trolley wire. He thought that the specifications of the Boston & Northern Street

Railway for No. 00 round hard-drawn copper trolley wire afforded an excellent basis for standard specifications covering all sizes of round wire. Mr. Palmer argued in favor of the torsion test as being a better indication of the homogeneity and toughness of the copper than elongation tests. He presented several samples of good and bad wire which had been submitted to a torsion test. The torsion test detects the presence of seams, hard and soft spots and brittleness, and poor wire cannot pass such a test. The committee agreed to a few minor changes in the Boston & Northern Street Railway specifications and will submit the new specifications for adoption as standard.

CONCRETE, GALVANIZED TUBULAR AND LATTICED POLES

Mr. Roberts read a report prepared by him on the construction methods and costs of reinforced concrete poles and also a letter from S. L. Foster, of San Francisco, another member of the committee, who advocated for city use the ordinary type of tubular iron poles properly painted. Mr. Foster did not favor concrete poles on account of the great weight and large number of sizes which would have to be carried in stock. He thought latticed iron poles were open to the objection of serious corrosion due to the difficulty of painting them properly and that the extra cost of galvanized tubular poles was not warranted by an increase in their life over properly painted black iron poles.

Mr. Palmer moved that the sub-committee appointed to consider this subject continue its investigation and submit designs and specifications for different sizes of reinforced concrete poles and definite recommendations for or against the use of these poles, particularly as regards first cost and durability as compared with wooden poles. This motion was carried. It was decided to drop the further consideration of lattice poles owing to the limited use to which these poles seem to have been put. The sub-committee was instructed to prepare a standard specification for metal poles, this subject to be taken up next year if the sub-committee cannot complete the work this year.

SPECIFICATIONS FOR FEEDERS FOR 1200 VOLTS

Mr. Palmer, chairman of the sub-committee on this subject, said that he had received criticisms from several members of the committee on power distribution relating to the tentative specifications presented last year. The form of the specification proposed this year has been altered somewhat and is now more in accordance with the manufacturers' standard specifications subscribed to by most of the large cable manufacturers. The specifications are so drawn as to cover any size of cable.

DISCUSSION ON NEW JERSEY PUBLIC UTILITIES LAW

In a speech at the banquet of the New Jersey Bankers' Association, Atlantic City, May 12, Frank Bergen, general counsel Public Service Corporation, criticised the present public utilities act in New Jersey. He said in part: "The act, in large part, is aimed at evils that are no longer practised and at conditions that no longer exist. Like the ordinance of old Woulter von Twiller it frowns defiance at an absent enemy. There never was in this State any genuine public sentiment in favor of the enactment of such a law. The act, as finally passed, is made up of scraps of statutes enacted years ago by legislative bodies of other States, some of which have been declared to be unconstitutional by the Supreme Court of the United States and by the Supreme Court of this State."

In a recent interview Assemblyman Egan, of whose original bill the present public utilities law was the outcome, defended the law. He believed that under it school children could still be carried for 3 cents, and said: "It is unfortunate that the policemen and firemen in uniform were overlooked. It was never intended that they should be victims." To overcome this difficulty he suggested that the railway companies could enter into a contract with the city to carry these officials for a nominal consideration. In conclusion he said: "The law is the essence of justice and is one of the finest pieces of legislation that occupies a place on the statute books. No State in the Union can boast of a more perfect law."

President McCarter in referring to Mr. Egan's statement said that the action of the Public Service Railway Company in regard to policemen, firemen and school children was taken upon the recommendation of its counsel, who believed that any other action would be in violation of the provisions of the law. President McCarter said further that at the recent session of the Legislature the company, through its representatives, had opposed certain provisions of the law which it believed to be improper and impracticable, but that it would endeavor to obey the law in letter and in spirit. It was not opposed to State regulation. It had co-operated with the old commission from the day it took office until it was succeeded by the present commission, and it expected to co-operate with the present commission.

LIGNITE DEPOSITS IN THE UNITED STATES

In an address on lignite delivered before the American Philological Society, Philadelphia, May 3, by Joseph A. Holmes, director of the Bureau of Mines, the following figures were given on the extent of the lignite deposits in the United States:

	Lignite. Square Miles.	Sub-bituminous. Square Miles.
Alabama	6,000	....
Tennessee	1,000	....
Louisiana	8,800	....
Arkansas	5,900	....
Texas	53,000	....
South Dakota.....	4,000	....
North Dakota.....	31,000	....
Montana	7,000	8,800
Wyoming .....	....	21,360
Washington .....	....	1,100
New Mexico.....	....	5,000
Colorado .....	....	5,910
Idaho .....	....	1,200
Total	116,700	43,370

In a number of states in the Rocky Mountain region there are large areas of coal that represent a transition between typical lignite and bituminous coals. For these the name "sub-bituminous coals" has been suggested, and is tentatively used by the United States Geological Survey. The lignite beds in Alabama, Mississippi and Tennessee represent a transition between peat and the more typical lignites of the Dakotas and Texas. Little or no use has been made of the lignite beds in these three states. The lignites in Texas and Arkansas have been used to a limited extent, as have also the lignites of the Dakotas and eastern Montana. In this latter field the lignites contain 20 per cent and in some cases more than 40 per cent moisture, slackening badly and rapidly on exposure to the atmosphere. This quality seriously interferes with their use and value for fuel purposes.

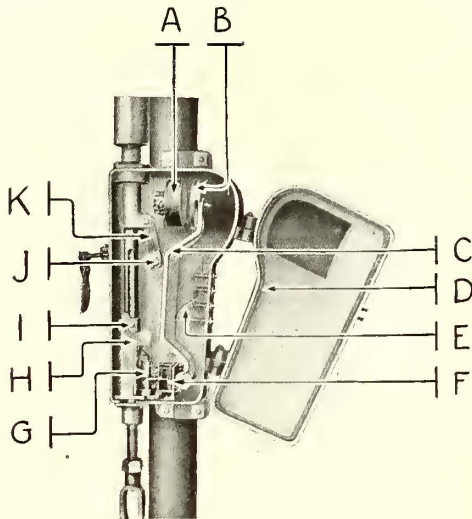
The speaker said that the outlook for the utilization of lignites is favorable along three lines: In gas producers, without either drying or other treatment; in boilers of special construction, such as that installed more than a year ago at Williston, N. D., by the United States Reclamation Service, where lignite is used in its natural condition almost immediately after being brought from the mine; as briquettes, which requires that the lignite should be thoroughly and finely crushed and dried to a moisture content of from 5 per cent to 10 per cent and then compressed into briquettes while still warm.

Limited quantities of lignite from California, North Dakota and Texas have been made into satisfactory briquettes at the Government Mine Experiment Station at Pittsburgh, using the full-sized German briquetting press, which develops a pressure of 20,000 lb. to 25,000 lb. per square inch. In the cases just mentioned the briquettes were made without any binding material, because a sufficient amount of tarry material remained in the crushed and dried lignite to serve as a bond for the particles of the briquette. In conclusion Mr. Holmes stated the belief of his department that its investigations along this line will demonstrate the fact that the lignite in Texas, the Dakotas and Montana can be made into briquettes on a commercial scale, and that in this form the lignite can be used as a substitute for other domestic fuel in these regions.

DISPATCHER-CONTROLLED TRAIN-ORDER SIGNALS FOR INTERURBAN ELECTRIC RAILWAYS

As the result of studies into the conditions attending the development of interurban electric lines in the United States and in the light of experience gained in adopting electrical apparatus to steam railroad needs, particularly in the application of the telephone to train dispatching, the United States Electric Company, of New York and Chicago, has brought out a dispatcher-controlled train-order signal system for interurban electric rail-

rod are at the left and the electromagnet at the right. Through the related action of the time wheel and the retaining pawl, only that selector is brought to a position to close its contact and to signal the station whose combination wheel corresponds exactly to the sequence of long and short impulses sent over the line. In all other selectors in the circuit the combination wheel has returned to its normal position and the station is consequently not signaled. In operation this selector will call the most remote station on the line in the time required to call the nearest. It cannot be operated by stray or induced currents from other wires or from the earth, for the operating current must be sent in certain combinations properly spaced before the selector will act.



Signal System—Semaphore Box

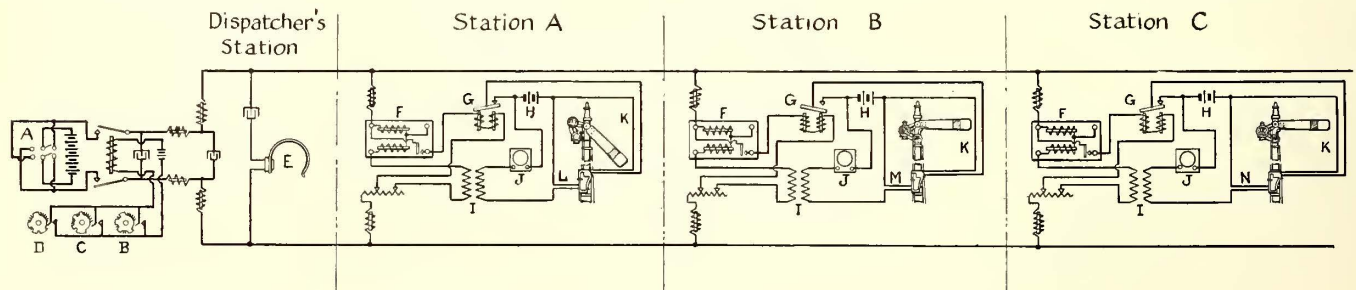
An automatic calling key at the dispatcher's office sends the proper combination of impulses. This key consists of a simple train of gears operating a circuit-breaker somewhat similar to the district messenger box. One such key is provided for every station in the circuit, its specially cut circuit-breaker wheel making that combination of code impulses which will bring unflinchingly to the contact position the selector in that station with the corresponding code number.

The complete dispatcher-controlled system comprises a combination of two pieces of equipment, the selector and the electric slot semaphore. Signals may be thrown to the "stop" or "danger" position by the dispatcher, wherever the signals are located or however attended. The signals are restored to "safety" by the train crew after receiving orders from the dispatcher and after his electrical consent to the restoring of the signal has been given. The system includes, however, equipment for the restoration of the signal by the dispatcher without the intervention of the train crew.

ways. The first public exhibition of this system was made at the Chicago Coliseum exhibit at the Maintenance of Way convention in March, and the *ELECTRIC RAILWAY JOURNAL* now presents the first description available to interurban railway interests.

The earliest efforts to adapt the telephone to railroad uses included calling by code ringing by the magnets, every call being heard at every station practically as in calling by a Morse sounder in telegraph service. It was not until the Gill selector was made the essential feature of the system that telephone train dispatching received a great impetus. By the selective system the train dispatcher may discriminate from among the stations on a circuit that particular station with which he wishes to communicate, causing at the desired station, and at no other on the circuit, the selector to be operated to the contact position, and thereby signaling that station by either audible or visible means as may be preferred.

The semaphore signal equipment consists of a 20-ft. iron mast, two double spectacle lenses, blade, oil or electric lamp, electric slot, restoring lever and an answer-back mechanism. The selector equipment comprises a selector, semaphore relay, bell and induction coil. A 6-volt or 10-volt battery of the closed-circuit type is required with each signal. The signal blade is held in the "safety" or "clear" position because the magnet in the electric slot is continually energized by the local battery. When the dispatcher desires to throw any particular signal to the "stop" position he will turn the automatic calling key for that station. When the contact of the selector closes it completes the circuit of the semaphore relay, which then operates the slot, causing the blade to go to the "stop" position. Immediately on concluding this movement the dispatcher gets, by induction, over the telephone wire a definite, audible answer-back, comprising a repetition of the distinctive signal number and showing that the signal operated has gone to the desired position. When the semaphore has gone to the "stop" position the blade is mechanically locked, so that it is impossible for any



Signal System—Wiring Diagram for Dispatcher's Selective Signaling to Three Stations

The Gill selector consists essentially of a combination wheel and an electromagnet the armature of which is arranged to step the wheel forward, a retaining pawl to retain the teeth stepped and a time element, the function of which is to permit the retaining pawl to assume either one of two positions, according to the length of impulse of the current. The time element consists of a metal wheel carried on a shaft of small diameter and so arranged that it can roll on its axis or shaft down an inclined rod. In the cut on page 883 the time wheel and inclined

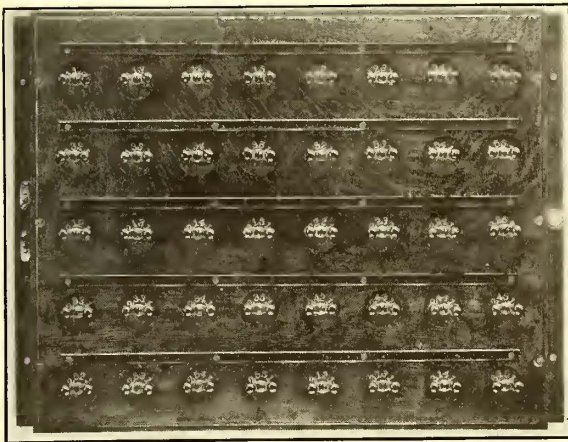
one to pull the blade down into the "safety" position nor can any one by operating the restoring lever reset the signal and set the blade back into the "safety" position.

After orders have been given to the train crew by telephone and properly verified, the dispatcher gives permission for the restoration of the signal. This is done by reversing the calling battery at the dispatcher's station by means of a switch and sending again the station's call by the individual key. This will again close the selector contact and open that of the semaphore

relay, permitting this signal to be restored to "clear" position.

The system is operated in a closed circuit and is so arranged that any failure of the current supply controlling a signal will set the signal at the "stop" position. When used as dispatcher's train-order signals but two positions are required for the semaphore. Either upper or lower quadrant signals may be furnished. Double lenses are provided when used to show light signals in both directions on a single-track road. Separate signals for movements in opposite directions may be furnished on a single pole. The selective signaling system may be connected direct to the ordinary train dispatcher's wire without interfering with the service at other stations where semaphore signals are not installed. The system is capable of conversion at any time into a part of an automatic block system by the addition of the necessary motor and track relay. The selector equipment would be retained for ringing operators at stations. No part of the present apparatus need be discarded in making such conversion.

The semaphore box on page 882 shows the slot magnet energized, the mechanical lock released and the slot latch in position to permit the blade to be reset to safety by the restoring lever. The view showing the parts indexed gives a clearer idea of the functions of the apparatus. *A* is the magnet for operating the signal. It is normally closed, but opened by the selector to set the signal. *B* is the armature operating through the armature lever slot latch *K* engaging the signal rod. *C* is the armature lever, the machine's left face forming a track for roller *J*. *D*



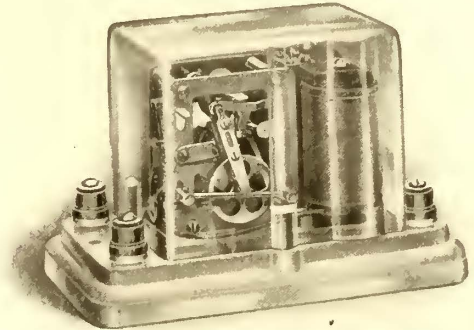
Signal System—Calling Key Cabinet

is a rubber gasket to prevent the entrance of moisture or dust. *E* is an armature lever spring to bring armature into contact with magnet. *F* is the answer-back mechanism which on the setting of the signal repeats the combination number to the dispatcher. *G* is the answer-back lever. The bracket carried by the signal rod depresses the plunger and operates the answer-back only when the signal is set in the "stop" or "danger" position. *H* is the mechanical locking lever engaging pin *I* and unlocked by a stud carried by the descending slot latch *K*. *I* is the locking pin carried by a sleeve working on the platted signal rod. *J* is the roller traveling on the face of armature lever *C* and actuating slot latch *K*. *K* is the slot latch engaging the signal rod. It cannot be engaged unless the magnet *A* is energized.

For brevity's sake the circuit diagram shows three stations only, with the electrical apparatus as with the three positions of the semaphore box mechanism. The reference letters in this diagram have the following meanings. *A*, reversing switch; *B*, *C* and *D*, calling keys 223, 241 and 421; *E*, telephone receiver; *F*, selectors; *G*, semaphore relays; *H*, local battery; *I*, induction coil; *J*, buzzer; *K*, wires to semaphore magnet; *L*, *M* and *N*, wires to answer-back 223, 241 and 421. The semaphore at station *A* is in the clear position and latched; that at station *B* in the stop position and mechanically locked; that at station *C* in the stop position but unlocked and ready to be cleared.

As illustrating the operative ability of selective telephone train dispatching it may be pointed out that there are on steam roads a number of circuits in excess of 250 miles, and on the Seaboard Air Line there is one circuit of 276 miles with fifty-two Gill selectors in service on it. The dispatcher-controlled signals will work as far as a telegraphic impulse can be effective and should prove reliable on the longest circuits which the interurban electric lines will present.

Two of these semaphore signals have recently been installed

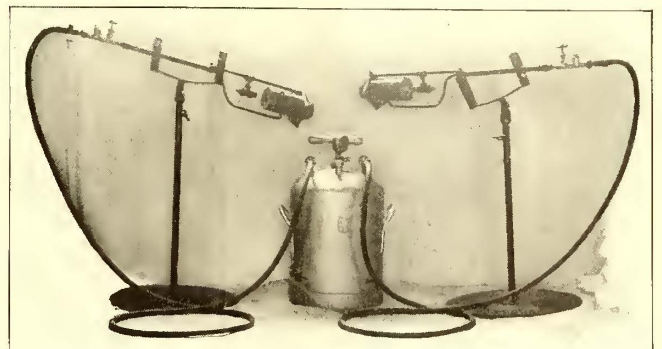


Signal System—The Selector

on the Indianapolis & Cincinnati Traction Company's interurban line, which consists of two branches extending from a point just outside of Indianapolis, one to Connorsville, a distance of 58 miles, and the other to Greensburg, a distance of 49 miles. The dispatcher's office is at Junction, near Indianapolis, and the semaphore signals are at Rushville, 37 miles from the dispatcher's office, and at Shelbyville carhouse, 22 miles from the dispatcher's office. This is an a.c. road, the trolley current being 3300 volts, 25 cycles, and the static charge on the telephone line is very great. One of these lines was so noisy that it was difficult to telephone over it, but the experience with the semaphores and the four selective stations installed shows that the selective signaling equipment will operate satisfactorily over a line which is hardly fit for talking. A party of Indiana interurban managers went over this line on May 12 to inspect these train-order semaphores and to witness their operation.

PORTABLE OIL BURNER

The accompanying illustration shows a portable oil burner built by the Hauck Manufacturing Company, Brooklyn, N. Y. This burner transforms oil and compressed air or oxygen into a heavy body of gas to give complete combustion. This result



Portable Oil Burner for Welding, Preheating and General Repairs

is obtained by placing crude fuel or kerosene oil in a tank under a pressure of from 15 lb. to 100 lb. per square inch, and connecting the oil tank with a line of tubing which conveys the fuel to the burner, where it becomes an intensely hot blue flame. The burner is therefore adapted for all kinds of repair work, which includes brazing, preheating in connection with electric or oxy-acetylene welding, tempering, annealing, melting,

etc. Its usefulness in car repair work may be appreciated from the fact that the No. 2 burner, which has a 15-gal. tank and consumes 3 gal. of oil and 15 cu. ft. of free air an hour, has bent a 1/2-in. steel plate 6 ft. x 10 ft. to right angles in 15 minutes. This meant the proper heating of an area 10 ft. x 8 in. with a 10-lb. burner. The portable outfit illustrated consists of one seamless tank equipped with a hand air pump, two sets of burners and hose attached to the tank and two adjustable stands to hold the burners in the proper position.

FEATURES OF ELECTROLYTIC ARRESTERS

Oil in the tanks of electrolytic lightning arresters is in contact with the electrolyte in the trays. Therefore, it soon becomes "wet"—that is, it absorbs moisture from the electrolyte.

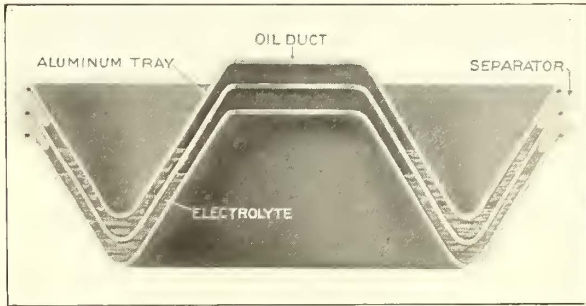


Fig. 1—Section of Three Trays of Electrolytic Arrester

It has been found that organic substances, such as wood or fiber, when used between electrolytic arrester trays, absorb moisture from the "wet" oil and thereby become conducting. They carbonize and difficulties ensue. To avoid trouble from this condition in Westinghouse electrolytic arresters, separators of porcelain are used between the trays. The wooden tie rods which bind the tray structure together are not in contact with

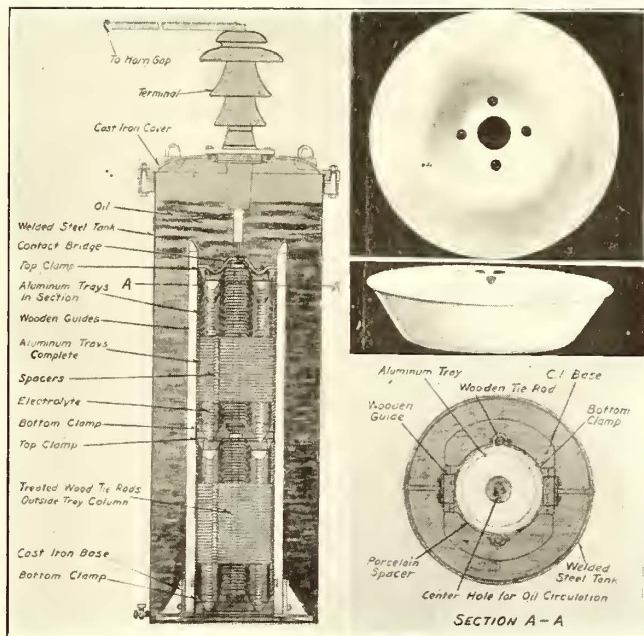


Fig. 2—Sections of Complete Arrester and Views of Trays

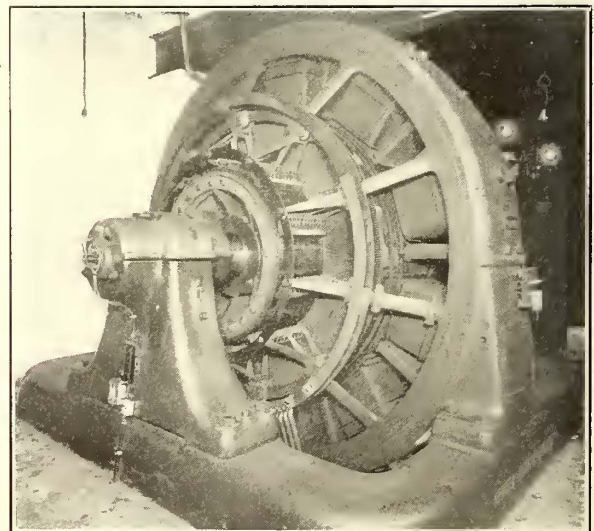
any trays except the top and bottom ones of each section. Fig. 1, a sectional view of three trays filled with electrolyte, shows how the porcelain separators are used. Four separators are installed between each pair of trays. Each stack of trays and separators is clamped with iron nuts turning on the threaded ends of wooden tie rods. In each electrolytic arrester tray there are four holes which, when the trays are stacked, form a vertical oil duct through which oil can circulate. This

promotes the discharge of bubbles from the electrolyte and assists in maintaining an arrester at a low temperature when it is operating continuously for a long period. Another feature that assists in the effective discharge of bubbles is the contour of the tray. The outer portion of each tray is of such shape and so inclined that bubbles forming in the electrolyte will be discharged directly into oil.

Tray structures for these electrolytic arresters are divided into sections or units, each small enough for ready handling by one man when he is putting it in or withdrawing it from a tank. There is ample oil space between the tray structure and the inner surface of the sheet-iron tank. In computing the clearance necessary between the trays and tank for sufficient insulation it was assumed that the oil would always be "wet." Two very desirable things accrue because of the allowance of this liberal clearance. One is that the oil volume, hence the ability of the arrester to discharge continuously, is greatly increased. The other is that it is not necessary to hang a circular screen of some organic insulating material down in the tank around the tray structure to prevent arcing between the trays and the tank.

REGULATING POLE ROTARY CONVERTER

A very interesting application of the General Electric regulating pole rotary converter is made by the Rochester Railway, Light & Power Company, which uses it to maintain constant the power which it takes from the Niagara & Lockport Power Company's transmission line. Electrical power is transmitted three-phase from Niagara Falls to Rochester at a potential of 60,000 volts, and is there stepped down to 11,000 volts for distribution. The power purchased from this transmission company by the Rochester Railway is transmitted to Station No. 6 and distributed from this to other substations which are supplied with regulating pole rotary converters. A current transformer, inserted in one of the lines, controls a contact-making ammeter which controls the motor circuit of a motor-operated rheostat inserted in the regulating pole field circuit of the rotary converter. When the power taken exceeds the fixed amount the contact-making ammeter closes the motor circuit and starts the motor. Resistance is thereby cut into the rotary regulating



Inter-Pole Rotary Converter Used in Rochester

pole field circuit to reduce the d.c. potential and cause the rotary converter to take less power. When the power is reduced to the fixed amount the contact-making ammeter breaks the motor circuit and the cutting of resistance into the rotary field circuit ceases. When the total power taken is less than the fixed amount the contact-making ammeter starts the motor in the reverse direction, cutting resistance out of the rotary field circuit, increasing the voltage and the load on the rotary.

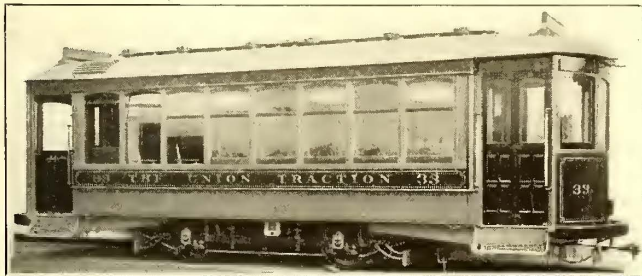
IMPROVED WATER-FLOW METERS

The General Electric Company has recently added a water-flow meter of recording and indicating type to its line of devices for measuring the flow of steam, air and gas. In appearance and general principles the new meter is similar to the steam and air flow meters which were described and illustrated on page 912 of the *ELECTRIC RAILWAY JOURNAL* for May 21, 1910.

Although the meter is calibrated to record the rate of flow in gallons per minute at 39.1 deg. Fahr., suitable means are provided for readily setting it for different temperatures, pipe diameters and rates of flow. This meter is useful for ascertaining the output of pumping plants, the input to water turbines and their loss of efficiency, the amount of feed water delivered to boilers, the amount of cooling water used in condensers, the slippage in pumps due to leaky plunger packing or worn-out valves, and for discovering losses due to leaks in water mains, etc.

FLAT-ARCH, SEMI-CONVERTIBLE CAR FOR COFFEYVILLE, KAN.

The Union Traction Company, Coffeyville, Kan., has recently received from the American Car Company, St. Louis, Mo., the single-truck, vestibuled car shown in the accompanying illustration.



Single-Truck Car for Coffeyville, Kan.

The window system is of the semi-convertible type. An especially interesting feature of this car is the flat-arch roof, which in turn required the installation of roof ventilators, as



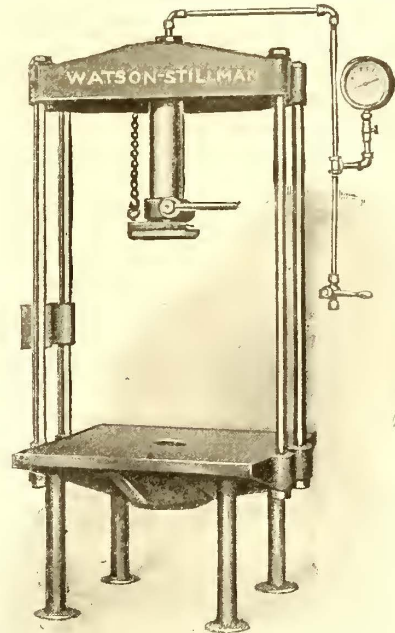
Interior of Coffeyville Car, Showing Ventilator Openings shown in the exterior and interior views. These ventilators are of the "Star" type and six are installed on each side.

This car is 30 ft. 1 in. over the vestibules, 20 ft. 8 in. over the body, 8 ft. 9 in. wide over all and 7 ft. 9½ in. wide over the sills. The height from the rail to the sills is 2 ft. 3 7/16 in. and from the sills to the trolley base 8 ft. 8 in. The underframe is of semi-steel and the body of wood. The interior trim is of Palace golden oak with a birch veneer headlining. The seats,

which are of the Brill "Winner" design, are made of wooden slats and seat thirty-two passengers. Forsythe curtain fixtures were installed. The car is mounted on No. 21-E trucks and is operated with Westinghouse No. 101-B-2 inside-hung motors. Among the specialties are Consolidated electric heaters, Syracuse headlights, Hunter destination signs and Peacock brakes.

HYDRAULIC PRESS FOR FORCING BEARINGS

The Watson-Stillman Company, New York, has added to its line another hydraulic press which is specially adapted to forcing bearings, bushings and making similar forced fits. The weight shown on the left counterbalances the ram, which can be handled independently of the pump by means of a rack, pinion and lever arrangement. A hole through the platen permits work to be projected or forced through. The capacity of



Hydraulic Press for Forcing Bearings

the press reaches its maximum of 30 tons under a hydraulic pressure of 6250 lb. per square inch, which may be produced by using either a hand or belt-driven pump attached to the pipe shown in the cut. The length of stroke of the ram is 18 in. and its diameter is 3½ in. An 18-in. stroke usually suffices for most press fitting. So long a stroke is often desirable.

1500-VOLT EQUIPMENT FOR PIEDMONT & NORTHERN RAILWAY

The Piedmont & Northern Railway, a subsidiary company of the Southern Power Company, Charlotte, N. C., has ordered from the Westinghouse Electric & Manufacturing Company all the substation and car and locomotive equipment for its 125-mile interurban line, which will be operated with direct current at 1500 volts. The aggregate cost of the equipment ordered is approximately \$400,000. It includes ten 500-kw motor-generator sets, twenty-three quadruple 90-hp motor car equipments and fourteen 55-ton electric locomotives, which will be used for hauling freight trains. This new line, which is now under construction, will connect Charlotte and Kings Mountain, N. C., and Spartanburg and Greenwood, S. C. It will have some long steep grades, but each of the locomotives is to be of sufficient capacity to haul a train of 800 tons. They will be equipped with four interpole motors geared to the axles. The Piedmont & Northern Railway is the first line which the Westinghouse Electric & Manufacturing Company has contracted to equip for operation with direct current at 1500 volts.

SIGNAL INSTALLATION ON TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION LINE

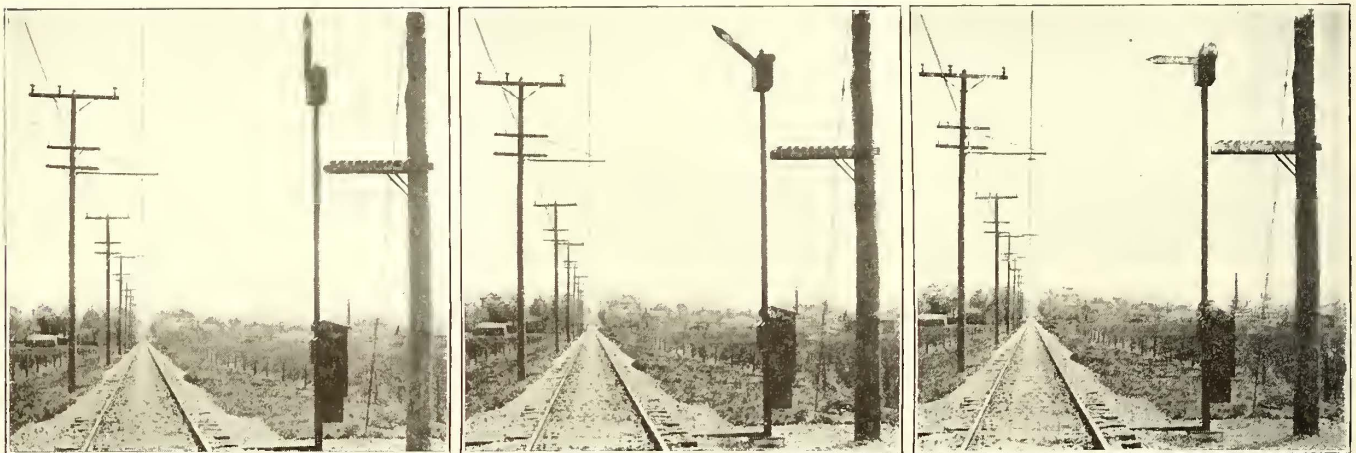
The Kinsman Block System Company, New York, has recently installed its signal system on a block of the Terre Haute, Indianapolis & Eastern Traction Company's line near Plainfield, Ind. This installation was examined on May 4 by members of the Indiana Railway Commission and by the Indiana interurban roads' committee on block signals, as noted on page 840 of the *ELECTRIC RAILWAY JOURNAL* for May 13. The only change suggested by those who inspected this equipment was that the counting mechanism should not repeat in case a car which had already registered backed up over the insulated track section. The Kinsman company states that this alteration can be made without difficulty.

The present apparatus consists essentially of two semaphores operated by track circuits using trolley current. No distant signals are used, but they can be applied if wanted. Relays at the end of the block permit operation on extreme variations in voltage. The experimental block is 3.47 miles long and one semaphore governs the track in each direction. Each signal is placed on a piece of single track about 300 ft. from the switch point of the siding which it protects. The signals are operated by track circuits at each end of the block. The track circuit consists of two adjacent insulated sections, each two rail lengths long. The sections are insulated by three Weber insulated joints. The section nearer the switch point controls the setting

vertical position. As a car enters a block the setting relay operates the controller at the entering end and the controller switches open. This breaks the circuit, de-energizing the signal at the distant end of the block, allowing it to fall by gravity to the horizontal or "stop" position. As a signal assumes the "stop" position it opens the circuit. When an entering car leaves the insulated section, the signal at the entering end is de-energized and falls by gravity to the 45-deg. or "caution" position and is held in this position by a slot magnet which is operated by the switch on the controller.

As each succeeding car enters the block it passes onto the insulated section and the signal moves from the 45-deg. position to the vertical position; then, after the car has passed over the insulated section, the signal falls back to the 45-deg. position. This indicates that the signal at the opposite end of the block will remain in the horizontal or "stop" position until the last entering car has passed entirely through the block. As each car passes out of the block the release relay operates and in turn actuates the controller at the entering end of the block one step back toward its normal position. As the last car passes out the controller switch is operated, which completes the circuit through the signal at both ends of the block, causing both to operate to the vertical position, which indicates that all cars are clear of the block.

The semaphore arm operates in the upper left-hand quadrant and has three positions as shown in the accompanying illustrations. The circuits between the two signals are completed by



Three Positions of Semaphore—Vertical When Block Is Unoccupied, 45 Deg. When Occupied by a Car or Cars Going in the Same Direction, and Horizontal When Occupied by Opposing Cars

of the signals, while the second section controls the release of the signals. The return circuit of the car propulsion current is carried around this insulated section to the opposite rail by bonds; also to the adjacent switch rails. Three wires are run from the insulated track sections through insulated wooden conduit to the base of the signal pole. One wire is grounded to the opposite rail, the second controls the setting relays and the third the releasing relays. All of the relays are in a box at the signal pole. They are operated by current from caustic soda batteries.

When a block is "clear" the normal position of the signal arm is vertical. The car in entering the block first passes over the setting section and operates the setting relay. This cuts out a release relay and makes both insulated sections a setting section. If a car is leaving a block it first passes over the release section, cutting the setting relay out of circuit and making both sections a release section. A step-by-step controller at each signal registers the movement of the cars in and out of the block and controls the circuit operating the signal. The controller switch is not thrown back to its normal position until the last car leaves the block.

The position of the signals is controlled by the position of the controller switch. When the block is unoccupied this switch is at normal position and the signals at both ends are in

three copper-clad line wires. Each signal has an 8-cp incandescent lamp for night indication. The lamp is behind a 4-in. lens. In front of the lens is a spectacle which carries green for "clear," yellow for "caution" and red for "stop." The indication side is red with a white stripe and the back is white with a black stripe. The metal signal blade is operated by a pair of magnets having a rotary armature which is directly connected to the shaft. The four circuit-breakers are operated by the position of the armature of the rotary magnets. One circuit-breaker opens the circuit when the signal assumes the "stop" position, one opens and closes its contacts as the signal moves from the "clear" position; the other two are installed to provide for future distant signals. The controller has a differential gear to operate both sides of the signal simultaneously without conflict in case one train is entering at the same time as another is leaving the other end of the block.

Twelve cars in which all the metallic portions of the body are made of aluminum have been put in service on the Zurich (Switzerland) tramways. In addition to its lightness, the metal has a further advantage, in that when it is cleaned with a sand blast simple painting suffices to protect it. The varnishing which is needed on steel plates is thus dispensed with.

News of Electric Railways

Meeting of Illinois Electric Railways Association

The Illinois Electric Railways Association is to meet at the La Salle Hotel, Chicago, Ill., at 10 a. m. on May 19, 1911. C. F. Flenner, auditor of the Aurora, Elgin & Chicago Railroad, who is secretary of the association, says that in addition to business matters of importance a paper on wood preservation will be read by C. P. Winslow, of the Forest Products Laboratory of the United States Department of Agriculture.

Program of Annual Meeting of Canadian Street Railway Association

The annual meeting of the Canadian Street Railway Association will be held on June 6 and 7, 1911, at the Windsor Club, Windsor, Ont., on invitation from the vice-president of the association, James Anderson, on behalf of the management of the Sandwich, Windsor & Amherstburg Railway. This railway is a part of the Detroit United Railway System, and every facility will be extended for a thorough investigation of the city and interurban lines of that company. It is probable that the second day's meeting on June 7 will be held in Detroit at the Cadillac Hotel and those who intend staying in Detroit will probably make their headquarters at the Cadillac. A number of important questions will be taken up at the meeting. The secretary-treasurer's report will deal with the association's work since the last annual meeting and will be discussed as read, section by section. The Board of Railway Commissioners of the Dominion having requested all electric railways under its jurisdiction to compile a code of rules for the operation of electric railways, to be submitted to the board for approval, a committee representing such companies will be appointed to draft the rules. It is intended to have this committee meet on June 6 or 7 so that the matter may be disposed of without the members of the committee having to attend another meeting for that purpose. Papers will be read on the following subjects:

"Cost of Production of Power."

"Notes on Distribution of Power in Street Railway Operations."

"The Use of T-Rails in Street Railway Construction."

"Modern Track Building," by John Kerwin, superintendent of tracks Detroit United Railway.

There will be topical discussions on the following questions:

Passenger fares of interurban electric railways, including the practice regarding one-way cash fares, one-way ticket and round-trip fares as compared to one-way cash fares; also if it is a practice to make reduced fares for special excursions, special parties or in commutation books, school books and mileage books, as far as that is a reduction from the regular one-way fare.

What is the safe limit of time to carry a load of 90 amp at 6600 volts on an a.c. generator which has a terminal amperage of 38 amp at 6600 volts?

Foundations for tracks in paving and foundations for tracks in intersection work.

Methods for handling freight in carload lots on interurban railways.

Training car crews.

The Question of Valuing the Toledo Property

On the evening of May 5, 1911, Prof. Edward W. Bemis, of New York, pointed out to the Council committee of the whole at Toledo, Ohio, some of the difficulties in arriving at a correct valuation of street railway property. He said from two to three months would be required to collect the data and arrive at conclusions. In one case mentioned it was said that the life of the rail was twenty years, but later developments showed it to be fifteen. This made a difference of many thousands of dollars in the valuation.

Professor Bemis said that the determination of the value of the Toledo plant equipment would be more difficult

than in Cleveland, because the Toledo Railway & Light Company does a lighting and industrial power business in addition to operating a street railway. The cost is more to produce current for lighting and power than for the operation of cars. The question of pavement was also a difficult one. Overhead and development charges were discussed at length, as was the question of depreciation. The company would gain by having a large depreciation charge, but this would affect the fare.

The value of the franchise, Mr. Bemis said, was small in his opinion. If he undertook the work he would want two or three helpers. A. B. DuPont, Cleveland, had offered to help without remuneration.

On May 10 the Council committee of the whole decided that an appropriation of \$8,000 should be made to cover the cost of securing an appraisal of the property. The question will be brought before Council at its regular meeting, and it is probable that the Mayor will be authorized to employ engineers.

H. E. Riggs, of Riggs & Sherman, Toledo, and F. T. Barcroft, Detroit, appeared before the committee. H. E. Riggs said his charges would be \$35 a day. Mr. Barcroft suggested that in case he did the work a price between \$25 and \$35 a day could be agreed upon.

Furthering Chicago Subway Plans

The Chicago City Council has ordered the corporation counsel to prepare a statement of the legal questions which should be settled before the construction of a passenger subway in Chicago can be begun. The resolution of the Council calling for the legal opinion included the following:

"What legislation is necessary to enable the city of Chicago (1) to construct by day labor or by contract and to own a system of subways for the transportation of passengers and merchandise and to provide for such underground municipal utilities as may be desired and to operate or to lease the same?

"To issue bonds for the construction and equipment of such subways, said bonds to be a lien upon such property only and not to be included in the bonded debt of the city.

"To exclusively pledge and pay the traction fund as interest upon such bond issue and to use any portion of such fund to aid in the creation of a sinking fund for the retirement of such bonds.

"To further use any net revenues received either from the operation or the leasing of such a system of subways, when constructed, for the purpose of paying off such bonds.

"To pay out of such bond issue the cost of the reconstruction of underground municipal utilities as are disturbed by the building of subways."

The question of including the word "merchandise" in the first paragraph was discussed at length. In speaking of the resolution Alderman Snow, its sponsor, said:

"The period of rehabilitation of the surface railway lines is practically over and Chicago now has the best street railway system in this country. The next step in providing for a perfect transportation system lies in the construction of means of through travel at high speed from one section of the city to the other, which shall supplement the slower surface systems.

"An ideal transportation situation would be one in which the long-distance traffic was gathered up by surface lines, carried to a subway entrance, transferred to high-speed trains to another section of the city, and finally redistributed by the surface roads. When this idea is reached we will have a condition in which both systems will perform their proper functions, the surface roads building up neighborhood centers and taking care of short hauls, and the subways connecting these centers by rapid train service.

"In order properly to co-ordinate the surface transportation with the subway transportation it is essential that the city of Chicago shall own its own subways."

As mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, Mayor Carter Harrison has requested Alderman Peter Reinberg, chairman of the local transportation com-

mittee, to appoint a sub-committee of three to take up at once plans for a subway in Chicago and report recommendations for starting work.

Trial of Rental Suit in Detroit

The trial of the suit of the city of Detroit against the Detroit (Mich.) United Railway to collect a rental of \$200 a day for the occupancy of the city streets by the Fort Street line since the expiration of the franchise in 1909 was begun in Circuit Court at Detroit on May 8, 1911, before Judges Henry A. Mandell, George S. Hosmer and Alfred J. Murphy. Corporation Counsel Hally asked that the hearing of testimony be dispensed with, as the city would admit that the rental demanded was excessive and that the question at issue was whether the city has the right to assess whatever fee it sees fit and whether it is really the owner of the streets. The court ruled to admit testimony and decided that Judge Mandell should preside. May 11, 1911, was the day set for taking testimony.

On May 11 Engineer Reifenberick, who was associated with Bion J. Arnold in appraising the property of the Detroit United Railway some years ago, testified that the reproduction value of the property within the single-fare zone was in round numbers \$26,000,000. Figures were presented by others to show a deficit of \$4,825 by the Fort Street line in 1910, and deficits aggregating \$83,489 for 1908, 1909 and 1910. It was also shown that the reproduction value of the Fort Street line was \$112,000 a mile, or an approximate total of \$1,827,760. William D. Bontron, of F. H. McPherson & Company, public accountants, testified that the deficit for 1910 was correct.

C. D. Joslyn, attorney for the company, said that no claim had been made that the company's rights in the streets where franchises have expired were such as to make it possible to dictate terms to the city. He said that the company, the municipality and the public have rights that are independent.

Fred A. Baker, attorney for the company, has asked that the Detroit *Evening News* and George G. Booth, president of the company which publishes that paper, should be cited for contempt of court, because of the publication of two articles and an editorial which are claimed to be false and misleading.

Progress of Hudson & Manhattan Railroad

William G. McAdoo, president of the Hudson & Manhattan Railroad, on his return from Europe recently, said in an interview in regard to the affairs of that company:

"A most gratifying feature of the annual report of the Hudson and Manhattan Company is the increase of 47 per cent in the number of passengers carried over the previous year's record. The 115 per cent increase received from advertising shows that our road is still in the development stage and will realize, in due time, the estimates made in the early stage of construction.

"We are still engaged in construction. Work is rapidly progressing on the Newark extension. This will be a most important feature of the company's development. It will mean (1) an efficient rapid transit service connecting Newark and Jersey City Heights with uptown and downtown centers of Manhattan; (2) utilization of the Hudson Terminal buildings as the downtown terminal of the Pennsylvania Railroad system; (3) a new local station in the heart of Newark affording frequent through service between Newark and New York. Undoubtedly this extension, tapping a vast territory, will mean large increases in passenger traffic and revenue.

"On the Manhattan side the extension to the Grand Central Station is yet to be built. The necessary property consents have been obtained for this extension, but it would be unwise to begin this work, or even finally to prepare plans for it, until the city officials have reached a decision on the main subway question. In order to make it most useful and efficient for the purposes intended, this extension should dovetail with any new subways which may be built.

"The same applies to the proposed extension from Sixth to Fourth Avenue under Ninth Street. The construction of these two extensions in Manhattan and the completion

of the Newark work will complete the Hudson & Manhattan Railroad as planned. We hope to be able to open the extension to Newark during the coming summer, but the completion of the Manhattan extensions will take several years.

"As for the present traffic, the Hudson & Manhattan Railroad had a record-breaking month during April. The total number of passengers carried for that month was 4,842,248, compared with 4,164,024 for April, 1910. This is an increase of 16 per cent over the previous year. This gives a daily average of 161,408 for April this year, as against a daily average of 138,801 in 1910."

Decision Against Public Service Commission in Wheel Guard Case

The Appellate Division of the Supreme Court on May 5, 1911, denied the motion of the Public Service Commission of the First District of New York to annul the trial before Justice Brady in the Supreme Court of a suit to collect penalties amounting to more than \$1,000,000 from Frederick W. Whitridge as receiver of the Third Avenue Railroad for failure to equip the cars of the Union Railway with wheel guards. Justice Brady dismissed the complaint and the Public Service Commission asked for a new trial on the ground that Justice Brady had been a stockholder of the Third Avenue Railroad, which controls the Union Railway, and was disqualified from hearing the case because of the ownership of the stock. The commission not only appealed from Justice Brady's judgment dismissing the complaint, but asked the Appellate Division to annul the proceedings because of the court's interest. The Appellate Division decided that Justice Brady's interest was too remote to affect his attitude on the trial of the case and affirmed his judgment, dismissing the complaint. When the case was called for trial Justice Brady informed counsel on both sides that he was a stockholder of the Third Avenue Railroad and counsel for both sides were willing to have the court hear the case.

Justice Scott, who wrote the majority opinion of the Appellate Division, notes that the Third Avenue Railroad was a distinct corporation from the Union Railway, which was being sued through its receiver, the only relation between the two being that in 1900 the Third Avenue Railroad, which owned all the stock of the Union Railway, pledged it to the Morton Trust Company under a mortgage which had been foreclosed in 1909 and had not only wiped out all the stock of the Union Railway, but the stock of the Third Avenue Railroad as well, so that Justice Brady's stock was of no value. Under the proposed reorganization plan of the Third Avenue Railroad, which the Public Service Commission has refused to approve, the stockholders of the Third Avenue Railroad were to have the right to purchase stock in the new corporation at \$45 a share. In his opinion Justice Scott said:

"The position of Justice Brady at the time of the trial was that as a stockholder of the Third Avenue Railroad he had been foreclosed of every possible interest, direct or contingent, in the stock of the Third Avenue Railroad, but that he might at some time in the future be able to acquire at a price stock in the Third Avenue Railway, which might or might not then own the capital stock of the Union Railway. As was well stated by Justice Bischoff at Special Term, 'This alleged interest is so remote and indeed so fanciful as to amount to nothing.'"

The court said that if that possibility constituted disqualification no judge could sit in an action affecting any corporation whose stock could be acquired in the market, because he might thereafter acquire some of the stock. Continuing Judge Scott said:

"The interest which will disqualify a judge to sit in a cause need not be large, but it must be real. It must be one which is visible, demonstrable and capable of precise proof. The alleged interest imputed to Justice Brady measures up to none of these requirements, and we entertain no doubt of his qualifications to sit in the cause."

The court expressed doubt as to whether, strictly speaking, Justice Brady would have been disqualified if he had held stock of the Union Railway itself, although he might and doubtless would have declined to sit to avoid possible criticism. If any judgment had been recovered it would

have been against Receiver Whitridge personally because of his omissions and not against the road. The court concludes:

"All he had before him was an action by the people against the individual who happened to be the receiver of the railway company."

Justice Scott, who also wrote the opinion affirming Justice Brady's judgment dismissing the case, remarks that the statute under which it was sought to collect \$5,000 a day from Receiver Whitridge is "punitive and very highly penal," and in order to make out a case the Public Service Commission must show that it actually issued an order which the defendant disobeyed. The order served upon Receiver Whitridge bore no signature or initials, and Justice Scott says that it is 'wholly insufficient as a self-proving document, and is of such a character that by itself it raises no presumption that it had in fact ever been adopted,' and the case against Receiver Whitridge is devoid of legal proof that any such order ever was adopted by the commission. The court said:

"Although the commission is a most important and powerful one it appeared that no minutes were kept of its proceedings, at least none were produced, although an opportunity was given plaintiffs to produce them if they existed. On this ground, if there were no other, the complaint was properly dismissed."

The court says, however, that Receiver Whitridge had anticipated tests of wheel guards being made by the commission and made some of his own, in the course of which he decided upon one that was rated highly by the commission. He contracted with the manufacturers to supply all his cars with these guards, but although many of them were equipped the receiver could not equip them all within the time specified in the order. The commission had suggested that if the receiver had asked for more time he could have got it, but the court says that the statute does not authorize the imposition of penalties for any such cause.

Philadelphia Loan Passed

The ordinance authorizing the Philadelphia (Pa.) Rapid Transit Company to increase its bonded indebtedness \$10,000,000 was passed by both chambers of Councils on May 11, 1911, as originally drafted. The amendment which was adopted by Common Council on May 5, 1911, as noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 847, was stricken out by Select Council and the bill was then passed by that chamber. Common Council at once concurred. Mayor Reyburn has announced that he will sign the ordinance. The loan bill was brought before Select Council on motion of E. E. Patton, who also moved to strike out the amendment. In supporting his motion Mr. Patton said:

"I am unalterably of the opinion that this amendment should be stricken from the bill; that it has no proper place in it. Your sub-committee on this matter has worked hard to get at the bottom of the situation, and we have been told positively that it is not the purpose of the Rapid Transit Company to accept such an amendment. The people who are to spend the money, they say, will refuse to accept it.

"Some time ago we asked the transit officials for information as to how they proposed to use this money, and received their letter setting forth their purposes. Now the company and its officers are bound just as much by these letters as they would be were they incorporated in the ordinance. I am assured that Mr. Stotesbury will absolutely refuse to go any further in the matter if this amendment is not stricken out. The Mayor has told me unequivocally that the bill should be passed exactly as it came from the committee, which is of course without the amendment. To fail to strike out this amendment would be the same thing as to kill the bill."

Transit Affairs in New York.

The committee of the Board of Estimate of New York, of which Borough President McAneny is chairman, and the members of the Public Service Commission of the First District of New York conferred on May 16, 1911, in regard to the report which the committee is to make to the Board of Estimate. When this conference adjourned it was learned that two members of the Public Service Com-

mission who have hitherto been in favor of the adoption of the offer of the Interborough Rapid Transit Company urged a division of territory. The division plan is said to be favored by Borough President Miller of the Bronx, Chairman Willcox of the commission and Commissioners Eustis and McCarroll. Mr. McAneny's position is understood to be that inasmuch as the Interborough Rapid Transit Company failed to adapt its amended offer to any suggestion of a compromise within the time allowed it by the city authorities to amend its offer, and inasmuch as the original plan of the Brooklyn Rapid Transit Company admitting of the division of the territory was superseded at the request of the city's conferees by a comprehensive plan for all boroughs, no object is to be accomplished in seeking to postpone definite arrangements with whichever company may have presented the better offer.

Ex-Controller Edward M. Grout, who was a former law partner of Mayor Gaynor, advocates the compromise plan, involving a division of territory between the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. In company with Bridge Commissioner Kingsley Martin, Mr. Grout called on Mayor Gaynor on May 16, 1911. Mr. Grout is now counsel for the Continuous Transit Securities Company, which has written two letters to the Public Service Commission objecting to the use of Broadway above Ninth Street by the subway extension proposed by the Brooklyn Rapid Transit Company and proposing a moving platform for that area. It is denied that members of the City Conference Committee favor withholding all subways from Broadway in connection with the present plans.

The proposals now before the commission from the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company have resulted in some striking display advertising in the daily newspapers. The Brooklyn Rapid Transit Company in one of its advertisements displayed two maps, one showing the lines embraced in its proposal and the other showing the lines embraced in the proposal of the Interborough Rapid Transit Company. The maps appeared under the heading "Maps Showing How B. R. T. Subway Extensions Would Provide Relief for Great Undeveloped Sections Not Considered in Interborough Plan." Under the heading "Study These Maps and See How Little Money the B. R. T. Offers to Put into Construction," the Interborough Rapid Transit Company, in one of its advertisements, which occupied an entire page with the exception of a column, presented three maps of the proposals, one under another, to influence public opinion. The first map was presented to show the Brooklyn Rapid Transit Company's original offer, the second map was presented to show the alternative proposition of the company and the third was presented to show that the Interborough Rapid Transit Company's own offer provided for city capital to the extent of \$69,720,500 for new construction as compared with \$133,824,500 from the company itself.

The proposition of the Continuous Transit Securities Company for the installation of a moving platform between Fourteenth Street and Forty-second Street on Broadway has taken definite shape in the submission of the plan to the Public Service Commission. In his letter accompanying the proposition Max E. Schmidt, president of the company, says:

"We understand that the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company have recently made extensive subway propositions and that in both cases a subway for trains on Broadway, Manhattan, has been included. We respectfully request that before you consent to the construction of any sort of subway for trains in Broadway you will give consideration to the following:

"Broadway crosses a great part of Manhattan diagonally and intersects all east and west streets and also nearly all the principal north and south avenues on the west side of the city. Broadway is the main artery of travel in Greater New York. For that reason it should receive special treatment and be provided with the best and most capacious method of transportation. The level at 20 ft. below the surface should be reserved for the installation of the best local collecting and distributing system that can be devised, with entrances and exits at every street.

"A subway equipped with ordinary trains could not possibly fulfil these requirements. It could not have stations located closer than four or five blocks apart, and the service would probably be taxed to the limit on the opening day and constantly overtaxed thereafter. A two-track train subway is plainly entirely insufficient, and likewise a four-track train subway, even if provided with the maximum number of stations, would certainly prove inadequate. On the other hand, a moving platform subway, such as proposed in our communication of June, 1909, would have fully twice the capacity of a four-track train subway, would have stations as close together as needed, could easily find space within the curbs and provide seats for everybody. It would also take care, as no train intermittent service could, of the constantly fluctuating volume of traffic due to sudden inrushes at unexpected times, which occur in every congested district and which should be provided for.

"We therefore submit, in the event of a subway for trains being located in Broadway, that, first, it should be operated exclusively by express trains and solely for through traffic; and, second, it should be operated in conjunction with moving platforms placed on the 20-ft. level as the collecting and distributing agent."

Central Railway Club.—G. K. Heyer, railway sales engineer of the Western Electric Company, read a paper on train dispatching by telephone at a meeting of the Central Railway Club on May 12, 1911, at Buffalo, N. Y. This was the last meeting of the season for this organization, which has adjourned until September.

Paper on Physical Valuation.—William C. Boyrer, assistant electrical engineer of the New York Public Service Commission, First District, read a paper on "Physical Valuation" before the Brooklyn Engineers' Club on May 11. Mr. Boyrer considered the subject generally from four standpoints—reorganization on stock issue, bond issue, determination of rates and sale of property. He discussed the original cost, the cost to reproduce new, and the present value, taking up the questions of tangible and intangible capital, depreciation and salvage value. The paper was discussed by C. W. Wilder and Joseph Strachan.

Prospects of Sale of Winnipeg Electric Railway to City.—The recent increase in the quotations for stock of the Winnipeg Electric Railway from 218 to 240 has given rise to the report that an agreement is likely to be arrived at between Mayor Evans, of Winnipeg, and Sir William MacKenzie, president of the company, for the acquisition of the company's system by the city of Winnipeg. The Mayor has no authority to conclude such a transaction, however. On May 11, 1911, the company's transformer station at Lac du Bonnet was struck by lightning, and all current was cut off the power and street railway system in Winnipeg.

Amendments to Tayler Franchise at Cleveland.—Street Railway Commissioner Dahl, of Cleveland, is anxious to have the City Council take up the amendments to the Tayler franchise proposed by the Chamber of Commerce. When the ordinance embodying the recommendations of the Chamber of Commerce is introduced it is probable that public meetings will be held, as was done when the original negotiations were in progress. The officers of the company have not expressed any opinions on the report. Prosecuting Attorney Cline, of Cuyahoga County, is preparing a suit against the Cleveland Railway to recover \$269,358.05, claimed to be due for back taxes for 1903 and 1904.

Association Publications.—The American Electric Railway Association is mailing to members a pamphlet containing the complete paper by George H. Davis, of Ford, Bacon & Davis, on "The Adjustment of American Street Railway Rates to the Expansion of City Areas," read at the mid-year conference of the association on Jan. 27, 1911. An abstract of this paper was printed in the *ELECTRIC RAILWAY JOURNAL* for Feb. 4, 1911. The association has also issued a bulletin to member-companies which gives statistics concerning the wages of conductors and motormen, based on returns from 400 companies. Part of these are city lines, part are interurban lines and part are combination city and interurban lines. The statistics are classified in a number of ways, and further information in regard to them can be obtained from the secretary of the association.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

NEW YORK.

Senator Harte, chairman of the Senate committee on taxation and retrenchment, has introduced a bill which has for its purpose the creation of a new source of State revenue at the expense of railroad corporations. Briefly outlined, the scheme proposed provides for annual taxes, assessed against the railroad, on the privilege of displaying advertisements in or on platforms and maintaining news-stands and vending machines at rates which vary in different localities throughout the State, according to population. In New York City the companies must pay \$150 for each car; in other cities of the first class, \$100; in second class cities, \$80; in third class cities, \$60, and in all other places, \$50. News-stands on railroad property are to be subjected to a contribution of \$50 each in New York City, and are graded down to a minimum of \$20 in all places other than cities. Slot or vending machines are also to pay amounts varying from \$10 to \$4. In addition, every sign on a railroad station or platform is to be made subject to an annual tax equal to 50 cents for each square foot of space. The taxes imposed are to be paid to the State treasurer, and evidence of payment is to consist of metal plates similar to automobile tags, which are to vary in color from year to year, and are to be attached to each of the different cars, stands, slot machines and bill boards on which the tax is paid.

OHIO.

The House has refused to concur in the amendments made to the Winters public utilities bill by the Senate, and a conference committee has been appointed to formulate a bill that will be satisfactory to both branches of the Legislature. The Smith bill, which is intended to dispossess the so-called electric mule company of any rights on the banks of the Miami & Erie Canal between Cincinnati and Toledo, has been passed by the House and is now before the Senate. The company has been in the hands of a receiver for years. The House has passed the Johnson Senate bill. This measure makes it possible for Cincinnati to build a boulevard on the Miami & Erie Canal within the city limits and a subway under it. Representative Geleerd, of Toledo, endeavored to introduce an amendment to the Johnson bill to give cities power to issue bonds to construct street railways. The Edwards subway bill was passed by the House after amendments had been made which had been agreed upon between the Cleveland Underground Rapid Transit Company and the Cleveland city administration. Under the amendments the city will have the right to approve the general plan of the tubes before work can begin. Representative Ray Kennedy has introduced a bill intended to make possible the condemnation of property by an electric railway when city authorities and county commissioners disagree.

The Committee on Railroads and Telegraphs has reported favorably the Harmon bill which would limit fares on interurban railways to 2 cents a mile, make 5 cents the minimum fare and require distances to be measured between points of entering and leaving the car instead of between stations. The Schaffer bill has been reported for passage in the House, having received a favorable vote in the Senate. It would give electric railways the right to condemn property within municipalities and to strip trees along the right-of-way when they interfere with the operation of cars. The Keller bill to give electric railways the right to borrow money regardless of their capital stock, to be secured by notes and bonds, has passed both the House and the Senate and is before the Governor.

On May 2 Governor Harmon vetoed the Calvey bill, which provided that electric railway companies should provide closed vestibules for conductors. He said that there is not the same reason for a closed vestibule for conductors as for motormen.

PENNSYLVANIA.

The bill providing for the merger of street railways and power companies has been passed. The Public Service Commission bill has been passed by the House and is now before the Senate. Final adjournment will take place on May 25. Of more than 2275 bills introduced probably not more than half will get out of committee.

Financial and Corporate

ANNUAL REPORTS Toronto Railway Company

New York Stock and Money Market

May 16, 1911.

Responding to the announcement of the decision of the Supreme Court in the case of the Standard Oil Company, most of the stocks advanced in price, and transactions for the day reached nearly 1,000,000 shares. The decision has removed one of the uncertainties which have exercised a restraining influence upon the business of the country and better conditions are now looked for both in financial markets and in general trade. Money markets show no marked change as yet. Quotations to-day were: Call, 2@2 $\frac{3}{8}$ per cent; ninety days, 2 $\frac{1}{2}$ @2 $\frac{3}{4}$ per cent.

Other Markets

The tone of the Philadelphia market to-day was far more active than it has been for some time.

Traction shares were in demand on the Chicago exchange to-day as a result of satisfactory news of the conclusion of the Chicago Elevated merger. There was an increase of two points in Metropolitan Elevated and South Side Elevated, and a gain of nearly three points in Northwestern Elevated.

The Boston market was strong to-day, with gains throughout the list, and a substantial increase was made in the volume of transactions.

No changes of moment are reported for Baltimore.

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

	May 9.	May 16.
American Light & Traction Company (common).....	a288	a292
American Light & Traction Company (preferred).....	a106	a107
American Railways Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a44	44
Aurora, Elgin & Chicago Railroad (preferred).....	a86	86
Boston Elevated Railway.....	a127 $\frac{3}{4}$	a128
Boston Suburban Electric Companies (common).....	a15	a15
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a10	a10
Boston & Worcester Electric Companies (preferred).....	a48	a49
Brooklyn Rapid Transit Company.....	78 $\frac{3}{4}$	80 $\frac{3}{8}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s..	85	85 $\frac{7}{8}$
Capital Traction Company, Washington.....	130	128
Chicago City Railway.....	a195	a195
Chicago & Oak Park Elevated Railroad (common)....	3	2
Chicago & Oak Park Elevated Railroad (preferred)...	7	6
Chicago Railways, pteptg., ctf. 1.....	a85	a85
Chicago Railways, pteptg., ctf. 2.....	a22	a21 $\frac{1}{2}$
Chicago Railways, pteptg., ctf. 3.....	a8 $\frac{3}{4}$	a8
Chicago Railways, pteptg., ctf. 4.....	a5	a5 $\frac{1}{2}$
Cincinnati Street Railway.....	*131	a131
Cleveland Railway.....	a97	97
Columbus Railway (common).....	*96	a96
Columbus Railway (preferred).....	*100	a101
Consolidated Traction of New Jersey.....	a75	a77
Consolidated Traction of N. J., 5 per cent bonds....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	a100	a100
Detroit United Railway.....	71	a70 $\frac{3}{4}$
General Electric Company.....	156	160
Georgia Railway & Electric Company (common).....	134	a136
Georgia Railway & Electric Company (preferred).....	a93	a92
Interborough Metropolitan Company (common).....	19 $\frac{3}{4}$	a18 $\frac{3}{4}$
Interborough Metropolitan Company (preferred).....	53 $\frac{1}{2}$	52 $\frac{1}{2}$
Interborough Metropolitan Company (4 $\frac{1}{2}$ s).....	79 $\frac{1}{2}$	79 $\frac{1}{2}$
Kansas City Railway & Light Company (common)....	a21	a20
Kansas City Railway & Light Company (preferred)...	a67 $\frac{1}{4}$	a66
Manhattan Railway.....	139	139
Massachusetts Electric Companies (common).....	a18 $\frac{1}{2}$	a19
Massachusetts Electric Companies (preferred).....	a88	a89
Metropolitan West Side, Chicago (common).....	a24	a24
Metropolitan West Side, Chicago (preferred).....	a68	a69
Metropolitan Street Railway, New York.....	*15	*15
Milwaukee Electric Railway & Light (preferred)....	110	110
North American Company.....	73	73 $\frac{3}{4}$
Northern Ohio Light & Traction Company.....	*44	a46
Northwestern Elevated Railroad (common).....	a21 $\frac{1}{2}$	23
Northwestern Elevated Railroad (preferred).....	a63	63
Philadelphia Company, Pittsburgh (common).....	a53	a56 $\frac{1}{8}$
Philadelphia Company, Pittsburgh (preferred).....	a42 $\frac{3}{4}$	a43
Philadelphia Rapid Transit Company.....	a17 $\frac{3}{4}$	a18 $\frac{1}{2}$
Philadelphia Traction Company.....	a83 $\frac{1}{2}$	a83
Public Service Corporation, 5% col. notes (1913)....	a100 $\frac{1}{2}$	a100 $\frac{1}{2}$
Public Service Corporation, ctf.	a106 $\frac{1}{2}$	a107
Seattle Electric Company (common).....	a109 $\frac{1}{2}$	a109 $\frac{1}{2}$
Seattle Electric Company (preferred).....	100	100
South Side Elevated Railroad (Chicago).....	a72	a73
Third Avenue Railroad, New York.....	11 $\frac{1}{8}$	11 $\frac{1}{4}$
Toledo Railways & Light Company.....	a8	a8
Twin City Rapid Transit, Minneapolis (common)....	a108 $\frac{1}{2}$	a109
Union Traction Company, Philadelphia.....	a46	a47
United Rys. & Electric Company, Baltimore.....	a18 $\frac{3}{4}$	a18 $\frac{3}{8}$
United Rys. Inv. Co. (common).....	42	42
United Rys. Inv. Co. (preferred).....	71	72 $\frac{3}{4}$
Washington Ry. & Electric Company (common).....	35 $\frac{1}{2}$	a34 $\frac{1}{2}$
Washington Ry. & Electric Company (preferred).....	89 $\frac{3}{4}$	a87 $\frac{1}{2}$
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	a103 $\frac{1}{2}$	a103 $\frac{1}{2}$
Westinghouse Elec. & Mfg. Co.	68 $\frac{1}{2}$	72 $\frac{3}{8}$
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a117	a117

a Asked. *Last sale.

The annual report of the Toronto Railway for the year ended Dec. 31, 1910, as compared with the previous year, shows the following:

	Year Ended Dec. 31,	
	1910.	1909.
Gross income.....	\$4,377,116	\$3,926,828
Operating and maintenance expenses.....	2,237,188	1,995,914
Net earnings.....	2,139,928	1,930,914
Passengers carried.....	109,415,264	98,117,991
Transfers	42,630,756	38,151,596
Percentage of operating expenses to passenger earnings	51.6	51.4

From the net earnings for 1910 there were deducted \$560,000 for dividends and \$201,288 for bond interest, etc., a total of \$761,288, and also the following payments to the city:

Percentage on earnings, \$596,297; paving charges, \$83,041; general taxes, \$48,142.

Sir William MacKenzie, the president, says in his report in part:

"It is gratifying to note that, notwithstanding heavy charges throughout the year, including an increase in wages granted the employees, the year's operations have resulted so satisfactory that your directors were enabled to transfer the sum of \$651,159 to the credit of profit and loss account.

"Large expenditures were made during the year upon capital account, the amount being \$633,786. The new car-house on Lansdowne Avenue, referred to in our last year's annual report, will be completed in a few months. Early in the year it was decided to build 100 more double-truck cars, upon the construction of which very large expenditures have been made in addition to providing the electrical equipment for same. Of these cars thirty have been completed and placed in commission, and work upon the balance is being rushed as rapidly as possible.

"In addition to the money expended on capital account, a large amount has been expended on the maintenance of the property of the company, and the board feels satisfied that the physical condition of the property has been greatly improved."

The balance sheet as of Dec. 31, 1910, shows that of \$1,302,006 set aside for renewals and depreciation \$664,127 has been used, leaving a balance in reserve of \$637,879.

A report of the nineteenth annual meeting of stockholders is included in the report. It says that Frederic Nicholls, the vice-president, who acted as chairman, referred to the large amount paid to the city of Toronto, and to the capital expenditure, and mentioned the fact that the company would have spent more if the city had not stood in its way, but the city had for years deliberately hindered the company in its progress. He said:

"In connection with the trial which has been going on, you must have seen from the newspapers that our general manager was able to show very conclusively from the official correspondence that for years we have been telling the City Council and the public that it is impossible to better conditions unless we have more streets to operate our cars on, as the present streets are being operated with as many cars as safety will permit. During the year we spent \$633,000 on betterments for the public. We have been going ahead building new cars, and we shall be ready to put them into operation as soon as the city will have the new streets ready for operation by the railway. And you must bear in mind, gentlemen, it is only after years of litigation, and after several decisions of the Privy Council in our favor, that this company is now being put in a position where it can reasonably expect to carry out what it considers its duty to the citizens by increasing its operating facilities. And the company has been blamed; it was inevitable that the company would be blamed. But the directors and the shareholders who attend the annual meetings know that the company has been endeavoring to do everything that was possible in the development of the business and for the comfort and convenience of the citizens, but we have been deliberately stopped by the Council from carrying out our policy of advancement in that respect.

"I would like to ask Mr. Fleming, our general manager, to say a few words. Mr. Fleming, as well as the directors.

but Mr. Fleming principally, has been the subject of a great deal of unjust criticism. Mr. Fleming has worked night and day in the interests of the company, and while the public may not realize it, the directors know that there is no manager of any public service corporation who, while trying to do his duty to his directors and shareholders, is more desirous of serving the public interest. The fact is that Mr. Fleming, having made a study of traffic conditions, knows better than anybody else what the public interest is, and he is advised by the best experts we can possibly get to show how far we can go in the direction of safety. The street railway in any city, more particularly though in Toronto, is always the butt of criticism, and I am sure Mr. Fleming has pursued the course that will in the end be justified."

Mr. Fleming said in part: "Not only have your officials made a careful and exhaustive study of the traffic conditions, but they have had the benefit of opinions of many railway experts from other large cities, which have substantiated our own observations that this company is giving a service not surpassed by any other company in America and equaled by few. Only during the past month we have had experts come here from a number of large cities in the United States, practical railroad men with a long and varied experience, who have gone into the witness box and sworn that in point of clean, well-lighted, sanitary, comfortable cars, car equipment, and car service in general, the Toronto Railway service compares favorably with the best systems in larger American cities, and that with regard to life-saving appliances, and safety of operation in particular, this company is the pioneer of all street railways. This is borne out by the remarks of the court that the evidence indicated that the company was not behind but actually in advance of any other company on this continent in life-saving appliances. Similar opinions have also been expressed by leading expert railway engineers who have been engaged by the city to report on the traffic situation. In view of this, it is perhaps unnecessary for me to dwell upon this point further than to report that the equipment is in first-class condition, which is evidenced by the fact that practically every car is in daily operation during the maximum traffic.

"It has been a continual and unpleasant fight for the last five years. Three years ago, when we got the judgment of the Privy Council in our favor, I thought our fighting would cease, and that, when we got an opportunity to lay down tracks upon the streets, we would be able to give the people such a service that there could be no reasonable cause for complaint. But you see the judgment of the Privy Council did not satisfy the City Council, and they appealed and again they fought and lost, and then they applied for further legislation. It was only last July, I believe, that the final order was passed and signed by the board instructing us to put down our tracks. We started during the year to do so, and I expect that during the current year we shall have probably 25 miles more of single track laid, and that we will have completed the balance of the 100 new cars now under construction. We will then be in a position where we can greatly relieve the present situation. At the present time we can do nothing; we cannot possibly operate more cars upon our present tracks.

"Almost since the franchise was secured the very fact that the company asked for something which it knew would be a benefit to the public appeared to be strongest reason why the aldermen should refuse the request. That was done simply for the purpose of giving the public the impression that their interests were being well looked after and that the railway company was always wrong, but the great majority of the public know entirely to the contrary, and it now looks as if opposition to progress on the part of the City Council of Toronto must soon be a thing of the past."

The number of passengers carried in 1910 was 109,415,264. The number of transfers issued by the company aggregated 42,630,756.

Gross income of the Toronto & York Radial Railway in 1910 was \$399,616, and maintenance and operating expenses were \$230,522, leaving a surplus of \$169,094. Interest on bonds and loans was \$113,096, leaving a net surplus of \$55,998.

Winnipeg Electric Railway

The annual report of the Winnipeg Electric Railway for the year ended Dec. 31, 1910, shows the following comparative statement:

Year Ended Dec. 31.	1910.	1909.
Gross receipts.....	\$3,284,341	\$2,623,731
Increase 1910 over 1909—25.18 per cent.....	660,610	
Operating expenses.....	1,654,833	1,320,665
Increase 1910 over 1909—25.31 per cent.....	334,168	
Operating expenses—		
Per cent of earnings.....	50.39	50.34
Net earnings.....	1,629,508	1,303,066
Increase 1910 over 1909—25.05 per cent....	326,442	
Net income per cent of capital.....	15.58	14.39
1910	6,000,000	6,000,000
1909		6,000,000
Passengers carried.....	31,369,421	26,382,773
Increase 1910 over 1909.....	4,986,648	
Transfers	8,003,038	8,925,849
Railway earnings per capita.....	10.02	10.03

From the net earnings for 1910 there were deducted fixed charges of \$694,739 and dividends of \$600,000, leaving a surplus of \$334,769.

Sir William MacKenzie, the president, says in the report in part:

"All the properties of the company have been efficiently maintained.

"Twenty-six large double-truck closed motor cars with wide vestibules, equipped with air brakes, electric heaters both in the body of the car and the motorman's vestibule, and many other modern appliances to insure the safety of passengers and operators, were constructed in the company's Winnipeg shops and put into service.

"Three new snow sweepers of latest modern design were purchased during the year and are also in service."

Gross earnings of the Winnipeg, Selkirk & Lake Winnipeg Railway for the year were \$75,725, operating expenses \$35,642 and net earnings \$40,083. Interest on bonds was \$20,000 and taxes were \$12,644, leaving a surplus of \$7,439. Gross earnings of the Suburban Rapid Transit Company for the year amounted to \$56,016, while operating expenses were \$34,107 and net earnings \$21,909. Bond interest amounted to \$25,000 and taxes to \$1,209, leaving a deficit of \$4,300.

Long Island Railroad

Ralph Peters, president of the Long Island Railroad, refers to electrical operations of the company in the annual report for the calendar year 1910 as follows:

"The gross revenues from railroad lines increased \$818,720, or 9.14 per cent, due chiefly to a general increase in the passenger traffic and to the opening of the Pennsylvania tunnels and the consequent operation of a large number of passenger trains to and from the Pennsylvania station at Seventh Avenue and Thirty-second Street, Manhattan Borough, instead of to Long Island City and the connecting ferry to the foot of Thirty-fourth Street in said borough. This resulted in a heavy loss in ferry earnings, which was further increased by the operation of trolley cars directly into Manhattan Borough over the new Queensboro Bridge.

"The number of passengers carried increased 3,511,854, or 12.8 per cent; the passenger mileage increased 52,528,703, or 12.9 per cent, and the passenger train mileage increased 651,180 miles, or 15 per cent; 496,000 miles of the increase was made by electric trains, a large portion of which represents the service to and from the Pennsylvania station, in Manhattan Borough.

"In pursuance of trackage rights granted by the Pennsylvania Tunnel & Terminal Railroad Company and the Pennsylvania Railroad Company, which operates its railroad as agent, the trains of your company began running through the East River tunnels to the Pennsylvania station in Manhattan Borough on Sept. 8, 1910. The train service consists of 101 trains in each direction, with direct service to the Far Rockaway branch, the Hempstead branch and Long Beach, and connections made at Jamaica with all steam trains running to various points on the island, and at Woodside with all Port Washington branch and White-stone branch trains. The service has been very satisfactory, although the increased earnings expected from the opening of the tunnels were not appreciable in 1910. Certain steam trains continue to run to Long Island City terminal, and this operation will be necessary until the Jamaica terminal

is completed, and the electrification of the North Shore branch is sufficiently advanced to permit of other arrangements.

"The results obtained from the operation of your electrified lines continue satisfactory both from the standpoint of economy and increased business.

"The improvement and electrification of your lines during the year consisted of finishing the four tracks between the mouth of the tunnels in Sunnyside yard and Jamaica, two tracks of the Glendale cut-off, one track from Springfield Junction to Valley Stream, two tracks from Valley Stream to Lynbrook, and single track, Lynbrook to Long Beach, third track on Far Rockaway branch, and the building of substations at Winfield and Mineola.

"The trolley lines held by your Long Island Consolidated Electrical Companies are showing improved results. No extensions were made in 1910. Six pay-as-you-enter cars were added to the equipment of the Ocean Electric Railway.

"The Public Service Commission for the First District approved your company's application to eliminate the grade crossings on the Port Washington division through Flushing, and the State and city will contribute \$400,000 toward this work. This will enable your company to abolish a number of grade crossings, extend second track to Great Neck and Whitestone, and electrify both branches so that through electric service can be operated to the Pennsylvania station.

"The general business of your company shows a healthy condition. The average number of daily commuters per month shows an increase of from 6387 in 1905 to 11,869 in 1910. Of the total number of passengers carried, amounting to 39,978,615, 28.8 per cent were commuters, 17.6 per cent local passengers on Atlantic Avenue, 4.4 per cent Rockaway Beach passengers from Delancey Street, New York, and the balance general first-class business to and from all points on the island."

Elevated Railroad Merger in Chicago

Announcement was made in Chicago on May 16 that Henry A. Blair had concluded negotiations by which the National City Bank of New York organizes a syndicate to furnish \$22,000,000 cash to be offered to stockholders of all the elevated railways in Chicago for the purpose of effecting a consolidation. It was stated that provision was made for a first and refunding bond issue to take up the \$18,000,000 Northwestern Elevated 4 per cent bonds due on Sept. 1, 1911, and that an agreement was made for an offer of either securities or cash to stockholders of the various companies. Mr. Blair announced that later in the week he would make public the details of the offer to the stockholders.

This consolidation will unite all the elevated roads in Chicago, which operate 177 miles of track and carry about 500,000 passengers daily. It is reported also that the merger of the elevated roads is preliminary to a final consolidation of these roads with the surface street railway transportation systems of Chicago, and possibly with the Commonwealth Edison Company, which supplies electrical energy for a great proportion of the mileage.

The syndicate, which is said to have agreed to Mr. Blair's program for consolidation of the elevated lines, includes the National City Bank of New York, Harris, Forbes & Company, Lee, Higginson & Company and others. The prices offered in cash to stockholders of the several elevated roads and which are said to have been acted upon favorably by the boards of directors are reported as follows: South Side Elevated Railroad, 75; Metropolitan West Side Elevated Railway, common, 27.5, and preferred, 72.5; Northwestern Elevated Railroad, common, 30, and preferred, 70.

Indianapolis & Louisville Traction Company, Scottsburg, Ind.—Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 853, of the plan formulated for the reorganization of the Indianapolis & Louisville Traction Company. It is proposed to issue new securities as follows: \$1,500,000 of 5 per cent, thirty-year, first-mortgage bonds, dated Jan. 1, 1911; \$600,000 of 6 per cent cumulative preferred stock and \$600,000 of common stock. The capitalization of the present company consists of \$1,250,000 of first-mortgage bonds, \$334,500 of second-mortgage bonds,

\$100,000 of preferred stock, and \$2,500,000 of common stock. According to the plan for the reorganization of the company the present first-mortgage bondholders will receive 70 per cent in new first-mortgage bonds and 30 per cent in common stock; the second-mortgage holders will receive 150 per cent in new preferred stock and \$200,000 in new common stock, and the preferred stockholders will receive 75 per cent in new preferred stock and 25 per cent in new common stock. Of the \$1,500,000 of new first-mortgage, thirty-year bonds, \$875,000 will go to the present holders of first-mortgage bonds, \$25,000 will be put in the treasury for working capital and \$600,000 will be issued for improvements at 80 per cent of the actual cost. Of the \$600,000 of 6 per cent cumulative preferred stock, \$501,750 will go to the holders of the second-mortgage bonds, \$75,000 will go to holders of the present preferred stock and \$23,250 will be placed in the treasury. Of the \$600,000 of common stock \$375,000 will go to present first-mortgage bondholders, \$200,000 will go to the second-mortgage bondholders and \$25,000 will go to the present preferred stockholders.

Norwich & Westerly Railway, Norwich, Conn.—Judge Noyse, in the United States Circuit Court at New Haven, Conn., on May 13, 1911, signed a decree of foreclosure of a mortgage on the Norwich & Westerly Railway, at the request of the bondholders, after passing to Robert W. Perkins, Norwich, as master, the question of the disposal of moneys in the hands of Frank B. Brandegee, the receiver of the company. The bonds outstanding had a par value of \$750,000, and with accrued interest the claim of the bondholders was \$933,302. The debts of the company above the mortgage are about \$200,000.

Otsego & Herkimer Railroad, Oneonta, N. Y.—At a meeting of the directors of the Otsego & Herkimer Railroad held in New York on May 9, 1911, William B. Reed, Jr., Brewster, N. Y., and John Reynolds, New York, N. Y., were elected directors to succeed H. T. Jennings and James W. McCabe, resigned, and William B. Reed, Jr., was elected vice-president of the company in place of Mr. Jennings. An application made by the company about two years ago to the Public Service Commission of the Second District for permission to issue securities is still before that body owing to the fact that the property has passed through several receiverships and that principles are involved that have not been before the commission heretofore. In acting upon the application, the commission wishes to make its decision a precedent for future decisions involving the same questions. It is believed now that the order is ready for promulgation. The company operates between Oneonta and Herkimer, and has about 65 miles of track. The earnings of the road during the present management have increased materially, although census reports show no increase in population of towns through which the road operates, except the two terminals. The company does a general passenger and freight business, carries express matter on express cars and operates a railroad post-office car. A considerable part of the business is done in the summer.

Philadelphia Company, Pittsburgh, Pa.—The report of James H. Reed, president of the Philadelphia Company for the year ended March 31, 1911, made public recently, shows earnings as follows: Gross earnings, \$20,140,035; operating expenses and taxes, \$10,918,214; net earnings, \$9,221,821; other income, \$277,586; total income, \$9,499,407; deductions from income, \$1,466,973; net income before deducting fixed charges, improvements, betterments, extensions, etc., \$8,032,434; fixed charges, \$3,411,719; net income after deducting fixed charges, \$4,620,714; improvements, betterments, extensions and extraordinary maintenance expenses, \$1,905,751; car trust notes issued Dec. 1, 1905, retired during the year, \$40,000; net income, surplus for the year, \$2,674,963; dividends on preferred stocks, \$382,961; balance, surplus for the year, \$2,292,002.

Philadelphia (Pa.) Rapid Transit Company.—The Chester & Philadelphia Railway, which, as noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, page 853, is controlled by the Philadelphia Rapid Transit Company, was incorporated in Pennsylvania in June, 1910, as the successor of the Philadelphia & Chester Railway. A new first mortgage has been made by the company to the Real Estate Title, Insurance & Trust Company, Philadelphia, Pa., as trustee,

Traffic and Transportation

Booming Baltimore

William A. House, president of the United Railways & Electric Company, Baltimore, Md., referred in part as follows in the pamphlet report of the company for the year ended Dec. 31, 1911, to the part which the company has played in booming Baltimore in the past, the idea of booming Baltimore having been taken up actively recently by the Greater Baltimore Committee:

"'Booming Baltimore' has recently been a subject of much discussion. Your company desires to participate and assist in this movement in every way. We believe that we have been largely a contributing factor in making possible the progress accredited to our city and suburban sections. Public service corporations come in for more or less unjust criticism in many cities of the country, but we feel that a substantial bond of friendship exists between the public and your company. No organization has labored more persistently to spread the good repute of the city. It has expended large sums to improve its service. The street railway hews the path for future suburban settlement and roads begin to radiate to right and left from its rails. These roads become streets and are gradually improved with homes. These railway lines into the suburbs and country are constructed and operated at first at a loss. In some instances they are still being maintained at a loss—that is, after the tracks are laid and equipment purchased, the revenue does not pay bare operating expenses, regardless of interest on investment or provision for depreciation. Yet your company has acted in this way as a developer of the city—as the agency through which the urban centre has expanded. It thus becomes possible for large numbers of our people to have their own homes, no matter where their work may be, and the city's fame as a residential town is thereby enhanced. The congestion of the population into crowded central sections and the existence of tenements becomes less necessary, and in this way health conditions are improved. The developed property is made available for a greatly increased valuation upon the tax books, and the public revenue is thereby increased.

"This much for the railway's part in helping the city to spread. Its course has been equally noteworthy in the development of the central portions of Baltimore. When protest is made about prevailing tax rates the reply is that Baltimore is now in a period of reconstruction and municipal development. Your company knows this better than any other taxpayer. Streets are repaired; street beds are torn up; grades are changed, and scarcely a step forward is made without requiring your company to bear a large and increasing expense in relaying its tracks or in reconstructing its lines.

"The growth of your company's business means much to every Baltimorean, for through the park tax the people of the city are directly benefited.

"Instead of expanding, developing and increasing the efficiency of its service, the company could well have lagged behind and have diverted a portion of its income to dividends to its stockholders, as has been done in some other cities. Your company, however, has not pursued this policy and the improvements, therefore, have been made in this sense at the expense of the common stockholder, who has not yet received a dividend upon his stock. The stockholder, for his reward, must look to the future, to the working out of a fair return upon these expenditures and to just treatment in turn by the public and the public authorities."

Pensions for Employees of American Railways Company

The American Railways Company, Philadelphia, Pa., has taken steps to establish a pension fund for its employees. In outline it provides that any employee of the company, or of its subsidiary companies or their predecessors, who has served continuously not less than twenty years and attained the age of sixty-five years may retire, or may be recommended for retirement by reason of disability, by his employing officer, or having attained the age of seventy years must retire upon a pension which will be 2 per cent of the average compensation for the last ten years of service multiplied by

to secure not more than \$600,000 of 5 per cent bonds dated July 1, 1910, and due 1940, but callable on and after July 1, 1915, at 105. Of the \$600,000 of bonds \$500,000 is now outstanding. The stock of the company is \$485,000. The officers are: Charles C. Kruger, president; R. B. Selfridge, secretary; I. H. Silverman, treasurer.

Toledo & Indiana Railway, Toledo, Ohio.—The Spitzer-Rorick Company, Toledo, Ohio, has purchased the entire issue of \$400,000 of 5 per cent, twenty-year bonds of the Toledo & Indiana Railway, and has offered the bonds for sale at 97. The bonds are redeemable after two years at 102½.

United Public Utilities Company, New Orleans, La.—The United Public Utilities Company, the incorporation of which was noted in the ELECTRIC RAILWAY JOURNAL of May 13, 1911, page 858, is to succeed the Southern Electric Securities Company, the security holdings of which were sold at auction in October, 1910.

United Railroads of San Francisco.—The annual report shows that its gross earnings were \$7,653,488 for the fiscal year ended Dec. 31 last. This compares with \$7,455,865 for the previous year. Operating expenses increased from \$4,242,549 in 1909 to \$4,301,169 in 1910, leaving net earnings for 1910 at \$3,352,319.

Dividends Declared

- American Railways, Philadelphia, Pa., quarterly, 1½ per cent.
- Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.
- City Traction Company, Pittsburgh, Pa., \$1.50.
- Columbus (Ohio) Railway, quarterly, 1¼ per cent, common.
- Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent, common.
- Metropolitan West Side Electric Railway, Chicago, Ill., quarterly, ¾ of 1 per cent, preferred.
- Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.
- Washington Railway & Electric Company, Washington, D. C., 2½ per cent, preferred; 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS COMPANY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	Apr. '11	\$318,954	.....	.....	.....	.....
1 "	" '10	302,654	.....	.....	.....	.....
10 "	" '11	3,314,568	.....	.....	.....	.....
10 "	" '10	3,112,817	.....	.....	.....	.....
BROCKTON & PLYMOUTH STREET RAILWAY.						
1 m.,	Feb. '11	\$6,420	\$5,799	\$621	\$1,559	*\$938
1 "	" '10	6,597	6,231	366	1,785	*1,419
12 "	" '11	120,046	83,249	36,796	19,719	17,077
12 "	" '10	130,442	94,725	35,717	21,008	14,709
BROOKLYN RAPID TRANSIT SYSTEM.						
1 m.,	Dec. '10	\$1,837,494	\$1,120,251	\$717,243	\$635,564	\$81,679
CENTRAL PARK, NORTH & EAST RIVER RAILROAD.						
1 m.,	Dec. '10	\$50,271	\$51,028	*\$758	\$2,414	*\$3,171
CONEY ISLAND & BROOKLYN RAILROAD.						
1 m.,	Dec. '10	\$106,878	\$75,952	\$30,926	\$32,413	*\$1,487
EL PASO ELECTRIC COMPANY.						
1 m.,	Feb. '11	\$54,850	\$31,050	\$23,800	\$8,341	\$15,459
1 "	" '10	53,839	27,753	26,086	8,486	17,600
12 "	" '11	645,479	376,827	268,653	98,479	170,174
12 "	" '10	615,870	359,199	256,671	99,530	157,141
GALVESTON-HOUSTON ELECTRIC COMPANY.						
1 m.,	Feb. '11	\$99,928	\$65,932	\$33,997	\$24,620	\$9,376
1 "	" '10	89,899	61,977	27,922	23,178	4,743
12 "	" '11	1,337,550	801,229	536,321	293,218	243,104
12 "	" '10	1,219,086	726,238	492,848	266,625	226,223
HUDSON & MANHATTAN RAILROAD.						
1 m.,	Dec. '10	\$332,296	\$109,700	\$222,596	\$210,928	\$11,668
INTERBOROUGH RAPID TRANSIT COMPANY.						
1 m.,	Dec. '10	\$2,787,710	\$1,214,317	\$1,573,392	\$1,046,257	\$527,136
JACKSONVILLE ELECTRIC COMPANY.						
1 m.,	Feb. '11	\$46,973	\$27,025	\$19,948	\$10,161	\$9,787
1 "	" '10	43,690	22,802	20,888	9,132	11,756
12 "	" '11	585,249	318,091	267,158	115,058	152,100
12 "	" '10	502,619	271,677	230,942	112,439	118,503
METROPOLITAN STREET RAILWAY.						
1 m.,	Dec. '10	\$1,132,416	\$738,925	\$393,491	\$329,440	\$64,051
NEW YORK & QUEENS COUNTY RAILWAY.						
1 m.,	Dec. '10	\$8,570,207	\$100,379	*\$14,677	\$26,049	\$40,726
THIRD AVENUE RAILROAD.						
1 m.,	Dec. '10	\$297,425	\$146,819	\$150,607	\$56,510	\$94,096

the number of years continuous service. The maximum pension, however, is not to exceed \$30 per month. The board has appointed a committee to work out the details of the scheme and to co-operate with the employees relief associations which have been organized on most of the properties which the company controls, and to affect organizations among the employees upon roads where they do not exist at present. The board will also consider the establishment of saving funds. The pension system is to become effective on July 1, 1911, after which date no one having attained the age of forty-six will be permitted to enter the employ of the company unless recommended by the committee on pension system and approved by the board of directors.

Safety Gates in Louisville.—The Louisville (Ky.) Railway has put its new safety gates in operation on the 23 cars of the Portland Avenue line. The gates are controlled by the conductor. The gates prevent passengers from entering or leaving cars while the cars are in motion.

The Meeting of the Joint Committee on Express and Freight Accounting.—The meeting of the joint committee on express and freight accounting of the American Electric Railway Transportation & Traffic Association and the American Electric Railway Accountants' Association has been set for May 27, 1911, at Cincinnati, Ohio.

Contract for Street Sprinkling in Memphis.—The City Commissioners of Memphis, Tenn., have contracted with the Memphis (Tenn.) Street Railway to sprinkle the streets, two cars to be run at \$208.83 a month each. A clause was defeated which was intended to provide that when no sprinkling cars were sent out, as on rainy days, the lost time should be made up later.

Attractions at Winona Lake.—The Winona Interurban Railway, Warsaw, Ind., has contracted with Glen H. Curtiss to give personal exhibitions with his biplane at Winona Lake, Ind., on July 18, 1911. One flight will be made from land and another from water. The company is also securing \$25,000 worth of postal-card views of its line and attractions which are to be distributed free for advertising purposes.

Columbus, Delaware & Marion Railway Puts on Limited Cars.—The Columbus, Delaware & Marion Railway, Marion, Ohio, is operating a limited service in conjunction with the limited cars of the Cleveland, Southwestern & Columbus Railway, which reach Marion from the north. The limited cars run between Columbus and Marion in fifty-seven minutes. The schedule time between Columbus and Cleveland will be four hours and fifty minutes.

Winnipeg Employees Renew Agreement with Company.—The employees of the Winnipeg (Man.) Street Railway have decided to renew their agreement with the company with a few minor changes and accept the scale of wages offered. All of the men who were discharged at the time of the strike in the winter will be taken back. The new scale of wages follows: First six months, 23 cents per hour; second six months, 25 cents; second year, 26 cents; third year, 28½ cents; fourth and succeeding years, 29 cents.

Additional Transfer Points in Boston.—Under an order issued by the Railroad Commission of Massachusetts eight new free transfer points will be established on the lines of the Boston Elevated Railway, and existing transfer privileges at Northampton and Washington Streets and at the Church Street entrance to the Public Garden will be enlarged. The order is based on petitions of Mayor Fitzgerald and of improvement associations and citizens. It will become effective July 1, 1911, but as many changes as possible are to be completed before that time.

Decision in Albany Fare Case.—The Court of Appeals has decided that the Cohoes Railway must obey the Barnes act of 1905, reducing the fare between Albany and Rensselaer from 6 cents to 5 cents. The company claimed that 5 cents was for fare and the other cent was for tolls to be paid to a bridge company for permitting cars to cross. The decision of the commission in this case was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 3, 1910, page 1127, and the argument before the court on April 24, 1911, was referred to in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, page 767.

Indianapolis Trade Association Trips.—Members of the Indianapolis Trade Association made a two-day trip over the Lafayette division of the Terre Haute, Indianapolis & Eastern Traction Company's line recently in the interest of trade in Indianapolis. Every town and city on the division was visited. Three cars were required to carry the 400 members of the party. At Crawfordsville the cars were switched to the Indianapolis, Crawfordsville & Western Traction Company's line, over which the return trip was made. Last year the association made a number of similar trips which proved very profitable.

Long-Distance Excursion on Illinois Traction System.—On May 14, 1911, the Illinois Traction System put in effect a two-day, round-trip excursion to St. Louis from Peoria, Bloomington, Lincoln and Springfield. Peoria and Bloomington are each 175 miles from St. Louis, and Springfield is 100 miles from St. Louis. The steam roads had put into effect a rate of \$1 for the round trip, which rate was met by the Illinois Traction System and resulted in more than 2000 people taking the ride of 350 miles. On May 14 1244 passengers purchased tickets from Peoria to St. Louis and return, 400 from Bloomington, 100 from Lincoln and 500 from Springfield.

Decision in Regard to Baltimore Suburban Fare.—The Maryland Public Service Commission in the case of the Allied Committees of the Suburbs of Baltimore, growing out of the commission's order directing the withdrawal by the United Railways & Electric Company of the residents' books issued on the Catonsville, Govanstown and Emory Grove lines, takes the view that the form of the ticket heretofore issued was unduly discriminatory, as it is not open to purchase by all persons who may desire to use the railway, but it is only open to residents, and it, therefore, refuses to order the restoration of the tickets. The commission recommends the issuance of some form of commutation tickets open to the general public.

Accidents on Interstate Electric Railways.—The Interstate Commerce Commission has issued Accident Bulletin No. 38, which contains the record of railway accidents in the United States during the three months ended Dec. 31, 1910. The electric railways which come within the jurisdiction of the commission reported 114 persons killed during the quarter and 1031 injured. There were forty-six collisions and twenty-one derailments. Thirty-four passengers and six employees were killed in collisions and one employee was killed by a derailment. The total number of passengers killed was forty-two and the total number of employees killed was twenty. Thirty-seven trespassers were struck or run over, of which number twenty-five were killed and twelve were injured.

Plans to Meet Court's Interpretation of Minneapolis Car Ordinance.—W. J. Hield, vice-president and general manager of the Twin City Rapid Transit Company, Minneapolis, Minn., has issued the following statement in regard to the plans of the company to meet the requirements of the so-called straphangers' ordinance as interpreted by Judge Willard, reference to whose ruling was made in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, page 768: "Orders have been placed to equip all Minneapolis cars with 'capacity' signs as required by the service ordinance, and when this work is complete the officers of the company plan to comply to the best of their ability with the terms of the ordinance as outlined by Judge Willard. It may take a week or two to get the signs in the cars, during which time the necessary instructions will be given to the trainmen. It is the intention of the company to make a consistent effort to comply with the order of the City Council."

Central Pennsylvania Traction Company to Reduce Suburban Fare.—The Central Pennsylvania Traction Company, Harrisburg, Pa., will issue round-trip tickets to Rockville and return, and vice versa, for 15 cents, on recommendation of the State Railroad Commission. At present the fare is 10 cents each way. Since the opening of Wildwood Park and the Academy there has been a general demand for reduced fares to Rockville. The 15-cent round-trip tickets will entitle the holders to the same transfer privileges that they now have. In a statement in regard to the matter the commission said: "The respondent stated to the commission that a flat rate of 5 cents would not pay for the cost

of operation, and such being the case the commission, in accordance with a decision of the Supreme Court in the 2-cent rate fare, held that a recommendation for a 5-cent fare would not be sustained by the courts. It was therefore finally decided to make the round trip 15 cents, which rate will be put into effect within a few days."

Prize Essays by St. Louis Employees on Prevention of Accidents.—Bulletins have been posted at all carhouses of the United Railways, St. Louis, Mo., announcing that eight prizes will be awarded by the company for the best essays on how to avoid accidents written by the 2800 motormen and conductors of the system. The prizes are in cash, and four of them, in amounts of \$100, \$50, \$25 and \$10, are offered for the conductors and the same number for the motormen. New ideas are especially desired. The papers must not contain more than 500 words. They must be submitted by July 1, 1911, and the judges will pass upon them without knowing who wrote them. The awards will be made about Aug. 1, 1911, when the prize winners will be invited to read their productions at a meeting of their fellow-employees in the entertainment hall established by the company for the men. The competition is open to men who have been with the company since August, 1910. The identity of the judges will not be made public until after the awards are announced.

Recent Work of the Indiana Railroad Commission.—The Indiana Railroad Commission has inspected the automatic block signal system now in operation on the New York, Chicago & St. Louis Railroad. The commissioners and a number of officers of electric railways in the State witnessed a successful test of the Gill selective signal system on the Rushville division of the Indianapolis & Cincinnati Traction Company's line on May 12, 1911. The commission has decided to exercise the authority conferred by the last Legislature and grant permits to interurban electric railways to cross industrial steam roads without stopping their cars. Under a rule of the commission promulgated in accordance with previous legislation the conductor of an electric car was compelled to cross all such steam railroad tracks in advance of his car and signal the motorman to proceed. In localities where mining and manufacturing are carried on extensively this rule has caused a considerable loss of time. The commission has been asked to investigate the alleged discrimination on the part of steam railroads against the electric railways in the delivery of coal for use in their power houses.

Improvements in Interurban Service of the Detroit United Railway.—The new schedules of the Detroit (Mich.) United Railway, which go into effect on May 24, 1911, will affect about every line of the company, except the one to Jackson, the timetable of which was revised about a month ago. On the Rapid Railway the limited cars will leave Detroit at 7:15 a. m., and every two hours to 7:15 p. m. The company will also place an Algonac limited in operation, as an experiment, in response to requests of Detroit people who have cottages at Fair Haven and Pearl Beach. It will leave Detroit daily except Sunday at 5:15 p. m., as a section of the regular limited, and will run as a limited to Anchorville, where it will branch off for Algonac, running as a fast local and making all local stops to Marine City. Returning, the Algonac limited will leave Marine City daily, except Sunday, at 6:46 a. m., making all local stops to Anchorville, from which place it will come in on limited time, reaching the City Hall, Detroit, at 8:50 a. m. In addition to this a car will be run from Fairhaven and Pearl Beach Mondays only, as a local, so as to reach the City Hall, Detroit, at 7:50 a. m. The Flint division limited service will be increased to seven northbound and six southbound, all operating between Detroit, Flint and Saginaw. These limiteds will leave Detroit at 6:25 a. m., and every two hours to 6:25 p. m. There will also be an increase in the number of limited cars between Detroit and Toledo to seven. These cars will leave Detroit at 7:30 a. m. and every two hours to 7:30 p. m. The new schedule fits in with the limited schedule of the Lake Shore Electric Railway from Toledo to Detroit, so that passengers can make connections. It is expected before the end of June to establish through service without change of cars between Detroit, Sandusky, Lorain and Cleveland.

Personal Mention

Mr. Lee Landis has been appointed general manager of the Ocean Shore Railway, San Francisco, Cal.

Mr. A. G. Maish resigned as general manager of the Des Moines (Ia.) City Railway, effective on May 15, 1911.

Mr. W. G. Owens has resigned as superintendent and purchasing agent of the San Angelo (Tex.) Street Railway.

Mr. William B. Reed, Jr., has been elected vice-president of the Otsego & Herkimer Railroad, Oneonta, N. Y., to succeed Mr. H. T. Jennings, resigned.

Mr. Ray Parker has been appointed assistant auditor of the Petaluma & Santa Rosa Railway, Petaluma, Cal. Mr. Parker was formerly connected with the San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.

Mr. Michael C. Buckley has been appointed city traction expert of Chicago, Ill., by Mayor Harrison of that city to succeed Mr. Millard B. Hereley. Mr. Buckley is president of the organization which exists among the employees of the Chicago City Railway.

Mr. William E. Rolston, whose appointment to the Des Moines (Ia.) City Railway was announced in the *ELECTRIC RAILWAY JOURNAL* of April 15, 1911, has been given the title of general superintendent of the Des Moines City Railway and the Inter-Urban Railway, Des Moines, Ia.

Mr. George S. Henry, who has been traffic manager of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., since the road was placed in operation, has resigned. Mr. C. O. Warfel, who has heretofore been chief clerk to the general manager, will succeed to the duties performed previously by Mr. Henry.

Mr. C. A. Cahill has been appointed chief engineer of power plants of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to succeed Mr. C. J. Davidson, whose resignation to enter the consulting engineering field in Chicago with Mr. Fay Woodmansee was noted in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911.

Mr. Sibbald MacDonald has recently been appointed auditor of the Duluth (Minn.) Street Railway, to succeed Mr. S. L. Reichert, who will continue as secretary and treasurer of the company. Mr. Reichert was appointed treasurer early in 1910 to succeed Mr. L. Mendenhall, who continues as a director of the company. Mr. MacDonald has been acting as Mr. Reichert's assistant for some years.

Mr. Earle W. Chafee, engineer of the Essex division of the Public Service Railway, Newark, N. J., sailed from New York on May 6, 1911, to become assistant chief engineer of the board of works of the Republic of Panama. Mr. Chafee was graduated from the United States Naval Academy at Annapolis. He began active railway work as instrument man with the Public Service Railway in 1906 and was advanced to the office of division engineer.

Mr. R. H. Wyatt, general freight and express agent of the Louisville & Interurban Railroad, Louisville, Ky., which operates the suburban lines controlled by the Louisville Railway, has been appointed general freight and passenger agent of the company in charge of all traffic over the lines. Mr. Wyatt is forty-seven years old and entered the service of the Louisville Railway twenty-seven years ago as a driver of one of the company's mule cars.

Mr. F. C. Potvin, formerly chief clerk to Mr. H. G. Kessler, secretary and auditor of the Saginaw-Bay City Railway, Saginaw, Mich., the gas and electric companies in Saginaw and Bay City, including the Saginaw Power Company and the Bay City Power Company, has been appointed to succeed Mr. Kessler with these companies, Mr. Kessler having been appointed general auditor of Hodenpyl, Hardy & Company, as noted elsewhere in this column.

Mr. C. O. Warfel has been made chief clerk to the president of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. Mr. Warfel began his railroad career with the Cincinnati, Hamilton & Dayton Railroad in the transportation department. In 1904 he entered the service of the Indianapolis & Cincinnati Traction Company as storekeeper. He was promoted to be a dispatcher and later entered the traffic department as a solicitor. Shortly afterward he was made general agent at Indianapolis.

Mr. Oscar Lively has been appointed superintendent of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind. Mr. Lively entered the service of the Indianapolis, Shelbyville & Southeastern Traction Company in 1903 as dispatcher. Later he was promoted to the position of chief dispatcher. When the Shelbyville line was consolidated with the Connerville division he remained with the company as trainmaster of the Shelbyville division and shortly afterward was made trainmaster of both divisions of the road.

Mr. C. O. Sullivan has resigned as general freight and passenger agent of the Winona Interurban Railway, Warsaw, Ind., to become traffic manager of the Western Ohio Railroad at Lima, Ohio, to succeed Mr. C. C. Collins, whose appointment as traffic manager of the Lehigh Valley Transit Company is noted elsewhere in this column. Mr. Sullivan advanced through the traffic departments of steam railroads to the position of traveling freight agent with the Rock Island Railroad. He resigned from the Rock Island Railroad to enter the employ of the Winona Interurban Railway.

Mr. H. G. Kessler, who has been secretary and auditor of the Saginaw-Bay City Railway, Saginaw, Mich., the gas and electric companies in Saginaw and Bay City, including the Saginaw Power Company and the Bay City Power Company, has been appointed general auditor of Hodenpyl, Hardy & Company, New York, N. Y., under whose management have come the public service properties mentioned on page 902 of this issue of the *ELECTRIC RAILWAY JOURNAL*. Mr. Kessler was formerly connected with the Westchester Lighting Company. He was appointed to the companies at Saginaw and Bay City some time ago, and about three years ago he was elected secretary of the companies.

Mr. Melville Dozier, Jr., has resigned as assistant general manager of the Northern Electric Railway, Chico, Cal., to enter the construction business in Sacramento with the Dozier Construction Company. Mr. Dozier was born in Santa Rosa, Cal., and was educated in the public schools in that city and in Los Angeles. He became a civil engineer and entered the employ of the Southern Pacific Railway, of which he was finally made assistant engineer. He resigned from this company to become chief engineer of the maintenance of way department of the Pacific Electric Railway. He was also connected with the Vallejo Northern Railroad as president.

Mr. Frank S. Cummins has resigned as traffic manager and chief engineer of the Inter-Urban Railway, Des Moines, Ia., and has been elected vice-president of the Union Securities Company, Des Moines. Mr. Cummins' business career has been confined for the most part to railway work. He was connected with the engineering departments of the Chicago, Rock Island & Pacific Railway and other railroads and has been with the Inter-Urban Railway for the last nine years as traffic manager and chief engineer. As announced in the *ELECTRIC RAILWAY JOURNAL* of May 13, 1911, Mr. Cummins will be succeeded as traffic manager of the Inter-Urban Railway by Mr. C. T. Chapman.

Mr. W. T. Maddox, whose appointment as superintendent of the Southern division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines was announced in the *ELECTRIC RAILWAY JOURNAL* for April 29, 1911, has been connected with the Pacific Electric Railway and the Los Angeles & Redondo Railway for the last nine years and has served these companies as train dispatcher, trainmaster, general freight and passenger agent and superintendent. Before becoming connected with the Pacific Electric Railway, Mr. Maddox served the Missouri Pacific Railroad and the Missouri, Kansas & Texas Railroad for nineteen years as operator, agent, clerk to the superintendent, train dispatcher and chief train dispatcher.

Mr. H. Wallerstedt has resigned as assistant engineer of the Pennsylvania Tunnel & Terminal Railroad, New York, N. Y., for which he served under Mr. George Gibbs, chief engineer of electric traction and station construction. Mr. Wallerstedt was born in Sweden in 1869. He came to the United States in 1889 and entered the employ of the Chicago office of the General Electric Company. Subsequently he was connected with the Metropolitan West Side Elevated Railway, Chicago, Ill., Sargent & Lundy, Chicago, and the

Illinois Steel Company. In 1899 he entered the employ of the Manhattan Elevated Railway, which was then being electrified, and continued with that company and its successor, the Interborough Rapid Transit Company, until 1906, as engineer of ear equipment. He resigned from the Interborough Rapid Transit Company to become connected with Ford, Bacon & Davis, New York, N. Y.

Mr. J. C. McPherson, whose appointment as superintendent of the north division of the Pacific Electric Railway, Los Angeles, Cal., was noted in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, began his railroad work in 1884 in the machine shop of the Atchison, Topeka & Santa Fé Railroad at Raton, N. M., and also served this company in the boiler and blacksmith shops. He was promoted to the position of fireman in 1886. In 1889 Mr. McPherson was made a locomotive engineer with the company and continued with the company in that capacity until 1895, when he moved to Los Angeles and became connected with the Los Angeles-Pacific Railway. He has served the Los Angeles-Pacific Railway and the Pacific Electric Railway as conductor, motorman, timekeeper, dispatcher, chief dispatcher, trainmaster, assistant superintendent at Pasadena and superintendent of the city division of the Pacific Electric Railway at Los Angeles.

Mr. C. C. Collins has resigned as traffic manager of the Western Ohio Railroad, Lima, Ohio, to become traffic manager of the Lehigh Valley Transit Company, Allentown, Pa., succeeding Col. E. C. Spring, whose appointment as assistant to the president of the Philadelphia & Western Railway, Upper Darby, Pa., was announced in the *ELECTRIC RAILWAY JOURNAL* of April 29, 1911, page 769. Mr. Collins began his railroad career with the Columbus & Eastern Railroad in 1890 as chief clerk in the traffic department. After the completion of the Columbus, Sandusky & Hoeking Railway and the merging of the Columbus & Eastern Railroad with that property he retained this position and was later appointed division freight agent of the Columbus, Sandusky & Hoeking Railway at Toledo. In 1898 this road was sold to the Pennsylvania lines, and Mr. Collins engaged in business in Porto Rico for several years. After his return to Ohio he entered the employ of the Detroit, Toledo & Ironton Railroad, but resigned from that company to accept a position with the Columbus, London & Springfield Railway, with which he remained as general express and passenger agent until 1907. In the latter year he entered the service of the Western Ohio Railroad as general freight agent, and in 1908 was made traffic manager of the system in charge of both the passenger and freight departments. Mr. Collins was one of the organizers of the Central Electric Railway Association and has always taken active interest in its affairs.

Mr. H. A. Mullett, who for the last two years has been assistant superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has



H. A. Mullett

been appointed superintendent of rolling stock to succeed Mr. E. W. Olds, resigned. Mr. Mullett was graduated from Rose Polytechnic Institute in 1904. Previous to his appointment as assistant superintendent of rolling stock of the Milwaukee Electric Railway & Light Company he was electrical engineer of the rolling stock department of the company for three years. Before becoming connected with the Milwaukee Electric Railway & Light Company he was an assistant engineer in the railway department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, with which he served an apprenticeship course. Mr. Mullett was also connected for a short time with the St. Louis (Mo.) Transit Company and with the Weber Gas & Gasoline Engine Company, Kansas City, Mo.

Construction News

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

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

RECENT INCORPORATIONS

***Little Rock, Pine Bluff & Eastern Traction Company, Little Rock, Ark.**—Chartered in Arkansas to build an electric railway to connect Little Rock and Pine Bluff via Altheimer, Stuttgart, Helena and Clarendon. Capital stock authorized, \$1,500,000. Common stock, \$1,000,000; preferred stock, \$500,000. Officers: C. C. Kavanaugh, president; J. M. Mahaffey, secretary, and E. W. Jackson, treasurer.

***Sacramento-Folsom Electric Railway, Sacramento, Cal.**—Application for a charter has been made by this company in California to build an electric railway to connect Sacramento and Folsom. Capital stock, \$1,000,000. Directors: Francis V. Keesling, Herman H. Grau, Ernest L. Brune, J. W. Cook and Otto K. Grau.

***Chicago, Waukegan & Woodstock Traction Company, Springfield, Ill.**—Incorporated in Illinois to build an electric railway between Waukegan and Woodstock via Waukegan, McHenry and Lake Counties. Capital stock, \$50,000. Headquarters, Chicago. Incorporators: Charles A. Spenny, Columbus, Ohio; Irving B. Stevens, W. P. MacCracken, Peter B. Olsen and H. S. Hedberg, all of Chicago.

***Piedmont Railway & Electric Company, Burlington, N. C.**—Incorporated in North Carolina to build an electric railway to connect Burlington, Graham, Haw River, Hope-dale, Carolina and Glenco. Capital stock, \$1,000,000. Incorporators: J. M. Cook, A. L. Davis, Burlington, and E. S. Parker, Graham.

North Randall Railway, Cleveland, Ohio.—Incorporated in Ohio to build a 7-mile electric railway between Cleveland and the race track at Randall. The company is negotiating to rent power and equipment from the Cleveland Railway. [E. R. J., May 6, '11.]

Dallas-Denton Interurban Railway, Dallas, Tex.—Application for a charter will be made by this company in Texas to build an electric railway to connect Dallas and Denton via Grapevine and Irving. Capital stock, \$500,000. Applicants for the charter are: Alvin C. Owsley, Denton; Curtis Hancock and J. H. Nelson, Western Heights; E. A. Gebard, Irving, and P. B. Hunt, Dallas. [E. R. J., May 13, '11.]

FRANCHISES

***Alabama City, Ala.**—B. T. Head and associates have received a franchise from the City Council to build an electric railway in Alabama City. This is part of a plan to build a line to connect Alabama City, Gadsden and Attalia.

Newton, Ark.—The Arkansas Valley Interurban Railway, Little Rock, has received a twenty-year franchise from the Council to build its tracks through Newton. This line will connect Sedgwick, Newton and Halstead. O. A. Boyle, Wichita, Kan., general manager. [E. R. J., April 1, '11.]

Oakland, Cal.—The Oakland Traction Company has received a franchise from the City Council to extend its lines from East Sixteenth Street along the Foothill Boulevard to Ygnacio Avenue, and for a line along Market Street, from San Pablo Avenue to Fifty-fifth Street, with the stipulation that the company shall widen Market Street for five blocks.

Albany, Ga.—C. W. Rawson and associates have received a perpetual franchise from the City Council to build a three-mile electric railway in Albany. [E. R. J., Oct. 29, '11.]

Atlanta, Ga.—The Georgia Railway & Light Company has asked the council for a franchise to extend its tracks 2½ miles from Buckhead to the boundary of Fulton County.

Vincennes, Ind.—The Vincennes-Interstate Traction Company has received a fifty-year franchise from the City Council to build its tracks over certain streets and across a bridge in Vincennes. This line will connect Vincennes and Bridgeport via Lawrenceville on the Illinois side of the Wabash River. C. W. Battin, Evansville, is interested. [E. R. J., April 1, '11.]

Paducah, Ky.—The Paducah Traction Company has received a twenty-year franchise from the Council to extend its lines in Paducah and to build a proposed extension to Mechanicsburg.

Boston, Mass.—The Boston & Northern Street Railway has received a franchise from the Board of Aldermen to double-track Union Street from Canal Street to the Duck Bridge in Boston, on condition that the company repave the street.

Biloxi, Miss.—The Gulfport & Mississippi Coast Traction Company, Gulfport, has asked the City Council for a franchise to build its tracks through Biloxi.

Summit, N. J.—The Morris County Traction Company, Morristown, has asked the City Council to condemn 15 ft. of land on the south side of Park Avenue from Overlook Road to Maple Street in Summit. It is reported that the company has secured right-of-way and will ask the Council for a thirty-five-year franchise to build its tracks over certain streets in Chatham.

New Rochelle, N. Y.—J. A. Young, representing the Westchester Electric Railway, White Plains, has received a franchise from the City Council to extend the Fifth Avenue line in New Rochelle to the east end of City Park, to extend the Webster Avenue line and to eliminate certain curves and to construct several turnouts in New Rochelle.

Niagara Falls, N. Y.—George H. Pettit and William C. Perkins, representing the Niagara Frontier Railway, have asked the Council for a franchise to build its tracks from Niagara-on-the-Lake to Fort Erie along the Niagara River. They have also asked the Stamford Council for a franchise. [E. R. J., Feb. 25, '11.]

Rochester, N. Y.—The New York State Railways, Rochester, has asked the Common Council for a franchise to build extensions in Culver Road and Clinton Avenue, South, in Rochester.

White Plains, N. Y.—The Hudson River & Eastern Traction Company, White Plains, has received a franchise from the Board of Trustees to extend its tracks over certain streets in White Plains.

Asheville, N. C.—The North Carolina Interurban Railway, Raleigh, has asked the Board of Aldermen for a franchise to build its tracks in Asheville. John C. Mills is interested. [E. R. J., May 13, '11.]

Carlisle, Pa.—The Cumberland Railway has received a ten-year franchise from the Council to build its tracks from Carlisle to Newville. Work has been begun.

Erie, Pa.—The Buffalo & Lake Erie Traction Company, Erie, has asked the City Council for five separate franchises. Two of the ordinances relate to franchise grants to the Erie & Suburban Company, a subsidiary line of this company, and are for a double-track line on East Twelfth Street and a single track on East Sixth Street. The other three ordinances provide for a single-track line on Wayne Street, a double track southwardly on State Street, and an extension of the East Twenty-sixth Street line from Ash Street to Pennsylvania Avenue in Erie.

Lansdowne, Pa.—The Terminal Street Railway, Lansdowne, has received permission to build its railway through Lansdowne. B. J. O'Connell, Land Title Building, Philadelphia. [E. R. J., April 15, '11.]

Knoxville, Tenn.—The Knoxville Railway & Light Company has received a franchise from the City Council to double-track Central Avenue from its intersection with Broadway, in Knoxville, north to the city limits.

Seattle, Wash.—George W. Write has asked the Board of Commissioners for a franchise to build a four-mile electric railway from the southern limits of Seattle to Lake Burien. [E. R. J., May 13, '11.]

TRACK AND ROADWAY

Dauphin Island Railway & Harbor Company, Mobile, Ala.—Plans are about completed by this company for building a trestle from Dauphin Island to Cedar Point. The structure will have three draw spans. The cost is estimated at \$420,000. The company plans to build an electric railway to connect Gadsden, Birmingham, Tuskaloosa and Dauphin Island. George T. Bishop, Cleveland, Ohio, president. [E. R. J., May 14, '10.]

Texarkana Gas & Electric Company, Texarkana, Ark.—This company has completed and placed in operation its 2-mile extension out beyond Rose Hill.

***Everett Street Railway, Glendale, Cal.**—This company is being promoted by E. D. Goode, general manager of the Glendale & Eagle Rock Railway, to build an electric railway over certain streets in Glendale.

Pacific Electric Railway, Los Angeles, Cal.—This company will soon call for bids for the grading for a double track and the building of a single track between Glendale and Burbank. This extension is $4\frac{1}{2}$ miles long.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—This company will let contracts for the construction of an extension from Petaluma to McNear's Point. At the terminus of the line a trestle upward of a mile in length will be built from the main land but in the direction of Marin Islands. The company has closed negotiations by which the necessary money is available to build the line to McNear's Point and to acquire two fast steamers to ply between the terminus on the bay and San Francisco. The Pacific Gas & Electric Company will supply the power.

Crescent City Railway, Riverside, Cal.—This company has completed and placed in operation its $2\frac{1}{2}$ -mile extension to Bloomington.

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—Right-of-way has been secured and construction will soon be begun by this company on the extension of its Elmhurst line.

St. Simons Railway, St. Simons Island, Ga.—E. A. Penman, Brunswick, is making a preliminary survey for this company on St. Simons for building a railway on St. Simons Island from Ocean Pier on the western part of the island to a point where Pastell and Bank Creek flow into the Atlantic Ocean on the eastern side of the island. Work will begin as soon as the survey is finished. Gasoline motor cars will be used. [E. R. J., Dec. 31.]

Twin Falls, Idaho.—W. L. Cherry, Twin Falls, advises that he is now securing right-of-way for an electric railway from Twin Falls to Snake River Canyon. [E. R. J., April 29, '11.]

***Delavan, Ill.**—John Fitzgerald, Pekin, and J. W. Crabb, Delavan, plan to build an electric railway between Pekin and Delavan.

***Galesburg, Ill.**—J. J. Ford and associates are interested in a plan to construct an electric railway between Galesburg and Galva.

Quincy, Mt. Sterling & Northeastern Traction Company, Quincy, Ill.—This company advises that it has surveyed from Liberty to Rushville; part of the right-of-way has been secured, but nothing definite has been done relative to financing the project. It is probable that this line will be merged later with another company. E. G. Koch, Fifth and Ohio Streets, Quincy, Ill. [E. R. J., Sept. 4, '09.]

Sterling-Moline Traction Company, Sterling, Ill.—This company has begun a survey from Walnut west to Deer Grove and thence to Sterling, passing through Normandy. It is stated that farmers have subscribed for stock to the amount necessary to pay for the preliminary work. J. J. Cotter, connected with the La Salle Bank of Chicago, is stated to have become interested financially in this road. He has looked over the proposed right-of-way from Sterling to Moline and from Sterling to Princeton, and is quoted as having said that if stock in the neighborhood of \$250,000 is subscribed for locally the complete financing can be done with ease. A. van Patten, Sterling, general manager. [E. R. J., Jan. 7, '11.]

Ft. Wayne & Springfield Railway, Decatur, Ind.—Plans are being considered by this company to build an extension from Decatur to Monroe, Berne and Geneva.

Ft. Wayne & Winona Traction Company, Ft. Wayne, Ind.—This company advises that it will begin construction some time during the summer on its 40-mile electric railway to connect Ft. Wayne, Warsaw, Coesse, Arcola, Columbia City, Larwell, Piercetown and Winona Lake. The company's power station will be located at Fort Wayne and its repair shops will be built in Columbia City. It will furnish power for lighting purposes outside of Ft. Wayne. Capital stock authorized, \$100,000. Officers: J. A. Barry,

Ft. Wayne, president, general manager and purchasing agent; G. W. Leslie, vice-president, and E. W. Cook, treasurer. [E. R. J., Aug. 13, '10.]

Iowa Light & Traction Company, Eldora, Ia.—Surveys have been begun by this company for an extension from Oskaaloosa to Waterloo.

***Savannah, Ia.**—A. H. Ross and C. B. Judd are considering plans to build an electric railway between Savannah and Blanchard via Tarkio, Graham and Fillmore. Another line also to be built from Clarinda to Villisca, a distance of 16 miles.

Paducah (Ky.) Traction Company.—Plans are being considered by this company for building a concrete bridge across Island Creek.

United Water, Light & Traction Company, Somerset, Ky.—Work has been begun by this company to extend and improve its lines in Somerset. The improvements will cost \$100,000.

Southwestern Traction & Power Company, New Orleans, La.—This company advises that it has awarded a contract to build the first division of its railway from Spanish Lake through Iberia to Jeanerette, a distance of 17 miles. Construction will begin within a month. The line will be 65 miles long and will connect Lafayette, Beaux Bridge, St. Martinsville, Spanish Lake, New Iberia, Jeanerette, Franklin, Patterson, Garden City, Berwick City and Morgan City with possible extensions. Its power station and carhouse will be located at New Iberia and it will operate 15 cars. The company will also furnish power for lighting purposes. Capital stock authorized, \$1,500,000. Officers: F. W. Crosby, Tenegre Building, New Orleans, president; P. H. Mentz, vice-president; R. E. L. C. Ries, Hennen Building, New Orleans, secretary and treasurer, and H. A. Mentz, engineer. [E. R. J., May 6, '11.]

Hagerstown & Clear Spring Railway, Hagerstown, Md.—This company advises that it is now completing surveys and that construction will be begun about June 1. The contract for construction and equipment will probably be awarded to the Burton Construction Company, Richmond, Va. The repair shops will be located at Conococheague Creek, and the company will purchase power from the Hagerstown Railway, Hagerstown. Six cars will be operated. Capital stock authorized, \$250,000. Bonds authorized, \$250,000. The Public Service Commission has issued an order empowering this company to issue \$250,000 first mortgage 5 per cent bonds, and to sell in addition such stock as will produce a sum not to exceed \$93,000. Officers: L. N. Downs, Hagerstown, president; O. D. Bowers, vice-president; H. L. Kirby, Hagerstown, secretary and treasurer, and J. B. Ferguson, engineer. [E. R. J., April 15, '11.]

Boston (Mass.) Elevated Railway.—Rapid progress is being made by this company on its extension being built from the North Station, Boston, to Lechmere Square, Cambridge.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—This company has ordered 1200 tons of rails from the Illinois Steel Company.

Saginaw Valley Traction Company, Saginaw, Mich.—It is reported that this company will soon build an extension to Bay City.

***Duluth & Northern Traction Company, Duluth, Minn.**—This company is said to have been organized to build a 5-mile electric railway in Duluth from Hardy Street to Tischer Road. Charles P. Craig and J. G. Williams are interested.

Minneapolis Northern Suburban Railway, Minneapolis, Minn.—This company will begin the construction of its line from Minneapolis to Anoka and Little Falls about June 1. Charles Sherman is interested. [E. R. J., Oct. 1, '10.]

Winona Railway & Light Company, Winona, Minn.—Contracts have been placed by this company for building about $1\frac{1}{2}$ miles of track with 60-lb., 6-in. Lorain section high T-rails.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—This company has applied to the Kansas State Board of Railroad Commissioners for permission to issue \$300,000 of stock to double track from Thirty-ninth Street, Kansas City, to Overland Park and reballast and retie the entire line and for the acquisition of additional power equipment.

***West Point, Neb.**—Plans are being made to build an electric railway from Omaha to Sioux City, via Bennington, Elk City, Arlington, Craig, Telebasta, Bertha, Lyons, Walthill, Winnebago and Homer. Branches are proposed from Elk City to Fremont, Howell, Stanton and Norfolk. Another branch to extend from Oakland to West Point. It is reported that construction will soon begin.

Asheville (N. C.) Electric Company.—Active work has been begun by this company on relaying the Patton Avenue line in Asheville with 70-lb. steel rails and paving between the rails with vitrified brick. Several other lines will be relaid with heavier steel, and the improvements will entail an expense of over \$100,000. The company has completed and placed in operation its 4-mile extension to West Asheville. This line will be extended in the direction of Conton.

Durham (N. C.) Traction Company.—A 3-mile extension will be built by this company to the Country Club in Durham.

Piedmont Traction Company, Gastonia, N. C.—This company will soon build several new bridges in North and South Carolina, one of which, across the Catawba River at Mount Holly, will cost \$60,000. The company has ordered 1400 tons of bridge work from the American Bridge Company. This 16-mile electric railway will connect Charlotte and Mount Holly. T. C. Lee, engineer in charge. [E. R. J., Sept. 10, '10.]

***Cambridge, Ohio.**—It is reported that a company is being formed to build an electric railway from Cambridge, Ohio, to Wheeling, W. Va., via Barnesville and St. Clairsville. It will connect with the Wheeling Traction Company at Bridgeport.

Cincinnati Short Line Railroad & Traction Company, Cincinnati, Ohio.—This company has completed surveys and will begin construction soon on its double-track 8-mile electric and steam railway to connect Red Bank, Madisonville, Oakley, Norwood, Bond Hill and Winton Place. Capital stock, authorized, \$1,000,000. Bonds, authorized, \$1,000,000. Peter Eichels, Cincinnati, Ohio, is interested. [E. R. J., May 6, '11.]

Oklahoma Union Traction Company, Tulsa, Okla.—About 2 miles of new track will be built by this company in Tulsa in the near future.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—This company will build during the next few weeks a 5-mile extension between Blenheim and its main line. W. Norris, general manager.

United Railways, Portland, Ore.—A 3½-mile extension has been built by this company from North Plains to Banks.

South Dakota Interurban Railway, Centerville, S. D.—About 52 miles of track will be built by this company from Sioux City to the north line of Garfield during the summer. This projected 160-mile electric railway will connect Parkston, Bijou Hills, Chamberlain and Sioux City. W. E. Miller, Bijou Hills, president. [E. R. J., July 30, '10.]

***Haskell, Tex.**—M. R. Hemphill, Haskell, plans to build a 12-mile electric railway between Haskell and Rule. It is expected to begin construction June 1.

Grafton (W. Va.) Traction Company.—Construction has been begun by this company on its 2-mile extension from Grafton to Grafton Park.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—This company has completed and placed in operation its extension from Fairmont to Fairview.

Parkersburg, Mariette & Interurban Railway, Parkersburg, W. Va.—Plans are being made by this company to build an extension from Parkersburg to Fairview Heights.

SHOPS AND BUILDINGS

Los Angeles (Cal.) Railway.—Plans are being made by this company for building an 8-story office building to be erected on Childs Place, in Los Angeles. The cost is estimated to be about \$500,000.

Chicago, Aurora & De Kalb Railroad, Aurora, Ind.—Contracts will be awarded by this company during the next four weeks for building a new station and waiting room at De Kalb and Maple Park.

Meridan Light & Railway Company, Meridan, Miss.—Contracts will soon be awarded by this company to build a new storeroom 60 ft. x 100 ft., of brick, steel and concrete construction. A. B. Paterson, general manager.

Atlantic Coast Electric Railway, Asbury Park, N. J.—This company is now building a new section to its carhouse in Asbury Park. The addition will be 36 ft. x 215 ft. S. F. Hazelrigg, Asbury Park, general manager.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—This company expects to place contracts during the next few weeks for building a freight shed and spur; also connections with the Grand Trunk Railway at Chatham.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—This company will build a new carhouse on Clare Avenue and South Eighth Street in Sheboygan. The structure will be one-story, 80 ft. x 120 ft., of brick construction.

POWER HOUSES AND SUBSTATIONS

Geary Street Railway, San Francisco, Cal.—This company has purchased a site in San Francisco at Jefferson Street and Jones Street on which it intends to build a power house.

Portland, Gray & Lewiston Railroad, Lewiston, Maine.—Messrs. Libbey & Dingley have placed an order with the General Electric Company for the equipment of the Portland, Gray & Lewiston Railway from Portland to Lewiston, Maine. The order includes three substation equipments each consisting of 300-kw rotary converters, transformers and switchboard. The switchboard in substation No. 1 will consist of a 10,000-volt incoming line and transformer panel, one rotary converter panel and a 600-volt d.c. rotary converter panel. The power is received from the Lewiston & Auburn Electric Light Company at a potential of 10,000 volts and stepped up to 33,000 volts for transmission to substations Nos. 2 and 3. The switchboard in No. 2 will consist of an incoming line and rotary converter panel, a d.c. rotary converter panel and two 600-volt d.c. feeders. The switchboard of No. 3 is the same as that of No. 2, except there is but one 600-volt d.c. feeder.

Boston (Mass.) Elevated Railway.—This company has ordered the following apparatus from the General Electric Company for the equipment of its new power station at South Boston: Two 15,000-kw, 6600-volt, 25-cycle turbo-alternators, six 2500-kva compensators and two motor-operated rheostats. The turbines will generate power at 6600 volts and this will be stepped up to 13,200 by the compensators, which are designed with a high reactance to reduce the current and thus prevent the turbines from receiving a heavy shock on a short circuit. The station will supply power to seven rotary converter railway substations, four of which will contain 2000-kw units and the other three 1000-kw units. The present installation of rotary converter equipments consists of eight 2000-kw and four 1000-kw units complete with transformers and switchboards.

Piedmont & Northern Railway, Charlotte, N. C.—This company has awarded a contract through W. S. Lee, of the Southern Power Company, to the Westinghouse Electric & Manufacturing Company for ten 500-kw motor generator sets. This equipment will be located at proper distances along the route from Charlotte to King's Mountain, N. C., and from Spartanburg to Greenwood, S. C. It is understood that the Piedmont & Northern Railway will order additional equipment in the near future.

Western Ohio Railway, Lima, Ohio.—This company expects to purchase in the near future coal handling machinery for its power house. F. D. Carpenter, Lima, general manager.

El Paso (Tex.) Electric Railway.—Permits have been secured by this company to build an addition to its power house in El Paso. The new structure will be 120 ft. x 58 ft. and 78 ft. high and of steel and brick construction. The cost is estimated at \$83,290. The cost of the equipment to be installed will be about \$62,350.

Fairmont, Clarksburg & Grafton Railway, Grafton, W. Va.—This company expects to build a power house in Grafton. Charles F. Sutherland, Morgantown, president. [E. R. J., May 13, '11.]

Manufactures & Supplies

ROLLING STOCK

Austin (Tex.) Street Railway is considering the immediate purchase of six closed cars.

People's Electric Railway, Muskogee, Okla., has ordered two 70-ft. McKeen gasoline motor cars.

Saginaw-Bay City Railway, Saginaw, Mich., has ordered seven Brill 21-E trucks from the G. C. Kuhlman Car Company.

Tri-State Railway & Electric Company, East Liverpool, Ohio, will purchase four cars through J. G. White & Co., New York, N. Y.

Windsor, Essex & Lake Shore Railway, Kingsville, Ont., has ordered one 55-ft. express car from the Preston Car & Coach Company.

Northern Texas Traction Company, Ft. Worth, Tex., has ordered eight Baldwin class 79-25-8 motor trucks from the Baldwin Locomotive Works.

San Francisco, Oakland & San José Railway, Oakland, Cal., has ordered twenty-five motor coaches, 69 ft. 3½ in. long, and trucks from the St. Louis Car Company.

New York, Westchester & Boston Railway, New York, N. Y., has ordered thirty double-motor equipments from the Westinghouse Electric & Manufacturing Company.

Portland, Gray & Lewiston Railroad, Lewiston, Maine, has ordered General Electric quadruple motor equipment with type M control for use on a general utility car.

Houston (Tex.) Electric Company has ordered, through the Stone & Webster Engineering Corporation, Boston, Mass., thirty No. 39-E trucks from The J. G. Brill Company.

Montreal (Que.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of March 11, 1911, as considering the purchase of fifty cars, is said to be preparing specifications for twenty-five cars.

Boston (Mass.) Elevated Railway has ordered forty No. 27-MCB-2 trucks, without wheels and axles, and forty No. 27-MCB-3 trucks, without wheels and axles, from The J. G. Brill Company.

Connecticut Company, New Haven, Conn., has ordered thirty-three 30-ft. 8-in. closed motor car bodies from the Wason Manufacturing Company and forty closed cars from the Osgood Bradley Car Company.

Piedmont & Northern Railway, Charlotte, N. C., has ordered twenty-three quadruple 90-hp motor equipments and fourteen 55-ton electric locomotives from the Westinghouse Electric & Manufacturing Company.

Pottstown & Phoenixville Railway, Philadelphia, Pa., will probably purchase twenty-nine cars for use on its line which is now being built between Pottstown and Phoenixville, Pa. C. T. Leland, 2215 Land Title Building, Philadelphia, is secretary.

Metropolitan Street Railway, Kansas City, Mo., has ordered one hundred No. 306 motor equipments from the Westinghouse Electric & Manufacturing Company. This is a duplicate order for two hundred motors placed by the company with the Westinghouse Electric & Manufacturing Company last year.

Des Moines (Ia.) City Railway, noted in the ELECTRIC RAILWAY JOURNAL of May 13, 1911, as having ordered twenty cars from the American Car Company, has purchased twenty-five cars. They are of the double-end, pay-as-you-enter type, and will be equipped with maximum traction trucks, Peter Smith hot-air heaters, National Brake & Electric Company's air brakes, and two General Electric No. 98, 50-hp motors.

TRADE NOTES

P. & M. Company, Chicago, Ill., has moved its Chicago office to 637 Railway Exchange Building.

Central Locomotive & Car Works, Chicago, Ill., has filed a certificate of incorporation in Augusta, Maine, with \$500,000 preferred stock and \$100,000 common stock.

L. A. Irwin, formerly purchasing agent of the Quincy, Omaha & Kansas City Railroad, has become connected with the Western Railway Supply Company, Kansas City, Mo.

Burton W. Mudge & Company, Chicago, Ill., dealers in railroad supplies, have elected Thomas H. Garland, the inventor of the Garland ventilator, a director of the company.

Corrugated Bar Company, St. Louis, Mo., has purchased the General Reinforcement Company, Youngstown, Ohio, and will continue to operate the plant of that company at Youngstown.

Ohmer Fare Register Company, Dayton, Ohio, announces the removal of its Pacific Coast representative, J. C. Liggett, from 171 Second Street to 402 First National Bank Building, San Francisco, Cal.

Ackley Brake Company, New York, N. Y., reports the receipt of orders through the Deutsche Ackley Bremsen Company for additional Ackley brakes for Lübeck, Germany, and Teschen, Austria.

Baldwin Locomotive Works, Philadelphia, Pa., have purchased thirty acres of land at Eddystone, Pa., adjoining the present plant. The company has announced that it has no immediate plans for using this property for extensions.

David Lupton's Sons Company, Philadelphia, Pa., has opened an office in the Oliver Building, Pittsburgh, Pa. Walter C. Scott, civil engineer, has resigned from the National Tube Company, Pittsburgh, Pa., to take charge of this new office.

Lorraine Smelting & Refining Company, Chicago, Ill., dealer in zinc and lead refuse from storage batteries, announces that it has added a babbitt metal department to its organization and that it is now prepared to manufacture high-grade babbitt metals on specifications.

Wheeler Manufacturing Company, Philadelphia, Pa., announces that F. S. Broadhurst has again become connected with the company as sales manager, with headquarters at Philadelphia. Mr. Broadhurst was recently connected with the Westinghouse Machine Company.

United States Metal & Manufacturing Company, New York, N. Y., has opened a branch office in the Morris Building, Philadelphia, Pa., which will be in charge of L. Weimer Murray, formerly in charge of the company's office at Lebanon, Pa. The Lebanon office has been discontinued.

International Steam Pump Company, New York, N. Y., reports for the year ended March 31 as follows: Net profits, \$2,464,420; increase, \$461,267; depreciation, \$404,948; increase, \$494,948. Charges, \$489,650; increase, \$48,918. Balance for dividends, \$1,479,822; decrease, \$82,599; preferred dividends, \$859,800; surplus after dividends, \$620,022; decrease, \$82,599. Reserve for sinking funds, etc., \$241,531; increase, \$123,473; surplus, \$378,490; decrease, \$206,072.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., will build a pattern shop this year to form part of its foundry plant at Trafford City, Pa. About 1000 tons of steel will be used in the construction of the building. Another foundry building for making large castings will also be erected. Approximately 3000 men will be employed at the Trafford City plant when it is entirely completed and all the foundry work of the Westinghouse Companies will be carried on there.

International Railway Tie Company, New Orleans, La., has been organized to place on the market a concrete tie and a concrete base for poles. The base is driven into the ground and extends about 1 ft. above the earth. On it can be set a wooden, concrete or metal pole. The company claims that wooden or iron poles do not decay or corrode as rapidly when mounted in this way as when they are in contact with the ground, and when renewed there is a saving of 5 ft. or more in length. The company has sample concrete ties on several steam railroads in the Southwest. The officers of the company are: L. S. Boudreaux, president; J. C. Telotte, vice-president; Robert J. Perkins, secretary, and William Drews, treasurer.

J. S. & W. S. Kuhn, Inc., Pittsburgh, Pa., bankers and dealers in securities, announces the reorganization of its executive staff on March 31, 1911, at its general offices in Pittsburgh, the following officers being elected: James S. Kuhn, president; W. S. Kuhn, vice-president; E. L. McClelland, vice-president; H. C. Ward, secretary; James K. Duff, treasurer; F. S. Carmack, assistant secretary; J. G. North, assistant treasurer; F. D. Glover, manager of sales; S. M. Vockel, manager municipal department; C. G. Apple-

gate, assistant manager of sales; F. O. March, advertising manager. The offices in Chicago, Philadelphia and New York will remain in charge of A. B. MacCaughy, W. G. Audenried, Jr., and Otto Billo, respectively.

Westinghouse Machine Company, Pittsburgh, Pa., has just completed two marine turbines and reduction gears for installation upon the United States collier *Neptune*, a ship of about 19,000 tons. The feature of this equipment is that the turbine operates at the high speed at which it is most efficient and this speed is reduced through gearing to that required for a screw propeller. It is claimed that the weight of this machinery is less than half that of other turbines having the propellers coupled direct to the turbine shafts or of reciprocating engines and that the steam consumption is from 20 per cent to 30 per cent less. The speed of the turbines is capable of being controlled directly from the bridge, a feature of high importance in maneuvering. In fact, the man on the bridge can reverse either or both turbines from full speed ahead to full speed astern in less than fifteen seconds.

Westinghouse, Church, Kerr & Company, New York, N. Y., have elected John F. Wallace president of the company to succeed H. H. Westinghouse. Mr. Wallace still retains the chairmanship of the board of directors of the company. Following his resignation as chief engineer of the Panama Canal, Mr. Wallace acted as confidential consulting engineer for the Chicago & Northwestern Railroad in the general design of the new passenger station for that company in Chicago, which has just been completed. He then took the office he has held until his present change. Mr. Wallace is also president of the Electric Properties Company, New York, which controls Westinghouse, Church, Kerr & Company. Among the directors elected at the annual meeting of Westinghouse, Church, Kerr & Company are N. W. Halsey and F. Q. Brown, New York; George Westinghouse and J. R. McGinley, Pittsburgh, Pa., and Homer Loring, Boston, Mass.

Francis E. Drake, who for several years has been the managing director of the Société Anonyme Westinghouse of Paris and Havre, and principal officer in several of the Continental Westinghouse interests, has resigned from the active management of these properties to occupy himself with certain private interests, and, after a period of rest and recuperation, will establish his office at No. 16 rue Halévy, Paris. Mr. Drake is well known in general electrical circles for his work as director of machinery and electricity for the United States at the Paris Exposition of 1900, and as reorganizing expert of the Union Elektrizitäts Gesellschaft, Berlin, before the fusion with the Allgemeine Elektrizitäts Gesellschaft. Mr. Drake is interested in several electric enterprises in Europe and will build, as engineer and contractor, certain railway lines now in process of development. The efforts of Mr. Drake in behalf of electric traction, especially in the direction of a single-phase development, and other aid rendered to French industries, recently received the recognition of the French government in the shape of promotion to the rank of officer in the Legion of Honor. Mr. Drake is a member of the Engineers' Club, New York, and a life member of the American Chamber of Commerce in Paris.

Hodenpyl, Hardy & Company, New York, N. Y., the organization of which was noted in the *ELECTRIC RAILWAY JOURNAL* of May 6, 1911, is interested in and will manage the major portion of the gas, electric and railway properties formerly managed by the recently dissolved firm of Hodenpyl, Walbridge & Company, New York, N. Y. The companies managed by the new firm are the Union Railway, Gas & Electric Company and the Commonwealth Power, Railway & Light Company, which will have their executive offices with Hodenpyl, Hardy & Company. The Union Railway, Gas & Electric Company controls the Evansville Gas & Electric Light Company, the Peoria Light Company, the Springfield Railway & Light Company, the Rockford & Interurban Railway, the Janesville Traction Company, the Rockford City Railway and the Consumers' Gas & Electric Company. The Commonwealth Power, Railway & Light Company controls constituent companies as follows: The Consumers' Power Company, the Michigan Light Company, the Cadillac Water & Light Company, the Grand Rapids Railway and Saginaw-Bay City Railway. Anton C. Hoden-

pyl, G. E. Hardy, J. C. Weadock and S. E. Wolff, of the new firm, have for years been prominent in the financing and management of public service and other corporations. Bernard C. Cobb has been closely identified with the executive management of gas companies in Michigan, Illinois and Indiana, and his activities have also extended along similar lines in the management of electric light, power and street railway companies in Michigan, Illinois and Wisconsin. William H. Barthold has for many years served the companies which will be managed by the new firm as consulting engineer. William M. Eaton has for some time given his attention to the development of water powers and the firm's electric light and power interests in Michigan. E. J. Bechtel will serve the new firm as its consulting electrical engineer.

ADVERTISING LITERATURE

Howard Metal Company, Reading, Pa., is mailing a card calling attention to Howard composite car bearings.

Mesta Machine Company, Pittsburgh, Pa., has just published a pamphlet on its horizontal, double-acting, four-cycle gas engines, which are built in sizes from 400 hp up.

Barrett Manufacturing Company, New York, N. Y., has printed a sixteen-page catalog which contains a description of Travia and information regarding the construction of roads with this product.

Standard Third Rail Company, New York, N. Y., has just issued a pamphlet entitled "W-S Standard Under-Running Third Rail." The pamphlet illustrates views along the New York Central electrical zone, the West Shore Railroad, the Philadelphia Elevated Railway and other lines equipped with the Wilgus-Sprague under-running third rail.

Westinghouse Machine Company, East Pittsburgh, Pa., has printed a catalog on the new model Roney mechanical stoker. Numerous installations of the old and new types of these stokers are illustrated. An appendix to the catalog contains brief references to the Westinghouse chain grate stoker and the Westinghouse coal crusher.

Crocker-Wheeler Company, Ampere, N. J., has issued Bulletin No. 132 on form 1 belt-type, direct-current motors in sizes from 3¼ hp to 50 hp. Another bulletin, No. 129, is devoted to several types of direct-current crane and hoist motors. The Crocker-Wheeler Company is also mailing a card calling attention to the advantages of its three-wire direct-current generators.

National Metal Molding Company, Pittsburgh, Pa., is mailing to the trade a wall placard or hanger illustrating the different forms in which sherardized national metal conduit and molding fittings are supplied. The hanger illustrates the different types of couplings, outlets, rosettes, elbows, etc., and gives the number of parts packed in a box, weight, prices and other information.

British Westinghouse Electric & Manufacturing Company, Limited, Manchester, England, has just published a leaflet in regard to the construction of the Westinghouse-Leblanc jet condenser. The circular points out that this condenser is particularly desirable for use in connection with steam turbines where a high vacuum is necessary. It also emphasizes the simplicity of its construction, the small area of floor space occupied, its high efficiency and the impossibility of its flooding the engine or turbine with which the condenser is connected.

Edgar Allen American Manganese Steel Company, Chicago, Ill., has issued two pamphlets, one giving a list of the uses of the manganese steel castings made by the company and the other giving an account of the application of manganese steel to ceramic industries. In the former the uses for electric railway work for which this material is mentioned as being particularly useful are frogs, crossings and other special work, rails which are subject to great wear and wheels. The second pamphlet is interesting particularly because it gives a history of the application of manganese steel by Edgar Allen & Company, Limited, Sheffield, and the Edgar Allen American Manganese Steel Company. One of the first uses for manganese steel castings was for dredge pins and afterward for the lips of the buckets and dredges of steam shovels. The employment of manganese steel for the jaw plates of rock crushers followed, and then its use for material subject to great wear became general.