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Saving Labor by Shortening Routes

As operating economies become more and more necessary in the conduct of the transportation department, a close study of the car service will often show where substantial savings can be made without seriously impeding the regular flow of travel. By combining transfer facilities with different arrangements of car routing it is sometimes feasible to give the public the same ride as before and still operate the schedules more efficiently. As an example, a city company recently ran two different lines of

cars from the urban center to a suburban terminal 7 miles distant. Near the city end of the route the two lines were diverted through adjacent districts, to be joined again about 4 miles out, the balance of the routes in each case being over a common pair of tracks. One mile from the suburban terminus was located the principal car house of the division, where transfers were exchanged between all cars moving in the same general direction, but having different destinations. The company desired to cut down its expenses to the lowest point consistent with good service and it was found that by terminating the route of one line at the car house seven round trips per day could be made by each crew against only five round trips under the old plan of operating cars through to the end of the route. The passengers were taken care of by a transfer good at the car house, according to their direction of travel, and small timetables were distributed to facilitate the convenience of making connections. The labor cost per round trip was reduced to about 64 cents, against 90 cents, simply by cutting off the longer route a mile short of its original destination and allowing passengers to continue their rides on other through cars. This simple change saved the company something like \$1,200 a year and the public was not restricted in the purchasing power of its fares on either route.

Motor Efficiency and Lubrication

Electric motors are free from many of the disadvantages under which steam locomotives operate during cold weather. The sudden fall in temperature which chills the steam boilers and steam chest of the latter has only a beneficial effect on the resistance of the field and armature coils of the former. Hence the electrical efficiency of the motor improves, but unless care is taken with regard to its lubrication, the total power consumption is apt to increase because of the sluggish action of the lubricant. Great progress has been made in motor lubrication during the past five years, but the subject is so important that too much attention can hardly be given it. An inconvenient position of the oil cup or the ineffective distribution of the oil may counteract elaborate efforts of the motor designer to add 1/2 of 1 per cent to its electrical efficiency. This portion of a motor equipment is supposed to be given daily attention, but often this work has to be done in the semi-darkness of a damp, cheerless pit or in the bitter cold of an open-air terminal. When under such conditions it is difficult to get oil into a cup without a great deal of discomfort, the chances are great that the duty will be neglected. Even if the oil cup is conveniently placed, there must be certainty that the lubricant is going where it should. Paucity in the quantity or quality will cause a heavy drop in efficiency of the

motor, aside from the expensive break-downs which are sure to come. Fortunately, defects of the kind just named above are not inherent to either motors or lubricants. The remedies for their correction lie in a closer personal study of motor inspection practice, and many a useful hint can be gained, even by designers, by observing the methods which master mechanics have invented to overcome such troubles.

Shop Employees' Meetings

We have referred a number of times in these columns to the gratifying results obtained by several of the larger electric railway companies through holding regular monthly or semi-monthly meetings of shop and car house foremen, at which questions relating to their work are discussed. The value of these meetings is unquestioned, and the practice is being widely adopted, even among smaller companies which have only a few men to participate in the exchange of opinions and experiences. The same plan, if extended to include also the rank and file of the shop and car house forces, offers almost unlimited opportunities for accomplishing good. Theoretically, the foremen are expected to impart all the knowledge and ideas absorbed at these meetings to the men under them. It is reasonable to suppose, however, that suggestions for improvement communicated first-hand to the men who actually do the work are more likely to be followed to the letter than when repeated more or less hazily a few days later through the foremen. It is true that the average shop employee is likely to be interested only in the details of car maintenance which form his daily work, and all the points of a general discussion of equipment failures, for example, would not especially interest him. Nevertheless the points relating to his particular part of the work would appeal to him directly and forcibly. Discussions of general topics would also tend to arouse the interest of the men in the work of departments in the shop other than their own, and perhaps lay the foundation for the development of capable foremen from among the ambitious men. For teamwork it is essential that the men and the officers over them learn to know each other's personalities, ideas and ambitions. No better means to this end is available than these informal experience meetings.

Steel Street Cars

The use of steel in passenger car construction has been making rapid strides of late. All-steel cars are now the only type of construction considered for subways, and have been generally adopted for suburban service on the electrified steam roads. There is also a strong decided tendency toward the use of this type of construction for passenger cars in through service on steam roads. A few street railway companies have had steel cars built for city service, and many other companies are seriously considering their adoption in the near future. The reasons for using all-steel construction for steam railroad and subway cars, however, are quite different from those advanced for adopting steel throughout in building street cars. The vastly superior strength of steel over wooden construction in collisions and derailments is a strong argument in favor of steel cars. The elimination of danger from fire is also

an important advantage, especially where the cars are run in subways or tunnels. One other reason, which in time will become more and more important, is the scarcity of timber suitable for use in the long underframes of modern railway coaches. In building street cars the strength of steel construction in derailments and collisions is a comparatively unimportant factor, as it is very seldom that a car is in collision or is derailed when running at a speed high enough to demolish it. The fire risk is also unimportant, as practically the only danger from fire is in short circuits of the electrical equipment, which can be sufficiently guarded against by the use of metal conduit for the wiring and protection plates under the floor above the motors. The scarcity of timber is not yet a serious difficulty in building wooden street cars, which are seldom more than 30 ft. or 35 ft. long over end sills as against 60 ft. to 65 ft. in steam railway coaches.

The use of steel in street car construction brings about two very important economies—of reduction in weight and in the cost of maintenance. The new all-steel cars of the United Railways Company, of St. Louis, which were described in the *ELECTRIC RAILWAY JOURNAL* of March 13, weigh 1000 lb. less than the composite steel and wood cars of which this company has a number in service. This reduction in weight should result in a saving in cost of operation of from \$50 to \$60 a year. The cost of maintenance is, of course, largely problematical, but the experience of the steam railways so far in the painting and upkeep of steel cars has been quite satisfactory.

The tendency in adopting steel construction is to go to the extreme of eliminating every piece of wood, even to the arm rests on seats and the window sash, as well as all interior moldings and finish. This is a good advertisement in some cases, as it inspires confidence in the traveling public that there is absolutely no danger of fire when riding in a car which has nothing in its construction which will burn. The use of steel for many of the parts of a car, however, is much more expensive than wood, and there is little, if any, saving in weight or cost of maintenance. Just how far the use of steel should be carried, to the exclusion of wood, is open to question. In the window sash, for example, it is extremely difficult to make a tight fit between the window and the frame when metal is used for both. Metal seat arms feel cold and hard in comparison with wood, and as they are subjected to constant friction the paint soon wears off of the metal finish and leaves an unsightly surface. Where wood is eliminated entirely, it is necessary to secure the steel plates and finish moldings with tap screws. The constant vibration and unequal expansion of the steel construction soon loosen these fastenings. The use of wood furring strips, to which the steel parts can be secured with wood screws, is a much better construction.

The cost of steel cars is as yet much in excess of the cost of wooden cars of the same dimensions. This is due not so much to a difference in cost of the raw material as to the cost of designing steel cars and in the amount of work necessary for their fabrication and erection. It took six months to make the drawings for the order of 50 steel cars now building for the Chicago Railways Company before a single part was manufactured. From this it will readily

be seen that the cost of design bears a very high ratio to the total cost of the cars. It is necessary to lay out in advance on paper every rivet hole and make templates and jigs for every piece. The erectors cannot use a saw and chisel to cut and try as can a carpenter working on a wooden car. If many cars of the same type are ordered at one time the unit of cost of making up the design is, of course, reduced proportionately, but few street railway companies order equipment in such large numbers as are required to keep down the first cost of steel cars to a point where they can compete with wooden cars. The solution of this problem, of course, is in the general adoption of standard designs. If the builders of steel cars are permitted to bid on their own standard designs they can afford to name a much lower price than if they are required to get up an entirely new set of drawings for every small order to meet the whims and hobbies of the purchaser. The steel passenger car industry is comparatively new to the railway companies, but the builders of steel passenger cars have been in the field long enough to develop designs which can be built at a moderate cost and in the end probably serve quite as well as special designs worked out by the engineers of the railway companies.

Further Evidence of the Cost of Rapid Transit in New York

The proposition of the Interborough Rapid Transit Company to spend \$50,000,000 in extensions of the present subway system in New York and the plan of the Hudson & Manhattan Railroad to build its line from its present terminus at Twenty-third Street to the Grand Central Station have led to some confusion and misunderstanding as to the profits in subway operation, when coupled with the report of the Chamber of Commerce published in our last issue and Mr. Arnold's study of the financial returns of the present subway. The reports of Mr. Arnold and the Chamber of Commerce were pessimistic as to the investment of private capital in further subways when built under present conditions, because, in spite of the enormous traffic which is assured, the average profits per passenger are so small.

To increase the net income in the present subway, Mr. Arnold suggested that a few economies, such as reducing the non-productive mileage, might be made; that the receipts per passenger mile, and hence per passenger, could be increased by devoting more attention to the local traffic, and that by certain changes in the equipment a gain might be secured in the capacity of the subway. But he based his main hope for any future system of subways upon a radical change in the design of the stations to increase greatly the capacity of the trackage and in the use of the city's credit in the equipment of the line, and believed that these courses presented the only alternative to a higher fare. The Chamber of Commerce took the ground that it would be a long time before the borrowing power of the city would be sufficient to warrant its financing any more subways, and expressed the hope that New York would be able to escape both horns of the dilemma by the adoption of some plan of profit sharing which would not require the issue of bonds.

At first sight the two propositions now before the city, involving the use of private capital in further subway construction, and that of the Amsterdam Company for a

rapid transit system along the river front, seem to conflict with the conclusions reached by Mr. Arnold and the representatives of the city's commercial interests, but in reality they will be found corroborative of them. The plan of the Hudson & Manhattan Company, as outlined to the Public Service Commission, is for a short extension only to the existing system, and one which places its northern terminal at a logical point so far as traffic is concerned. The haul from Forty-second Street to Christopher Street, where the line leaves Manhattan Island to cross the Hudson River, is only about 2 miles, and this is the maximum distance which a person could travel on Manhattan Island. The average length of ride per passenger on the completed system is yet problematical, as the line is not yet in operation, but it will probably be less than 3 miles of course, a much shorter distance than on the present subway system.

The plans of the Interborough Rapid Transit Company, to which legislative sanction is necessary, are in no respect similar, so far as traffic is concerned, to those which would be present in a new subway, or even to those existing in the present subway. The construction of the extensions from Times Square to the Battery on the lower West Side, and from the Grand Central Station north on Lexington Avenue to a point where the road would join the present subway, would tend to decrease the average ride per passenger in two ways. First, the two tracks which it is proposed to install would be useful in attracting considerable short-haul traffic, and, second, they would shorten the distance which the express trains from the north on either side of the city have to traverse before reaching the Battery. The offer of the Interborough Rapid Transit Company is coupled with the proviso that it should have permission to build third tracks on the Second and Third Avenue elevated lines under the same conditions as those possessed by the present elevated lines. This latter improvement is one for which a strong plea was made by the Chamber of Commerce, and as a way of ameliorating the present conditions should have been adopted long ago.

The proposed Eleventh Avenue and West Street improvement of the Amsterdam Company is to be devoted largely to freight, and should in no wise be considered on the same basis as a purely passenger road.

The situation in New York possesses far more than local interest, as it indicates that even in New York City investment in city transportation enterprises has come to be less favorably regarded than perhaps at any time during its history. This is partly because of the increased cost of supplies, partly because of the added burdens imposed by legislative action upon railway companies, and partly because of the lower receipts per passenger which have followed extensions of the average length of ride per passenger. The causes that are at work in New York are present in all cities—large and small—throughout the country, as well as on the interurban lines of the far East and the central West. If, in addition to this condition, those railway companies which show a profit are to be limited in their returns to a nominal percentage, not on the investment made by the company, but on the appraised value of the material in use, it will soon be regarded as a better indication of business sagacity to lock one's money up in a safe deposit vault than to invest it in public utility.

THE OREGON ELECTRIC RAILWAY SYSTEM

In the spring of 1906, after considerable delay on the part of the city, the Oregon Electric Railway Company (under the name of the Willamette Valley Traction Company) secured from the city of Portland, Ore., a franchise enabling it to enter the city, establish its freight and passenger terminals and connections with the yards of the transcontinental steam railroads. At the same time sim-



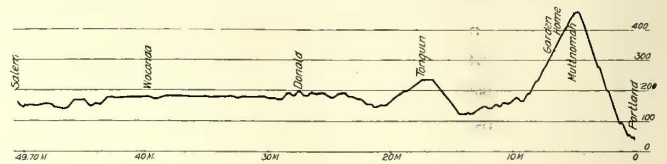
Oregon Railway—View Showing Catenary

ilar franchises were secured in Salem, the capital of the State, and other intervening cities.

The first section of the main line, as now built and operated, connects the cities of Portland and Salem (50 miles), and a branch line, 20 miles long, has just been completed to the cities of Hillsboro and Forest Grove, located southwest of Portland.

The main line enters the remarkably beautiful and fertile Willamette Valley, destined to be the "garden of Portland" and capable of supporting in itself an independent population of several million people. Before the Oregon Electric Railway system was projected, this territory, about 300 miles long and 60 miles wide, was served by one steam

few miles of 35-lb. rails, no evidence exists of these many unsuccessful ventures. One reason for the failure of previous projects was doubtless the unappreciated difficulty in effecting a river crossing, since the Willamette River cuts



Oregon Railway—Profile

off Portland to the south from the most fertile part of the valley. This river is supplied by glacial streams and a very extensive valley watershed, and has at certain times during the year a rapid rise and fall, amounting often to 40 ft. or more. This serious obstacle had in the past not received proper consideration by the promoters until the work was under way, and then, when the difficulty was realized, the capitalists back of the project became uneasy and abandoned it.

The effecting of a proper entrance into Portland from the south was in itself a serious problem. The Southern Pacific's line, leaving the city on a 4 per cent grade, winds up among the mountains which surround Portland to the south and west until an altitude of over 600 ft. is reached. The Oregon Electric Railway Company, after a number of careful surveys, selected a route out along the side hills, and with a maximum grade of $2\frac{1}{2}$ per cent reaches an altitude of about 450 ft. in a distance of 5 miles, from which point it can reach any locality in the valley by easy grades and curves. The main line of the company extends approximately south from Portland a distance of 49.7 miles to Salem. In addition, there is a branch from Garden Home Junction, 7 miles from Salem, extending west 19.1 miles to Forest Grove.

TRACK

The construction of the track and substructure was rendered difficult, due to four causes inherent in the country and the route:

1. The hills which guard the entrance to Portland.
2. The Willamette River, which had to be crossed at a



Oregon Electric Railway—Willamette River Bridge

road, namely, the Portland-San Francisco main line division of the Southern Pacific, which traverses the full length of the valley.

For more than 20 years a Willamette suburban electric line had been planned by as many companies, but beyond an "occasional streak of rust" left here and there by a

height sufficient to pass river-going craft underneath, allowing for 46 ft. clearance at high-water level.

3. The rainy season, which lasts five months, and during which time the soil is difficult to work.

4. The scarcity of material suitable for ballast.

In the 70 miles of line there are many bridges, trestles

and undergrade crossings, the most important structure being the bridge over the Willamette River. This bridge is 3422 ft. long. It is made up of four steel spans (810 ft.) carried by concrete-steel piers and approached by two high-

lightened by a hollow construction stiffened by cross-walls. The foundations are heavily ripped with stones, no one of which weighs less than 5 tons.

During the construction of the piers men were stationed at points up the valley to notify the workmen of an approaching flood. When such a signal was received work was stopped, all machinery removed and the incompleting piers capped over. The rapidly rising waters were allowed to flow over the work, heavy log booms being used to keep off driftwood. All night powerful acetylene searchlights were placed on each shore, and men in boats stationed inside the booms and armed with pike poles warded off floating logs and other debris.

Under these repeated strains a careful examination after the work showed no injury whatsoever, and soon the piers were above the high-flood danger line. All foundations and the steel structure were designed and erected by the engineers, W. S. Barstow & Company.

About a year after it was finished, the bridge was tested by running over it, at 65 miles an hour, a steam train consisting of a 116-ton locomotive and 10 loaded ballast cars, each weighing 136,000 lb.; making a total load of 1,592,000 lb. The deflection was only 1 1/8 in., which is less than one-half of the camber when the bridge is unloaded.

The substructure of the road itself is built for heavy passenger and freight traffic. A typical section, showing slopes, etc., is illustrated. The width of the single-track roadbed at subgrade is 16 ft. on embankments and 22 ft. in cuts, 14 ft. of width being added for each additional track.

The track consists of Illinois Steel Company's No. 7010 steel rail, 70 lb. per yard, spliced with 24-in. angle bars, weighing 40 lb. per pair and laid on 8-in. ties, spaced 2880 to the mile.

The engineers had the good fortune to locate before the work was started an unusually fine gravel bed of about 21 acres at a point on the line near Salem, and from here out all ballast for the entire road was hauled. During the first year of operation the road was not ballasted, because of the impossibility of doing this work while the wet season ran out as fast as it was put in. When it was once properly put down under favorable weather conditions it gave no further trouble during the wet seasons. About 2500 cu. yd. of ballast was used per mile of single track, with the result that a solid and smooth riding road has been produced.

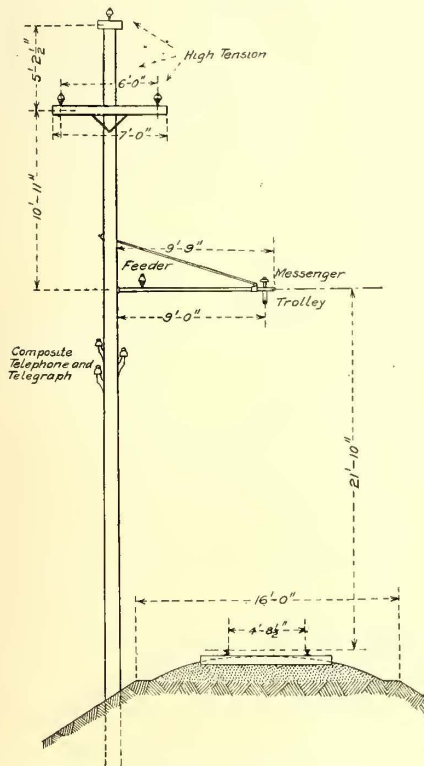
The track is bonded partly with the Ohio Brass Company's type GA, No. 0000 knife-edge soldered bonds, and partly with the Lord Electric Company's type Ct, No. 0000 soldered bonds, both types being soldered to the ball of the rail. In the streets, at crossings and at other places where the bonds are liable to be injured, the Ohio Brass Company's type GFA, No. 0000 concealed bond is soldered to the web of the rail under the angle bar. At every 23d rail the track is cross-bonded with one Ohio Brass Company's type F63, No. 0000 bond soldered to the flange of the rails. The bonds used on open track and soldered to the ball of the rail were tested with a



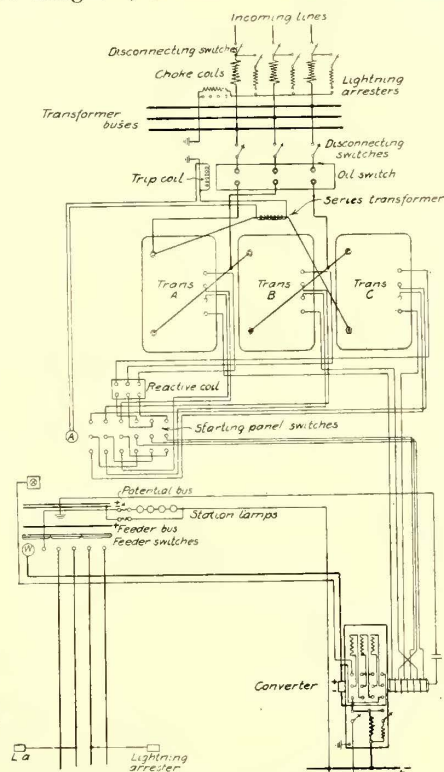
Oregon Railway—Long Trestle

pile three-stringer trestles, the one on the north being 982 ft. long, and the one on the south 1630 ft. long.

During the construction of this bridge, which lasted from August, 1906, to September, 1907, there were seven floods, the water rising from 18.6 ft. to 41.6 ft. above normal low-water mark, and had these extraordinary conditions not been taken into account by the designers, or had



Oregon Railway—Track and Overhead Section



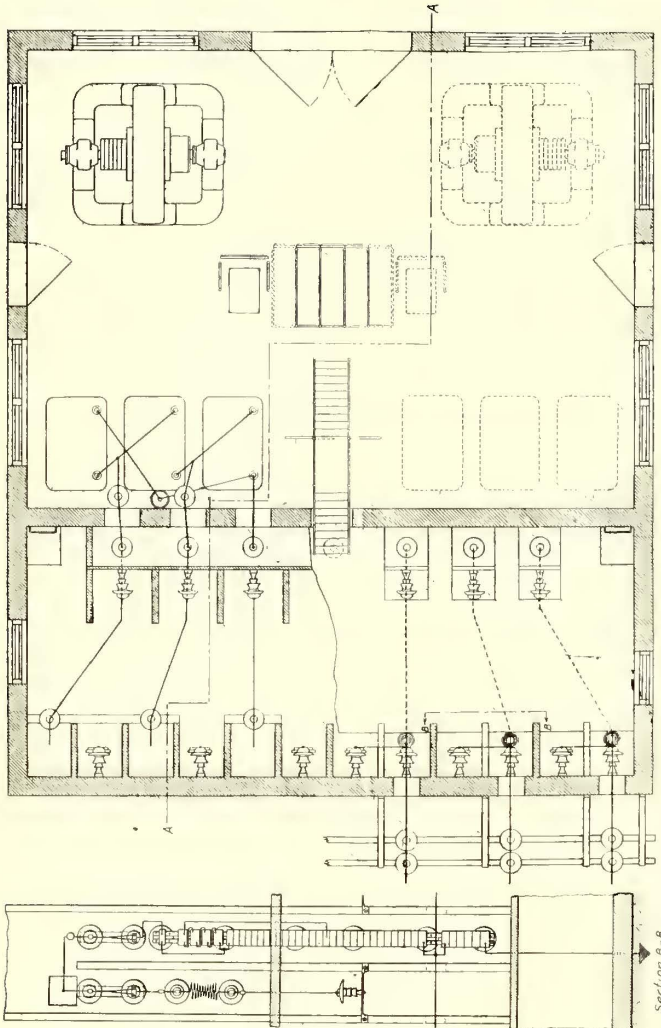
Oregon Railway—Typical Connections in Substation

their plans not been skilfully carried out, the partially completed bridge would have been washed away before its completion.

The piers of the bridge rest upon heavy foundation footings some 40 ft. below mean river level, and are of solid concrete up to high water. From this point the piers are

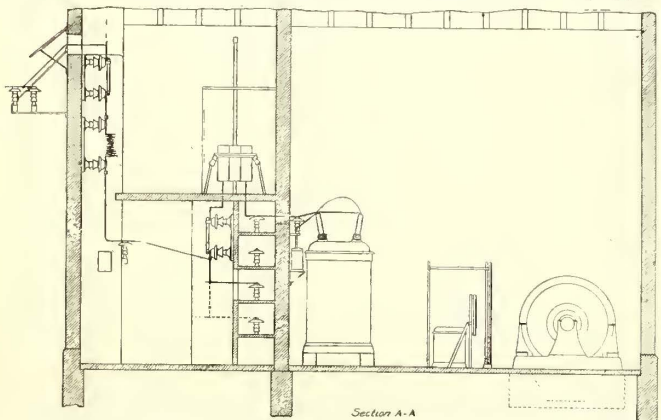
shering stress of 1800 lb. per square inch of contact surface.

Every precaution was taken to render operation as safe as possible. The entire right of way, including station yards, etc., is fenced in with standard American Steel & Wire Company's woven wire fencing, with one strand of



Oregon Railway—Plan of Typical Substation

barbed wire strung along the top. At grade crossings, public or private, the track is protected by cattle guards and wing fences running from the edges of the track to the main fences on each side. The road is well equipped



Oregon Railway—Cross-Section of Typical Substation

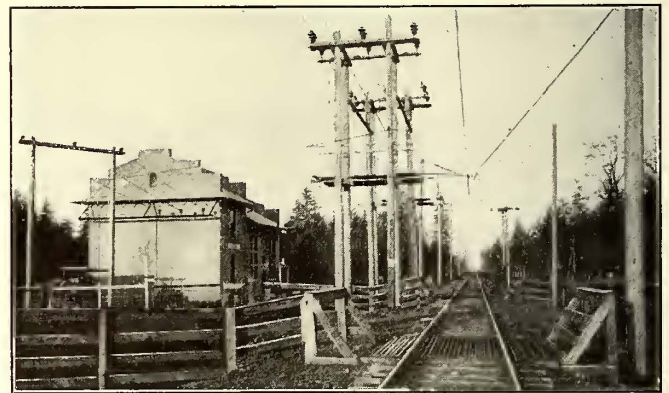
with signs, indicating distances, boundaries, danger points, etc., for the guidance of trackmen, motormen, property agents and others. A comprehensive system of signals and interlocking switches was installed, and has given excellent results in actual operation.

OVERHEAD CONSTRUCTION

The high speed employed made the catenary type of construction preferable. The single catenary type of suspension furnished by the Ohio Brass Company was used. The construction can be seen in several of the illustrations. A 7/16-in. galvanized steel messenger cable having a safe tensile strength of 12,000 lb. is suspended from insulators on brackets with 150-ft. spans and anchored every 1/2 mile on straight track and at the end of every curve. On curves the standard construction was modified by stringing a 5/16-in. galvanized steel cable between the supports which serves as a spring guy, to which 1/4-in. pull-off bridles are attached at 15-ft. intervals, thus making a very smooth curve.

Section insulators are provided at every substation so that the overhead wire can be cut out between any two stations without affecting the rest of the line. The contact wire is of No. 0000 hard-drawn copper, suspended from the messenger at intervals of 15 ft., and is fed with a 500,000-circ. mil copper feeder over the heaviest grades for 7 miles out of Portland, and from there on with a No. 0000 copper feeder tapping into the contact wire at every 10th pole.

The insulation of all catenary construction is designed for 1500 volts, so that later, when the traffic becomes



Oregon Railway—Tapping Transmission Wire at Substation

heavier, this voltage can be used by changing the car motors and converters, thereby increasing to a very large extent the power-carrying capacity of the entire system without disturbing in any way the overhead feeder or trolley installation.

SUBSTATIONS

The direct-current distribution system is supplied with energy through synchronous converter substations. Five of these stations were built and feed the middle sections of the line, while the ends of the line are fed from substations belonging to the local power companies in Portland and Salem.

The substations are built of reinforced concrete, with corrugated galvanized iron roofing carried on steel beams. Waiting rooms and ticket offices are provided in each substation, the attendant acting as electrician, station agent and telegraph operator.

The building is divided into two parts: the high-tension compartment, which contains the lightning arresters, disconnecting switches, oil switches, etc., and the operating room, which contains the transformers, switchboard and the converters. The high-tension compartment is divided into two stories, the upper one containing the oil switches and the lower one the high-tension buses.

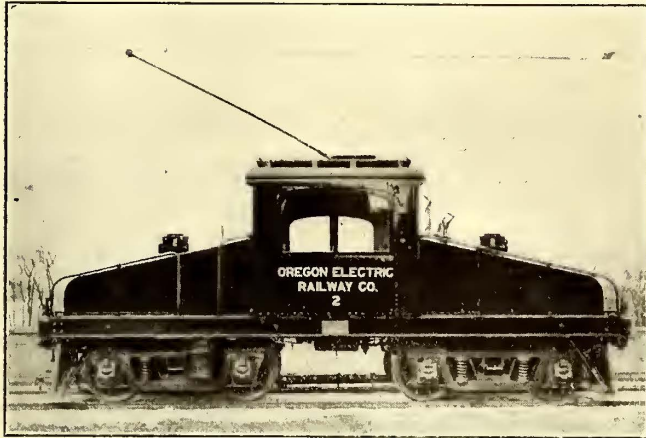
The low-tension wiring, both a.c. and d.c., is carried in

fiber conduits embedded in the concrete floor. The drawings show the general arrangement of the apparatus and high-tension wiring and the complete diagram of connections for the station.

The 33,000-volt line enters the building under a weather-proof hood through 18-in. holes, and passes down the wall through a disconnecting switch and a choke coil to the lower room, where it crosses to the high-tension buses. The lightning arresters are fastened to the rear wall and separated from the disconnecting switches and choke coils by concrete barriers. They are connected through disconnecting switches to the line just after it enters the building.

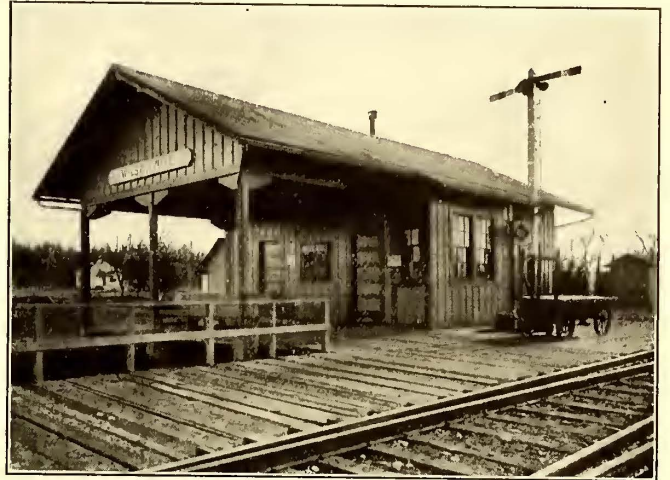
Taps from the high-tension buses pass through disconnecting switches, up through the floor to the oil switches, then down again and through the partition wall to three 185-kw. 33,000 to 430-volt transformers connected in delta.

The entire high-tension system is designed for 60,000 volts, and later, by changing the transformer connections, the e.m.f. may be raised to 52,000 volts, thereby increasing the power carrying capacity of the whole transmission sys-



Oregon Railway—Electric Locomotive

Four leads are brought out from the secondary winding of each transformer and connected diametrical-six-phase to a 500-kw synchronous converter, which is equipped with end-play and speed-limit devices and a low-voltage circuit-breaker. The converter is started on one-third and two-thirds transformer taps.

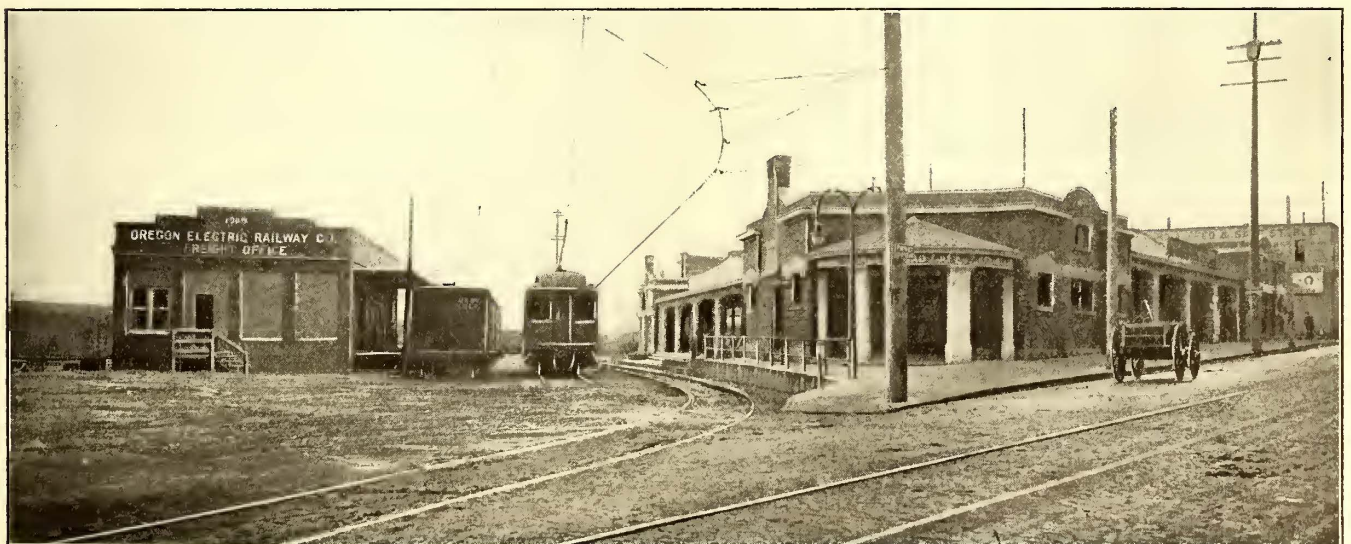


Oregon Railway—Typical Waiting Station

tem. The switchboard consists of two feeder panels, one converter panel and one starting panel, which equipment will later be doubled. The entire electrical equipment for the transmission lines and substations was furnished by the General Electric Company.

TRANSMISSION LINE

The substations are supplied with energy by the Portland General Electric Company from its hydro-electric plant in Oregon City and interconnected with its other power plants. The transmission line extends from Oregon City over a private right-of-way and for a very short distance along a country road 8½ miles to a point about 1 mile north of the Willamette Bridge, where it connects to the transmission line that is carried on the same poles with the overhead work, and runs from Salem to Multnomah and from Garden Home Junction to Moffat sub-



Oregon Electric Railway—Portland Terminal Freight Station at Left, Passenger Station at Right

Voltage range to meet all conditions is secured by a 75-kv-amp reactive coil in the substation; also by 5 per cent taps on the low-tension side of the main transformer at Oregon City (the beginning of the transmission line), and 2.5 per cent taps on the high-tension side of the substation transformers.

station, making a total of 65½ miles of transmission lines. At Oregon City the e.m.f. is stepped up from 10,000 to 33,000 volts by three delta-delta-connected 33-cycle, 750-kw water-cooled oil-insulated transformers, which are housed in a reinforced concrete building. A motor-operated three-phase oil switch is connected to the primary

side of the transformers, and air switches are provided to enable a disabled transformer to be cut out so that operation can be continued with the remaining two. The building also contains lightning arresters, and is intended to accommodate just double the present equipment. The pole line is built with 45-ft. cedar poles, each fitted with two fir cross-arms; the upper one 5 in. x 5¾ in. x 18 in., and the lower one 5 in. x 5¾ in. x 84 in. The wires are No. 0 seven-strand aluminum, and are carried on No. 419 slate-glaze Locke insulators, spaced to form a 6-ft. equilateral triangle and supported by 5/8-in. steel pins. A composite telephone and telegraph line is carried on the pole line from Portland to Salem and to Oregon City. The power wires are not transposed, but the telephone wires are transposed at every alternate pole, with the result that no trouble is experienced from induction.

ROLLING STOCK

The rolling stock now in operation consists of 14 combination passenger, smoking and baggage cars, 77 express and baggage cars, 2 freight locomotives and 77 freight cars.

and deck sashes, in which opalescent cut glass is used. The exterior finish is in orange color and similar to that of the coaches of the Chicago, Milwaukee & St. Paul Railroad.

The electrical equipment of the cars is as follows:

Sprague-General Electric relay automatic multiple-unit control system with one master controller.

Four GE-73 motors rated at 75 hp each, having a gear ratio of 22 to 53, which gives a speed of about 45 miles per hour.

One Westinghouse motor-driven air compressor and automatic pressure governor.

Two circuits of No. 93 truss-plank heaters.

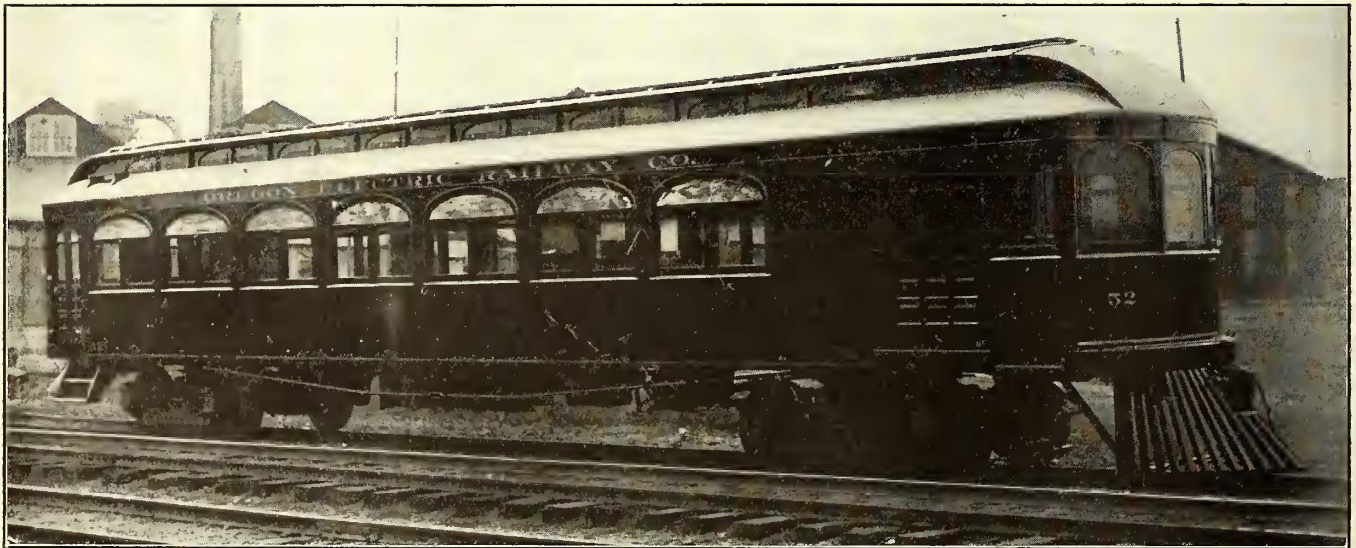
One 4-amp luminous arc headlight.

Five 32-cp incandescent lamps.

Thirty 16-cp incandescent lamps.

A switchboard located in the motorman's cab permits the control of all the auxiliary apparatus mentioned above.

The trucks were made by the Baldwin Locomotive Works. They are equipped with rolled steel wheels pressed and keyed on the axles, according to approved steam locomotive practice. The journal boxes are of the M. C. B.



Oregon Electric Railway —Standard Passenger Car

Of the 14 coaches, eight were built by the Jewett Car Company, while the rest and the two express cars were built by the Niles Car Company. The general dimensions of the passenger cars are as follows:

Length over bumpers.....	57 ft. 8 in.
Length over bulkheads.....	47 ft. 10 in.
Width over all.....	9 ft. 4 in.
Distance from top of roof to top of rail.....	13 ft. 7 in.
Weight.....	50 tons
Seating capacity, main compartment.....	38
Seating capacity, smoking compartment.....	16
Baggage room.....	8 ft. 2 in. x 9 ft.

The seats were furnished by the Heywood Brothers & Wakefield Company, and are of its "Walkover" type; they have high backs and are equipped with grab handles, roll head rests, pedestal bases and automatic foot and arm rests. Those in the main compartment are upholstered with dark-green plush, while those in the smoking compartment are upholstered with rattan.

The interior, including the end doors, is finished in mahogany rubbed to a dull finish. The ceilings are full empire style, done in green and gold, and all windows are glazed with heavy American plate glass, except the top

type and were made by the T. H. Symington Company. The general dimensions of the trucks are as follows:

Truck gage	4 ft. 8½ in.
Wheel base	6 ft. 6 in.
Weight of truck.....	10,250 lb.
Weight of truck with two motors.....	18,994 lb.
Diameter of wheels	36 in.
Tread of wheels.....	4½ in.
Flange of wheels.....	1½ in.
Diameter of axle at center.....	6 in.
Diameter of axle at gear seat.....	7 in.
Journals	5 in. x 9 in.

All passenger cars are equipped with Westinghouse automatic air brakes and also with hand brakes.

The two locomotives were built by the American Locomotive Company and were equipped by the General Electric Company with 4 GE No. 55 motors rated at 160 hp each and controlled by the Sprague-General Electric non-automatic multiple-unit control system. The general dimensions are:

Length over bumpers.....	29 ft. 4 in.
Length over main cab.....	9 ft. 6¼ in.
Distance from top of rail to trolley base.....	11 ft. 9 in.
Weight	50 tons

TRAIN SERVICE

The main line from Portland to Salem has been in operation about a year and the branch to Hillsboro and Forest Grove about 60 days. Local and express passenger trains are operated at frequent intervals. A number of limited trains are operated daily in each direction over

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

The hearing before the Railroad Commission of the case instituted by the city of Milwaukee to compel the Milwaukee Electric Railway & Light Company to reduce its fares to 3 cents was continued at Milwaukee last week. After hearing, the evidence presented on March 12, the commission adjourned the hearing until March 29, when further testimony will be given on behalf of the company.

The examination and the cross-examination were conducted by the following representatives of the company and the city:

George P. Miller and Edwin S. Mack, of Miller, Mack & Fairchild, of Milwaukee, general counsel, Milwaukee Electric Railway & Light Company. W. J. Curtis, of Sullivan, Cromwell & Curtis, of New York, general counsel, North American Company. John T. Kelly, city attorney; Lester C. Manson, assistant city attorney.

TESTIMONY OF C. N. DUFFY

C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, took the stand on March 10. Mr. Duffy described his connection with St. Louis companies as secretary, treasurer and auditor, and with the Chicago City Railway as secretary and auditor, comprising experience with horse, cable and electric railways, and as comptroller of the New York City Railway in 1903.

APPORTIONMENT OF COMMON CHARGES IN OPERATING EXPENSES

Mr. Duffy explained the apportionment of common charges in the operating expenses of the Milwaukee Electric Railway & Light Company and Milwaukee Light, Heat & Traction Company substantially as follows:

General Expenses.—“General expenses common” are apportioned as between “railway,” “lighting” and “heat” on the basis of the proportionate gross earnings of each. “Railway” is further apportioned as between the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company on the basis of the proportionate car-hours of the two companies. “Lighting” is further apportioned as between each of the lighting systems of the two companies, on the basis of the proportionate gross earnings of each. There is no further apportionment of “heat,” as there is only one company and one system for the heating business.

Transportation, Way and Structures, Rolling Stock.—These expenses are apportioned as between the Milwaukee Electric Railway & Light Company or Milwaukee Light, Heat & Traction Company on the basis of the proportionate car-hours of each company.

Maintenance and Operation of Power Plants and Substations.—The cost of generating and regenerating electric current, as carried in “Maintenance and operation of power plants and substations” is charged to “railway,” “lighting” and “other purposes” of each company and each system of each company separately, on the basis of the kw-hour consumption. “Heat” is charged with steam furnished by the power plants, which charge is deducted in arriving at the net cost of electric current. Electric current for “other purposes” than “railway” or “lighting” is charged out at 2 cents per kw-hour consumed. The difference between the cost of generating and regenerating electric current so consumed and the charge of 2 cents per kw-hour is credited in “maintenance and operation of power plants, and substations,” correspondingly reducing the kw-hour cost charged to “railway” or “lighting.”

NAMES OF STATIONS AND DISTANCES FROM PORTLAND

Name	Distance in miles	Name	Distance in miles
Main Line—		Main Line—	
Portland	0.0	West Woodburn	32.8
Shops	0.8	St. Louis	35.6
Corbett Street	1.7	Waconda	39.5
View Point	2.8	Chemeketa	41.1
Fulton Park	3.3	Quinaby	42.4
Capitol Hill	3.9	Chemawa	44.7
Ryan Place	4.5	Claxtar	45.9
Multnomah	5.0	Highland	48.1
Shahapta	5.4	Salem	49.7
Kusa	6.0	Branch Line—	
Barstow	6.5	Garden Home Junction	7.0
Garden Home Junction	7.0	Firlock	7.6
Metzger	8.7	Whitford	8.5
Greenburg	9.5	Beaverton	10.2
Tigard	10.4	St. Mary's	12.0
Bonita	11.8	Mortondale	13.4
Durham	12.7	Quatama	15.1
Tualatin	14.3	Orenco	16.4
Nasoma	15.8	Milkapsi	17.3
Tonquin	17.3	Moffat	19.0
Mulloy	18.5	Hillsboro	20.2
Wilsonville	21.2	Varley	22.0
Wallace	23.0	Cornelius	23.6
Chopunnish	24.3	Haynes	24.8
Donald	27.4	Forest Grove	26.1
Broadacres	30.1		

Note: A number of these stations are flag stations.

the road. The schedules of these trains are arranged especially to suit the different classes of travelers; for example, the “Supreme Court Train,” which leaves Portland at 8 a. m. daily and arrives at Salem at 10 a. m., is especially intended for Portland attorneys and others who desire to be present at the opening of the State Supreme Court. Some of the trains make exceptionally good time between Portland and Salem; one of the fastest, the



Oregon Railway—Making a High Fill

“Capitol City Flyer,” leaves Portland at 9:15 a. m., arriving in Salem at 10:50 a. m., making the run of 50 miles in 95 minutes, including two stops, one at Garden Home Junction and the other at Tualatin.

ORGANIZATION

The road was designed and built by W. S. Barstow & Company, New York, who acted throughout as engineers for the owners. The operating offices of the Oregon Electric Railway Company are located in Portland. The officers are: George B. Moffatt, New York, president; Guy W. Talbot, vice-president and general manager; George F. Nevins, secretary, auditor and traffic manager; C. A. Coolidge, superintendent; H. Milliken, electrical engineer.

What are termed "special accounts" with this company, known as "clearing accounts" in the Interstate Commerce Commission classification of accounts, and by some electric railways entitled "apportionment accounts," consist of the following: 1, Printing bureau; 2, draughting bureau; 3, photograph bureau; 4, laboratory; 5, pipe shop; 6, brass foundry; 7, cast welding; 8, operating gravel pits; 9, stable expense; 10, utility equipment.

In the 10 accounts outlined above are carried all expenses of operation, maintenance and fixed charges, in order to arrive at the true cost of the product produced or the service performed incident to the operation of any one of the departments enumerated above. This true cost thus ascertained is charged in the proper account or accounts of the company or companies using the product produced or receiving the benefit of the service performed.

Work Orders.—For all work other than current or ordinary maintenance, renewals or repairs, a work order is issued upon the recommendation of the departmental head or heads interested or concerned and the approval of the president and general manager. This recommendation covers a full description of the work to be done, with an estimate of its cost. All labor, material and expenses incident to doing the work covered by the work order is charged to this work order and carried in the work-order book, finally landing in the accounts of the company, usually as a charge to "depreciation" or "construction," although, of course, there are some work orders charged to operating expenses or some other account.

Mr. Duffy also described the division of earnings and expenses shown by the Milwaukee Light, Heat & Traction Company cars while running over the Milwaukee Electric Railway & Light Company's lines.

BENEFITS OF ORGANIZATION AT MINIMUM EXPENSE

By the apportionment of the common charges to operating expenses between the Milwaukee Electric Railway & Light Company, Milwaukee Central Heating Company and the Milwaukee Light, Heat & Traction Company, Mr. Duffy said that each company bore the proper proportion of the expense of operation of the three companies, as well as the different kinds of business in which they were engaged. Each company and each kind of business of each company enjoyed all the advantages of the organization of the entire property at a minimum of cost. Without these advantages, each company separately could not operate at the low cost that it does and maintain its property in the condition it does. These advantages, with the uncommon capacity of the president and general manager, his executive ability and efficient and economical administration of the property made possible the results achieved. Without these advantageous conditions, neither of the three companies could show the results attained, if, indeed, they could operate the properties and meet fixed charges, to say nothing of any profits.

APPORTIONMENT ON CAR-HOUR BASIS

After discussing further the apportionment of operating expenses between the Milwaukee Electric Railway & Light Company and Milwaukee Light, Heat and Traction Company on a car-hour basis, Mr. Duffy said that that basis had been adopted as more equitable than any other and as the most practicable one to apply. For instance, in maintenance of way and structures it was found that so far as current maintenance and renewals were concerned the costs were approximately the same for both companies. The current or extraordinary renewals were greater on the

city system than on the suburban or interurban system, but were charged to depreciation reserve, not operating expenses.

The car-hour unit had the advantage of eliminating the element of speed, which made the car-mile unit unsatisfactory in many instances.

WISDOM IN ESTABLISHMENT OF RESERVES

Mr. Duffy then analyzed a supplemental report made by Edward E. Gore, accountant for the city, regarding the operations of the company in 1907. The report of Mr. Gore criticised the reserves of the company. Mr. Duffy spoke of the wisdom and foresight in the policy of the company which dictated the establishment of the reserves for depreciation, contingencies, injuries and damages, fire insurance and taxes. No provision was made for other reserves which it would be desirable to set up, as for amortization of the non-physical investment, including expenses of organization, creation of the property and financing; for the preservation of the physical investment or the difference between the value of the physical property as an operating whole and the shrinkage in that value as a non-operating property because of expiration of franchise; and for casualties, such as earthquakes, conflagrations, floods, strikes, riots, etc., the experiences of San Francisco, Baltimore, Boston, Chicago and St. Louis illustrating the advisability of such provision.

The reserves set up on the books of the company indicated, Mr. Duffy said, an able, wise and conservative administration, seeking to strengthen the financial condition of the company and to provide in advance for misfortunes that might befall it.

Attention was then called by Mr. Duffy to the classification of accounts for electric utilities prescribed by the Railroad Commission of Wisconsin, which included depreciation and "contingencies—extraordinary," as items of operating expense. Discussing the desirability of making provision from earnings for depreciation and contingencies, as demonstrated by his own experience, Mr. Duffy mentioned the cyclone in St. Louis in 1896 and the loss which it entailed upon many, including the railway with which he was connected. Mr. Duffy said: "I say that reserves are just as necessary and important in this business as they are, for instance, in any insurance business. You might as well say that the difference between the premiums collected by the insurance company, fire, life, casualty, liability or whatever it may be, and the expense of conducting the business, represent the profits available for distribution and dividends on stock. It is exactly the same principle. Is there any man that would insure his property in an insurance company conducted on that basis? Would any man insure his life for the benefit of his wife and children in a company conducted on those lines? No. It is part of the cost of the business that the buyer of insurance has to pay for and the buyer of transportation facilities in a street railway ought to pay for; and it is exactly the same principle in one case as in the other."

In submitting the accompanying table showing the number of transfer and revenue passengers carried and car-miles run from 1897 to 1908, Mr. Duffy called attention to the fact that the number of transfer passengers carried in 1908 was about three and one-half times the number shown in 1897; the number of revenue passengers in 1908 was only about two and one-half times the total in 1897.

The accompanying table shows the revenue and transfer passengers carried per car-mile from 1897 to 1908.

These figures should be considered in connection with the rates of fare charged in different years, shown in the second table.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
PASSENGERS CARRIED AND CAR-MILES RUN.
Submitted in Evidence by C. N. Duffy, Comptroller.

Year.	Transfer passengers.	Revenue passengers.	Car-miles run.
1897.....	7,088,300	27,777,962	7,632,849
1898.....	7,913,393	30,673,564	7,426,033
1899.....	8,327,553	33,765,324	7,662,821
1900.....	10,505,107	38,286,003	8,395,323
1901.....	12,151,806	41,682,088	8,669,402
1902.....	13,926,679	46,974,373	9,143,023
1903.....	16,253,333	52,104,579	9,568,915
1904.....	17,172,188	55,149,378	10,477,929
1905.....	19,886,450	61,327,936	10,521,160
1906.....	22,976,165	68,798,430	11,492,013
1907.....	25,809,012	74,720,783	12,294,354
1908.....	26,492,482	74,965,927	12,144,642

The average fare per passenger and percentage of revenue passengers riding on transfers from 1897 to 1908, in-

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
PASSENGERS CARRIED PER CAR-MILE.
Submitted by C. N. Duffy, Comptroller.

Year.	Revenue.	Transfer.	Revenue and transfer.
1897.....	3.64	.93	4.57
1898.....	4.13	1.07	5.20
1899.....	4.41	1.15	5.56
1900.....	4.56	1.25	5.81
1901.....	4.81	1.40	6.21
1902.....	5.14	1.52	6.66
1903.....	5.44	1.70	7.14
1904.....	5.26	1.64	6.90
1905.....	5.83	1.89	7.72
1906.....	5.99	2.00	7.99
1907.....	6.08	2.10	8.18
1908.....	6.17	2.18	8.35
Average 12 years.....	5.12	1.57	6.69

RATES OF FARE.

1897, 1898, 1899:
Adults, 5 cents cash or 5-cent ticket.
Children under 10 years of age, 3 cents cash.
1900, 1901, 1902, 1903, 1904:
Adults, 5 cents cash, 4½-cent ticket (6 for 25 cents), 4-cent ticket (25 for \$1).
Tickets good only between the hours of 5:30 and 8 a. m. and 5 and 7 p. m.
Children under 10 years of age, 3 cents cash.
1905, 1906, 1907, 1908:
Adults, 5 cents cash, 4½-cent ticket (6 for 25 cents), 4-cent ticket (25 for \$1).
Tickets good all hours of the day and night.
Children under 10 years of age, 3 cents cash.

clusive, with the average for the entire period are shown in the second table published herewith. Attention was called

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
AVERAGE FARE PER PASSENGER AND PERCENTAGE OF REVENUE PASSENGERS RIDING ON TRANSFERS.
Submitted by C. N. Duffy, Comptroller.

Year.	Including transfers—cents.	Excluding transfers—cents.	Percentage of revenue passengers riding on transfers.
1897.....	3.94	4.95	25.52
1898.....	3.92	4.93	25.80
1899.....	3.89	4.91	26.14
1900.....	3.76	4.80	27.44
1901.....	3.75	4.84	29.15
1902.....	3.76	4.87	29.65
1903.....	3.72	4.88	31.19
1904.....	3.71	4.86	31.14
1905.....	3.27	4.33	32.43
1906.....	3.22	4.30	33.40
1907.....	3.18	4.27	34.54
1908.....	3.15	4.27	35.34
Average 12 years.....	3.61	4.68	30.15

by Mr. Duffy to the rapid decline in the average revenue per passenger carried, beginning with the year 1905. The percentage of revenue passengers riding on transfers increased from 25.52 to 35.34 per cent in 1908, notwithstanding the purpose of the company to route its cars so that wherever possible and practicable a man could be carried from one part of the city to any other part without the necessity of changing cars.

At the presentation of the table last mentioned Mr. Curtis said it seemed to him to be a more impressive exhibit of the effect of increasing transfer traffic than he had ever seen before.

The company had been criticised severely, Mr. Duffy said, for enforcing a rule embodied in its 1900 contract with the city of Milwaukee, providing that transfers should be issued only at the time of the payment of fares. Enforcement of this rule was absolutely necessary for the

preservation of the life of the company, and that was demonstrated by the misuse of transfers in other cities.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
EARNINGS AND OPERATING EXPENSES.
Submitted by C. N. Duffy, Comptroller.
CENTS PER CAR-MILE.

Year.	Gross receipts.	Operating expenses.	Operating expenses—per cent of gross receipts.
1897.....	18.45	10.63	57.60
1898.....	20.48	11.08	54.09
1899.....	21.78	11.04	50.71
1900.....	22.04	11.38	51.63
1901.....	23.44	11.68	49.82
1902.....	25.18	11.83	46.99
1903.....	26.74	13.50	50.49
1904.....	25.76	13.10	50.85
1905.....	26.38	12.48	49.18
1906.....	25.67	12.67	43.90
1907.....	26.21	13.70	52.27
1908.....	26.54	13.82	52.08
Average 12 years.....	23.99	12.24	51.22

Another table presented by Mr. Duffy, reproduced herewith, showed the gross receipts and operating expenses, per car-mile, from 1897 to 1908, and the percentage of gross earnings used in operating expenses.

TESTIMONY OF CHARLES J. MARR

Charles J. Marr, resident partner at Chicago of Dick-inson, Wilmot & Sterrett, certified public accountants, was called to the stand on Feb. 26 to testify regarding an examination and report which he made of the books and accounts of the company.

The witness said that the purpose of the examination was to ascertain in what respects the report of the accountants engaged by the city differed in results from what was shown by the books of the company, the reasons and the propriety of the differences.

In computing the cost of the property Mr. Marr began with the actual net cash invested in the property as of Jan. 1, 1897, as disclosed in the testimony in the 4-cent-fare case, which was tried about that time. The Milwaukee Electric Railway & Light Company was formed by issuing its securities in exchange for the securities of the predecessor company and Mr. Marr inquired into the basis for the exchange and then endeavored to go behind the values to ascertain the values behind the securities of the predecessor company. In reaching the figure of \$8,885,644.17 Mr. Marr excluded items of bond discount and of like character amounting to \$3,675,000. This is more than the amount excluded by the accountants for the city, who arrived at a first cost of property of slightly over \$9,000,000.

The depreciation adopted would work out to about 4 cents per car-mile over the 10 years' history of the Milwaukee company, and the maintenance would amount to about 2 cents per car-mile, making a total of 6 cents. By the method adopted the accountants had taken care of all the elements which could arise so far as they had been experienced in the last 10 years, but it might be that changes in the management and operation of street railways might be more radical in the next 10 years than in the past 10, in which case the rates would be insufficient.

RATE OF RETURN

The rate of return on the investment in ordinary private business enterprises varied considerably. No industrial or manufacturing company would be regarded as successful which did not earn 8 per cent or over and many earned a great deal more. In this statement the witness meant a return on the capital stock outstanding, which in the case of a majority of corporations of this character was offset by a more or less substantial amount for goodwill. The percentages would be a great deal more accord-

ing as the good-will was eliminated from consideration in the capitalization of the business. In a well-managed private corporation earning the rate of return named it was customary to make liberal provisions from earnings for depreciation of plant, machinery and equipment and for reserves for bad debts and contingencies in addition to carrying a considerable amount to surplus.

Reference was made to the reports of several large industrial companies, including the United States Steel Corporation. The latter company, Mr. Marr said, set up liberal reserves and its accounts were prepared on the most conservative basis possible. The greater the reserve the more solid would be the foundation on which a company would stand.

During his examination the witness found the books were well kept. No attempt was made to hide any entries of any kind; the books were remarkably free from any criticism in that respect.

Under examination by Mr. Curtis, it was stated by Mr. Marr that upon the low adjusted cost of operation as computed by the accountant for the city, allowing 4 per cent return upon the valuation fixed by the engineering staff of the Railroad Commission—reproduction value new—it would be impossible for the road to be operated and pay on a 3-cent fare. It was also stated by the witness that, based upon the readjusted expenses of operation of the city's accountant and upon his insufficient depreciation of 8 per cent and allowing $2\frac{1}{2}$ per cent return on his valuation of the property, it would cost more than 3 cents per passenger to do the business. The amount of depreciation allowed by the company, which was 2 per cent in excess of the allowance suggested by the city's accountant, was wholly insufficient, in the opinion of Mr. Marr.

ALLOWANCES IN CHICAGO ORDINANCES

A question was raised as to the rates allowed for maintenance, repairs, renewals and depreciation in the Chicago ordinances and the witness said he did not know how the companies in that city could maintain the property on the basis of only 14 per cent of gross earnings. The experience of the Chicago railways had demonstrated that 14 per cent was wholly insufficient. Their experience had shown that at least 24 per cent would be sound. Any ordinance which restricted them to expending 14 per cent and charging that against the earnings and paying additional expenditures for maintenance out of the company's share of the profits would not be fair. The Chicago companies, however, made the existing arrangement in the face of the approaching end of the franchises.

Mr. Marr considered that intangible assets had a value which was usually determined by the difference between the price paid in a purchase and what was received that was tangible. Sometimes evidence of the value could not be seen because the company had bought, as in this case, several disconnected and old and antiquated systems and practically replaced them with new. The cost of the new included, nevertheless, the cost of the properties bought and superseded immediately. A lot with a building on it might be bought and payment be required for the building; but although the building should be torn down immediately, the price paid would be considered the price of the lot. Transactions of the magnitude of that involved in the Milwaukee case were not based usually upon a minute investigation of the value of each separate piece of property. Independent of the other value in a property of this kind was that of the going concern, the opportunity of getting and putting together several disconnected parts

and making of them a complete, up-to-date, efficient whole.

GOOD FAITH IN PURCHASE

Mr. Marr was asked by Mr. Manson to explain his reference to good faith in the purchase of properties of this character. He said in reply: "If I go into partnership with you and pay a price which I believe to be reasonable at the time in this joint enterprise, not intending to impose upon you or in any way do you any financial injustice, I should think that although it might transpire later that I paid an excessive price for the property, I ought to be entitled to a proper return on what I did pay." He added that he should think that the city and the people would have been very glad that some powerful financial interests stepped in and took up the bankrupt property and provided a well-equipped and serviceable system. If a private corporation stepped in and bought a broken-down property and, in face of the failure of the previous property, undertook to expend a great deal of money in the reconstruction and extension, provided free transfers and commodious cars and charged a low rate of fare, that implied a community of interest between the public benefited and the capitalists who risked their capital. Clearly it would be in the highest degree inequitable for the city to deny those contributing the necessary capital any return on a portion thereof merely because it is not now represented by physical property.

EXCLUDED ITEMS

When the hearing was resumed on March 2 Mr. Mack submitted on behalf of the company a statement of the items excluded from the cost of property by Mr. Marr. The company and its counsel believed that the inclusion of many, if not all, of these items could be justified and the statement was submitted in order that in the argument counsel might present reasons for including these items.

The cross-examination of Mr. Marr was then resumed by Mr. Manson, who questioned the witness first regarding his discussion of a reserve to cover the difference in the investment in physical property at the expiration of the franchise and the scrap value thereof. The witness said that the reserve recommended for this purpose was based on the theory that the company may be required to realize what it could at the termination of the franchise. If, under the new law providing for an indeterminate permit in Wisconsin, the company, at the expiration of its franchise, received recognition from the authorities for its intangible values as well as the physical values, the question of a provision for the extinguishment of these values would not be of such paramount importance. No matter how responsible the parties were who guaranteed that something might be done in 1934, the witness would prefer to have his whole investment repaid in the meanwhile, or provision made for such repayment, than to wait until 1934 and then take his chances.

The subject of reserve for injuries and damages was brought up and the witness said he did not think it would be wise for the company to expect to be as fortunate in the future as in the past in the matter of accidents. After 10 years of strenuous experience this huge corporation was left with a beggarly \$300,000 of reserve that had been provided out of operating. This did not seem to Mr. Marr to be unreasonable or excessive.

TESTIMONY OF CHARLES J. DAVIDSON

Charles J. Davidson, chief engineer of power plants of the Milwaukee Electric Railway & Light Company, testified on March 3.

Mr. Davidson thought that 5 per cent should be set aside annually to cover depreciation of engines due to wear and tear. He questioned whether any engineer would be justified in making a definite statement at this time as to the proper allowance for depreciation due to obsolescence and inadequacy of engines as the state of the art was more unsettled at present than it had ever been before. Mr. Davidson then described the progress of the art until the development of steam turbines and said that conservative engineers probably believed that the steam turbine may always occupy a certain portion of the field, but that did not mean that it would not be generally superseded. Two developments were in view for the generation of electricity. One was the combination of the steam engine and the steam turbine, using the higher pressure of steam in the engine and the lower pressure in the turbine, but the greater rival for popularity was the gas engine. Within even two years it may be considered to be proper economy and profitable to discard the best installation the company has now. Mr. Davidson made a trip to Europe two years ago to study the development of power-generating apparatus.

A proper allowance for depreciation of boilers, due to wear and tear, would be 7½ per cent yearly. An allowance for probable future obsolescence and inadequacy would depend very largely on the development of the gas engine. The development in boilers was toward larger units and higher degrees of superheat. For depreciation of heaters and economizers, due to age and wear, Mr. Davidson would allow 5 per cent to 7½ per cent. The state of the art was fairly well settled so long as steam apparatus remained in vogue. Piping practice was undergoing great changes. The allowance for depreciation due to age and wear only should be at least 7½ per cent annually.

For pumps and condensers an allowance of 6 per cent yearly should be made for depreciation due to age and wear. To take care of probable future obsolescence and inadequacy not less than an additional 5 per cent per annum should be allowed, but the cost might be, and probably would be, a great deal more than that. Not less than 5 per cent annually should be provided for obsolescence and inadequacy in the entire power plant. An allowance of 3 per cent annually for depreciation, due to age and wear, should be made for traveling cranes in power-plant service.

Depreciation due to age and wear of coal and ash conveyors would require an allowance of 10 per cent annually; and belting shafts, ropes, etc., also dynamos, 7½ per cent annually.

A question was asked as to how useful a building erected for a power plant would be after the power plant itself was no longer useful. The speaker thought that it would be more profitable to tear down the old building than to try to form a new plant inside of it. The arrangement of the machinery was important; after it had been arranged the architect was permitted to construct the building around the machinery. That was the only way to create a good power plant.

CONCEALED COSTS

Mr. Davidson cited an instance to show an element of concealed cost that would not be apparent when an inventory was made. A 1500-kw unit was installed in Racine last year. The estimate, based on the best data available, was \$27,200, but the cost was \$33,000, due very largely to conditions under the floor that could not be seen. Nothing was known of old foundations of concrete and other masonry, left from previous installations, which

were very expensive to remove, and other developments occurred, requiring the rehandling of the machinery through no fault of the company; these conditions increased the cost beyond all estimates. The water-power installation at Kilbourn, Wis., generating 8000 hp, was started with an estimated cost, compiled by capable engineers, of from \$1,000,000 to \$1,250,000, but the actual cost would be \$1,750,000. The power plant of the Union Electric Light & Power Company, of St. Louis, cost approximately \$4,800,000, due partly to contingencies resulting from the construction of a river wall in strata that contained, among various difficulties, old steamboats and engines through which piling could not be driven. An engineer, not knowing of these conditions, or leaving them out of consideration, if known, would be warranted in estimating \$3,000,000 as the cost of reproduction. These contingencies would lengthen the period of construction very materially.

The witness said that there would have been practically no difference in the size of the Commerce Street plant, Milwaukee, if it had been installed merely to supply the city railway and lighting system without furnishing any power whatever to the Milwaukee Light, Heat & Traction Company. An added economy resulted from the use of this plant for the city railway and city lighting system as well as to the railway company's own lighting circuits, as the peak loads rarely came at the same time. While the witness did not know the exact amount of the increased load attributable to the traction company, it was relatively a small amount and would not affect any part of the operation of the plant except the quantity of coal consumed. The labor element would not be affected at all.

The cost of labor had increased up to about the beginning of 1908, but had been about stationary since that time. From 1906 to 1908, however, the difficulties in the labor situation were rather in the direction of decreased efficiency than of further increases in wages.

TESTIMONY OF OTTO M. RAU

Otto M. Rau, chief electrician of the Milwaukee Electric Railway & Light Company, who has charge of the distribution system, was called to the stand on March 4. For depreciation due to age and wear he said he would allow the following annual percentages:

	Per cent
Poles, fittings and wire.....	7½
Conduits	2
Underground feeders and cables.....	5
Generating apparatus	5
Substation apparatus	5
Storage batteries	10
Switchboards and cables	5
Telephone system	7½

A proper allowance for depreciation due to obsolescence and inadequacy in power plant apparatus would be 10 per cent annually. There would be little, if any, depreciation for obsolescence of poles, wiring and fitting. Probable inadequacy, rather than obsolescence, should be considered in the underground system, and an allowance of 2½ per cent be made therefor.

TESTIMONY OF M. G. STARRETT

Milton G. Starrett, of New York, consulting engineer for the receivers of the Metropolitan Street Railway, of New York, was introduced as a witness on March 4.

Mr. Starrett, under examination by Mr. Curtis, defined the different elements of depreciation. Depreciation due to wear and tear depended on the average life of different parts of the structure or property used and that life de-

pended to a large extent on conditions and amount of use. There was also depreciation due to obsolescence, to inadequacy and to public requirements.

The percentage indicated in the accompanying table, 5.59 per cent, was, in the opinion of Mr. Starrett, a proper allowance for depreciation due to wear and tear. It was very difficult to give a definite percentage for depreciation due to obsolescence, because it would vary in different places and under different conditions, but for the purpose of getting a definite figure in this case, Mr. Starrett took 1.79 per cent of the total reproduction cost. For depreciation due to public requirements or such changes as the company might be obliged by ordinance, for instance, to make, and for inadequacy in making tentative figures Mr. Starrett would allow 1/2 of 1 per cent, making a total of 7.88 per cent.

In reaching the replacement value of a railway property Mr. Starrett would add the following allowances to the items enumerated in a unit estimate:

Engineering and superintendence.....	4 per cent
Organization and legal expenses.....	2 per cent
Interest during construction.....	3 per cent
Contingencies	5 per cent
Discount on bonds.....	9 per cent
Working capital	1 per cent
Total	24 per cent

Assuming that 7-in. 95-lb. rails were used, the cost of constructing a mile of roadbed such as is in use in Milwaukee, with concrete foundation as used in that city, would be \$15,733.74, in Mr. Starrett's opinion. In this calculation 898 yd. of concrete were taken at \$3.65 per yard and an allowance of 10 per cent was added for supervision, contractors' profits and incidentals.

Mr. Starrett also stated that he had made an estimate of the cost of construction of a mile of track, assuming a 6-in. 72-lb. rail costing \$40 and 898 yd. of concrete and allowing 10 per cent for supervision, contractors' profits and incidentals. The estimate was \$14,076. In making estimates for construction of track in streets, electrical construction or other similar work, Mr. Starrett's practice for years had been to add an allowance of 5 per cent for contingencies. If engineering and supervision had not been added separately a certain percentage was provided for those expenses and also for contractors' profits. Mr. Starrett would increase the allowance of 3 per cent for contingencies, as made by Professor Pence, to 5 per cent, and he thought that an allowance for the additional items mentioned should have been made in the valuation of the engineering staff of the commission.

Mr. Starrett had been accustomed to consider that all expense for renewals and replacements of part of a property should be charged against depreciation and that the expense of keeping part of the property in adjustment should be considered a repair item or an operating item.

The accompanying table, compiled by Mr. Starrett, showing the rates of annual depreciation of physical property due to age and wear only, was based on his own experience and that of other engineers of other properties. The amounts given by Mr. Starrett to be set aside for depreciation indicated the amounts which, if applied annually, would keep the property continually in a usable condition. If the boiler, for instance, were not superseded for obsolescence it might be used perpetually or for an indefinite period with the application of the percentages of value indicated. The supersession of the machine as a whole or of the renewed machine would occur because of obsolescence or in-

adequacy. The calculation of an additional percentage for obsolescence or inadequacy was made for the reason that the machine must be replaced through obsolescence or inadequacy despite the continued renewal through the depreciation fund.

Mr. Starrett was asked if he would be safe in setting aside a somewhat lower rate for depreciation and in assuming an interest accumulation to make up the difference. He said that perhaps it could be assumed that some interest would accumulate, but that these renewals would have to be made at varying times during the life of the apparatus and payment made for them from the accumulated reserve; the reserve could not draw interest and provide for renewals at the same time.

In the estimate of the average life of boilers it was considered that replacements would be made practically as

COMPUTATION OF ANNUAL DEPRECIATION DUE TO AGE AND WEAR OF PHYSICAL PROPERTY (OPERATING RAILWAY ONLY) OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, AS MADE BY M. G. STARRETT, USING COST OF REPRODUCTION AS COMPUTED BY PROF. W. D. PENCE.

Items.....	Reproduction cost.....	Reproduction cost plus 12 per cent, items 1 to 9 inclusive.....	Rate of depreciation.....	Annual depreciation.....
1 Land	\$597,845	\$669,586	0
2 Track	1,236,949	1,385,382	8	\$110,830
3 Cars and equipment.....	2,007,876	2,248,821	6	134,929
4 Electric distributing system....	1,063,818	1,191,476	7	83,403
5 Power plant equipment.....	1,060,615	1,187,889	5	59,394
6 Buildings	878,807	984,264	5	19,685
7 Office furniture and appliances..	23,443	26,256	5	1,313
8 Tools, implements and mach'y..	285,564	319,831	7	22,388
9 Horses, wagons and miscell..	32,410	36,309	5	1,815
10 Stores and supplies.....	57,630	57,630	5
11 Paving	823,871	823,871	8	65,909
Totals	\$8,068,837	\$8,931,315	5.59	\$499,668

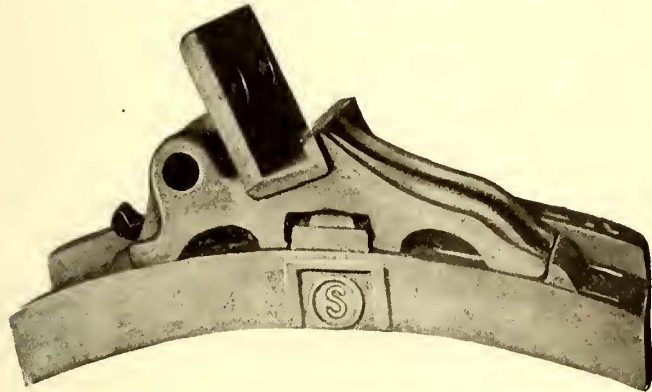
they became necessary. Anything that did not involve the replacement or renewal of parts Mr. Starrett should consider as repairs. If the deterioration or loss of value should be made good through the repair account it would not be necessary to have so much money in the reserve or depreciation account.

Under cross-examination by Mr. Manson, Mr. Starrett reiterated that it was very difficult to assign any definite value in estimating for depreciation due to inadequacy. The value which he placed was an arbitrary one. Some allowance should be made to cover possible errors in estimating the conditions which may arise in the operation of a property, such conditions rendering the apparatus provided insufficient for the purpose. The element of uncertainty as to future conditions should receive some consideration.

Rumors have been current for some time that the Washington, Baltimore & Annapolis Electric Railway, which is equipped with single-phase system, would be changed to direct current. It is understood that the equipment of the company as it now stands was never accepted by the engineers or management of the company and that, in accordance with its contract, the railway company can change to direct current under certain conditions. The officers of the company when interviewed declined to state that the change to direct current had been absolutely decided upon, but they admitted that it was being considered, and that the change might be made in the near future.

BRAKE SHOE PRACTICE ON THE PUBLIC SERVICE RAILWAY

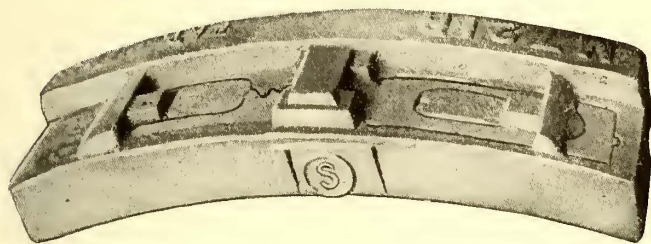
The Public Service Railway Company has the distinction of operating over a larger area than any other electric railway system. It embraces 555 miles of standard gage and 108 miles of 5-ft. gage track, which serve almost every important community in New Jersey. These lines, when



Standard Head and Shoe Used by the Public Service Railway

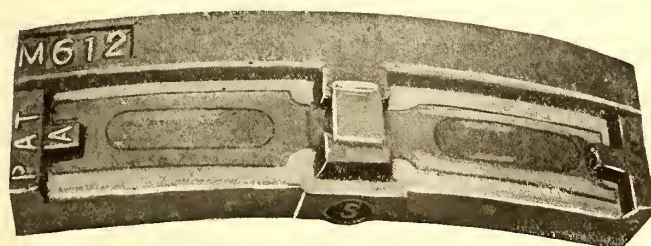
consolidated, had the most diverse practices, but within the last two or three years uniformity has been rapidly attained on that portion of the system including Newark, Jersey City, Elizabeth and Hoboken, the cars of which are maintained at the large Plank Road shops between Jersey City and Newark.

Uniform practice in brake shoes has resulted in reduc-



Standard Shoe, Type M-721, Used by the Public Service Railway

ing the number of patterns applied in these shops from about 20 to 1, except that two other shoes are required for 80 cars with maximum traction trucks. These latter are of the American Brake Shoe & Foundry Company's pattern No. 294 for pony wheels and No. 295 for drivers. The shoe which has been made the standard is the same manufacturer's pattern No. M-721, used in connection with

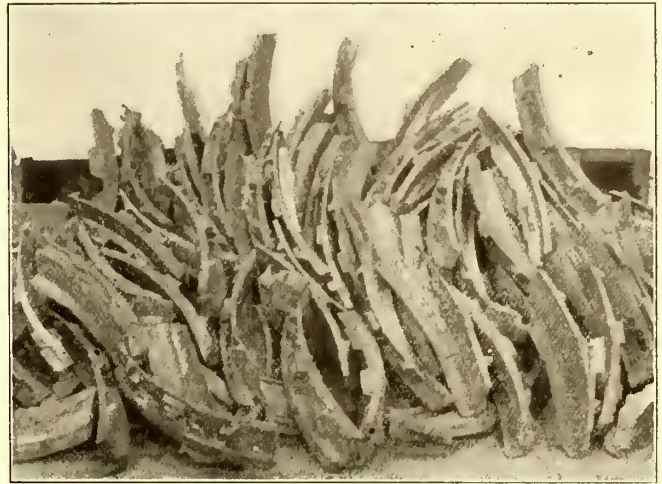


Standard Shoe for Narrow-Tread Wheels, New Weight 24-lb., Scrap 6 to 8 lb.

the head for both the right and left-hand wheels. This shoe is of soft cast-iron body, with special metal hard inserts, and is reinforced with a steel back and wrought steel lug. Its weight when new is 25 lb., and the average wear is 62 per cent as used on cast-iron wheels. The adoption of this design has reduced the weight of braking

metal per equipment about one-half, with no reduction in the service obtained per shoe.

This brake shoe is made for 2½-in. tread, but owing to the conditions imposed by the short wheelbase of this com-



Scrap Brake Shoes at West Hoboken Shop—200 Shoes, Average Weight 9.16 lb. and Average Wear 61.83 Per Cent

pany's cars, it cannot be used with the standard head for narrow-tread shoes, as recommended by the standardization committee of the American Street & Interurban Railway Association. This short wheelbase does not permit room for the standard long head and key. The type M-721 shoe is only 8¾ in. long between end stops, as against the 12¾ in. of the association standard, and the opening of the keyway in the lug is but ½ in., while the association standard is 13/16 in. This special shoe was designed by Charles Remelius, superintendent of rolling equipment, Public Service Railway.

CONCRETE FENCE POSTS

A report on this subject was presented at the Chicago meeting this week of the American Railway Engineering & Maintenance of Way Association. The committee reported that concrete fence posts are in use to a limited extent in all fields wherein wood posts are used and that they appear sufficiently strong for all practical purposes after being properly cured and set. An abstract of the conclusions of the committee follows:

The claim that concrete posts reinforced with steel form lightning protectors appears reasonable. They will, of course, resist the action of fire and decay. They will not float and cannot be displaced so easily as wood posts. On the other hand, concrete posts must be carefully handled in loading and unloading and well cured before using. Fence wire in contact with their surfaces should be well galvanized. The concrete post is much heavier than the wood post and the cost of distributing and setting is about 25 per cent greater. The committee believes that the concrete post is particularly adapted to railroad use. Most of the post machines are cheap and portable and the materials required are in daily use on all roads employing concrete; the materials are cheap and easily obtained.

There are over 20 manufacturers of posts and post-making machinery in the United States and Canada. A majority of these firms use or advise the use of Portland cement and gravel varying from the size of sand to pebbles which will pass a wire screen having meshes of from ½ in. to 1 in. square. The ratio of cement and gravel is as 1 to 4. The methods of reinforcing and tamping concrete posts vary almost as much as those of fastening the fence wire to the posts. The machines are of various capacities and design—from the one-post hand mold to the "post per minute" power machine with continuous mixer attach-

ment. The average total cubic content of the 7-ft. post is 0.825 cu. ft.; of the 8-ft. post, 0.95 cu. ft. The weights vary from 65 lb. to 95 lb., according to methods of manufacture and reinforcement used. Concrete posts retail for from 25 cents to 35 cents per post. End and gate posts are of about three times the volume and cost of intermediate posts. In section, concrete posts vary from square or rectangular to triangular, half-round and circular. Reinforcements are of wire, wood, strap steel, steel and wire truss, wood and wire truss, chain scrap strips and expanded metal. Fence wire fastenings are also of various forms—from the wire loop around the post to the patent staple encasement. All the posts observed taper from a smaller top to a larger base. Some have very wide concrete block bases.

In response to invitations sent to all manufacturers whose addresses were known in July, 1908, four concrete post-machine firms demonstrated their machines at Bay City, Mich., making 12 reinforced concrete posts each, which posts were tested for tensile strength at the Michigan Agricultural College at Lansing, Mich. Panels were erected to test the holding power of the fence in place as well as give the set posts impact tests and if possible to compare their strength of resistance to impact with wooden posts. They were tested in a machine of large capacity, 42-in. span, both ends supported, load applied in center; and the following results obtained as an average of 7 to 12 posts of each sort so tested:

Name—	First crack	Maximum weight post broken	Deflection in inches
"D".....	458 lb.	1090 lb.	0.68
"B".....	648 lb.	1071 lb.	0.70
"A".....	564 lb.	1020 lb.	0.53
"C".....	927 lb.	1356 lb.	0.66

A cedar post of dimensions identical with the average of these concrete posts would weigh about one-fourth as much and be four times as strong. The results in practice show that the wood posts used are much stronger than necessary rather than that concrete posts are not strong enough.

WOOD PRESERVATION*

In the practical execution of wood preservation numerous problems occur, all of which are not yet on a proper basis. Experience has demonstrated that woods vary greatly in their receptibility of preservatives. This is found to be a serious problem in the operation of a timber-preserving plant, and its proper solution is essentially a problem for this committee. Wood needs proper preparation in order to be successfully treated. This preparation often has serious effects on the wood itself. Furthermore, the application of the preservative may itself affect the wood in strength and durability. This brings out the fact that it is necessary to study the wood itself in the course of its preservation.

The work of the committee so far has fully determined that many facts are known, but these facts have not been compiled or brought together in the form to be most useful. There are a great number of statements given out as facts which are not proved. The committee, in its first year, recognizing the responsibility which rests with it and feeling that the work of its first year should be primarily an analysis, refrains in general from presenting matter to the association for positive action, excepting in a few minor cases. The report, therefore, in general contains facts, statements and analyses for the foundation of future work.

STATISTICS

Thirty-nine members of this association were selected who were likely to possess information. The committee was extremely fortunate, receiving 36 answers. The detailed reports have been filed in the association office and are open for reference.

(1) Creosoting may be relied upon to preserve piles from 20 to 25 or more years if they are injected with 16 lb. to 24 lb. per cubic foot.

(2) Creosoting at present cannot be relied upon to preserve ties more than 15½ years to 19 years, an absolute maximum, unless the ties are protected against mechanical destruction. If badly injected, they perish from decay in 5 years to 12 years.

(3) Burnettizing when well done can be relied upon to preserve ties from 10 years to 14 years. The amount to be injected varies with the proposed subsequent exposure. In arid climates ¼ lb. of dry zinc chloride per cubic foot may give good results. In moist and warm climates not less than ½ lb. per cubic foot should be injected. There are great differences in the thoroughness with which the work can be done. See also in Appendix B the difference between good and bad work.

(4) The zinc-creosote process has been too recently introduced (1904) in this country to give definite conclusions; it has given ties a life of 12 years to 18 years in the track in Germany.

(5) The Rueping and the Lowry processes are too recent to form definite opinions as to the resulting life of ties.

(6) Great waste and disappointment will result unless accurate records are kept, for 10 years at least, of the results in the track, connecting them with the way in which the work has been done. The best method of identification is by dating nails.

(7) It is indicated by the statistics given that a treated tie or timber may be destroyed by mechanical action long before it is decayed. The present general American method of rail fastening is not ample and not efficient. It is essential in order to obtain the full economic life of a preserved tie to improve the fastening by providing greater bearing surface and by the use of screws or screw spikes.

PRESERVATIVES

The work on preservatives is necessarily progressive. The committee does not wish to present at this time a detailed study of preservatives in general. It was determined to limit the work this year to coal-tar creosote and chloride of zinc, which are now being commonly used.

The increasing demand for coal-tar creosote has shown the necessity for the adoption of some standard specification. At the present time a considerable number of different specifications for this substance are in use (see Vol. 9, p. 740, of the Proceedings).

The chief requisite for a successful coal-tar creosote, i. e., one which shall preserve wood for an indefinite period of time, should be that the oil be composed of compounds which, because of their high-boiling points, will guarantee the greatest possible stability. With this end in view the following specification is recommended (see Appendix F, report of tie committee, Vol. 9, of the Proceedings). The principal points in connection with this specification are that it leaves out of consideration the question of relative properties of compounds and dwells essentially upon the necessity of obtaining fractions of a high-boiling character, as determined by fractional distillation:

STANDARD SPECIFICATION FOR COAL-TAR CREOSOTE

The oil used shall be the best obtainable grade of coal-tar creosote; that is, it must be a pure product of coal-tar distillation and must be free from admixture of oils, other tars or substances foreign to pure coal tar; it must be completely liquid at 38 deg. C., and must be free from suspended matter; the specific gravity of the oil at 38 deg. C. must be at least 1.03. When distilled according to the common method, that is, using an 8-oz. retort, asbestos covered with standard thermometers, bulb ½ in. above the surface of the oil, the creosote, calculated on the basis of the dry oil, shall give no distillate below 200 deg. C., not more than 5 per cent below 210 deg. C., not more than 25 per cent below 235 deg. C., and the residue above 355 deg. C., if it exceeds 5 per cent in quantity, it must be soft. The oil shall not contain more than 3 per cent water.

The zinc-chloride used shall be as free from any impurities of any kind as is practicable, being slightly basic and free from free acid.

METHODS FOR MEASURING COAL-TAR CREOSOTE

The committee finds that there are a good many different methods in use at the present time for determining the amount of creosote both as received at the treating plants and as absorbed by the timber. These differences relate largely to different temperatures at which oil is measured. This has given rise to a good deal of confusion, and as there appears to be no good reason why there should be so many different standards, the committee recommends that the standard temperature at which oil should be stated as 100 deg. Fahr. At this temperature practically all creosote oils in common use are liquid and can therefore be readily measured.

In view of the fact that coal-tar creosote is used at tem-

*Abstract of committee report presented before the American Railway Engineering & Maintenance of Way Association, Chicago, March 16, 17 and 18, 1909.

peratures other than 100 deg. Fahr., i. e., either above or below 100 deg. Fahr., it is necessary to reduce the volume at any observed temperature to the standard volume at 100 deg. Fahr. The factor which is almost universally in use at the present time for making volume corrections is 1 per cent expansion or contraction in volume for every 22½ deg. In making corrections for volume it is exceedingly important to state a volume at a standard temperature as indicating 100 per cent, i. e., a unit volume.

MEASUREMENT OF COAL-TAR CREOSOTE BY WEIGHT

The measurement of creosote by volume is always subject to more or less variation, owing to errors obtained in measuring large quantities, and in converting volumes as measured at a given temperature to the standard of 100 deg. Fahr. It is suggested, therefore, that wherever possible oil quantities be measured by weight. If desired, the volume can then be determined by ascertaining the specific gravity. That this is perfectly practicable is shown by one of the large oil producers who ships all oil by weight.

The committee has in progress a series of tests of treated timber which are not yet (Nov. 30, 1908) complete, and the work presented at this time is a compilation of available reports on strength of treated timber.

Experiments are under way at Purdue University for the committee on wood preservation to determine the comparative resistance of railway ties, natural and treated, to the action of the rail. These include red oak ties treated by the Lowry process and also by the zinc-chloride process. A further series of tests is arranged for on bridge stringers treated by the Lowry process.

GENERAL PRINCIPLES TO BE OBSERVED IN APPLYING PRESERVATIVES

Certain essentials must be observed to make the application of preservatives successful. First, the timber must be seasoned. It must be known to be of such character that it can be treated in the manner prescribed. Second, the element of heat is vital. Temperatures of the process must not be such as to be injurious to the wood. They must also be such that no change or injury will occur to the preservative itself. It is vital, however, that the temperature of treating be as high as possible, because this will either increase the fluidity of the preservative or tend to open the wood cells, or both. The maximum limiting temperature, however, is about 225 deg. Fahr. It is essential in order to produce economical results in the cost of treatment that tanks, retorts or reservoirs, or whatever vessel in which the timber is treated, be provided with sufficient means of heating, so that the heating may be done quickly and may be easily and surely controlled. Third, in order that there may be minimum cost of application it is necessary to have proper velocity of treatment. This involves the entire design of the apparatus for the application. It must be possible to perform every step quickly and accurately, but at the same time thoroughly. Fourth, it must be possible to apply the preservatives uniformly to all pieces of timber in any one charge; that is, each particular piece must have its full quota; this, too, means that the timber in any one charge must be alike in character so far as its ability to absorb is concerned.

THE PRESSURE PROCESS

The essentials of the apparatus of the process are, of course, the sealed retort and the pressure pump. The particular things which govern the apparatus are:

1. The character of the timber to be treated.
2. The character and amount of the preservatives used and the desired methods of application.
3. The desired capacity per day or per hour.

For refractory woods and heavy preservatives, as creosote, it must be possible to produce a pressure of 175 lb. per square inch to obtain economic velocity of treatment. For light wood a pressure of 75 lb. per square inch may be ample. These pressures, 175 lb. per square inch and 75 lb. per square inch, are in general the upper and lower limits used. If the timber to be treated is limited entirely to refractory woods as the red oaks, it must be possible to obtain the pressure of 175 lb. per square inch. When only light woods, as sap pine, are used, a pressure of 75 lb. per square inch may suffice, as stated.

The more fluid a preservative the more easily it can be

injected and the lower will be the desirable pressures. High fluidity is valuable. The higher the amount of preservative to be used per unit of timber, the greater will be the necessary pressure.

In the specifications for treatment adopted by the association it is proposed to steam the ties unless they are thoroughly air seasoned, in which case it may be omitted, at the option of the purchaser. It is to be emphasized, however, that this scheme should at all times be omitted when the ties are thoroughly air seasoned and are to be treated with oils.

In applying preservatives to timber the particular result looked for is cheapness of application, and this application shall be such as to produce the full value of the preservative. There are in general two classes of preservatives used in the pressure process—oils and salts. In general the oils are injected as a whole, the salts being injected in solution.

It is to be emphasized that in the pressure process it is vital that the sealed vessel or retort must be provided with accurate measuring devices both for measuring volumes and temperatures. It must be possible to determine closely the actions within the retort.

The open-tank process is the simplest form for applying a preservative. As its name indicates, it consists in dipping the wood in open tanks or vessels filled with the preservative to be used. It necessarily follows that this is an absorption rather than an injection, of the preserving fluid. It also follows that the depth of penetration obtained is small, except for particularly open or porous woods, such as sap pine, where a penetration of 1½ in. has been obtained.

CONCLUSIONS

To state the conclusions of this report in definite form they would be as follows:

- (1) Coal-tar creosote and zinc chloride are efficient preservatives when properly applied and when used under proper conditions.
- (2) It is necessary to keep better records than have been kept so far in order to form proper conclusions as to the merit of different methods and processes.
- (3) Preserved wood may be destroyed by mechanical action long before it is decayed.
- (4) The specification as given for coal-tar creosote is good practice and should be adopted.
- (5) There should be a standard temperature at which coal-tar creosote is measured. The temperature of 100 deg. Fahr. as given in the report is recommended.
- (6) It is essential that timber should be properly grouped in order that a successful treatment may be obtained. The species, proportion of heartwood and sapwood, condition of the timber with respect to its moisture content, and the wood structure, will in general determine this grouping.
- (7) It is desirable to air-season timber in order to prepare it for treatment. Most woods can be best treated after being air-seasoned.

APPENDIX, B—PRECAUTIONS TO BE OBSERVED IN BURNETTIZING TIES, SUGGESTED BY OCTAVE CHANUTE

(1) Wood should be well seasoned. The best check on this is the weight per cubic foot previously ascertained for a particular species of wood which takes the treatment well. Some resinous woods, such as Oregon fir, may best be treated when the sap is yet liquid.

(2) Different species of wood or woods taking treatment in different degrees should not be mixed in the same charge. Otherwise irregular injection will result.

(3) If the ties are sawed, lath or iron strap should be put between the layers to give the solution easy access.

(4) When the wood is thoroughly seasoned steaming may be dispensed with and better results obtained.

(5) Steaming, when necessary, should never exceed 20 lb. to the square inch pressure to avoid injuring the fiber. It should be continued from one to three hours, as dictated by the state of seasoning and experience.

(6) Vacuum, when applied prior to injection of preservative, should be 20 in. to 26 in. for one to two hours. It is desirable to measure the amount of sap extracted.

(7) The pressure on the solution, previously heated to 150 deg. Fahr., may be varied with the species of wood

and continue from one to three hours as found best. It should not exceed 200 lb. per square inch.

(8) The strength of the solution, made from chemicals previously tested for purity, should be such as to inject an average of $\frac{1}{2}$ lb. of dry chloride of zinc to the cubic foot. The strength of the solution should be tested for each run.

(9) The amount of solution absorbed is preferably ascertained by weighing each buggy load, both before and after treatment.

(10) Treated ties should dry in close piles, in ordinary weather, 20 to 30 days before being put in track, to insure the best results.

(11) Daily statements should be made of each run and be submitted to the proper authorities.

(12) Accurate records should be kept of the life of the ties in the track for at least 10 years. For this purpose dating nails should be used, and their shape may be varied to distinguish special modes of treatment, etc. It is possible to obtain a result of the life of the ties by placing them in an experimental section of track.

COMMITTEES OF THE AMERICAN STREET & INTERURBAN RAILWAY ENGINEERING ASSOCIATION

Paul Winsor, president of the American Street & Interurban Railway Engineering Association, announces the appointment of the following committees to report on the subjects stated at the next convention:

Power generation committee: Chairman, G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind.; A. S. Byrd, superintendent of power plants, Montreal Street Railway Company, Montreal, Canada; Jas. D. Andrew, superintendent of power stations, Boston Elevated Railway Company, Boston, Mass.; Wm. S. Twining, chief engineer, Philadelphia Rapid Transit Company, Philadelphia, Pa.; William Roberts, superintendent motive power, Northern Ohio Traction & Light Company, Akron, Ohio; F. Heckler, superintendent motive power, Lake Shore Electric Railway, Fremont, Ohio.

Power distribution committee: Chairman, James Heywood, superintendent lines and cables, Philadelphia Rapid Transit Company, Philadelphia, Pa.; G. W. Palmer, electrical engineer, Boston & Northern Street Railway Company, Boston, Mass.; W. J. Harvie, chief engineer, Utica & Mohawk Valley Railway Company, Utica, N. Y.; E. J. Dunne, superintendent of distribution, Public Service Railway Company, Newark, N. J.; S. L. Foster, chief electrician, United Railways of San Francisco, San Francisco, Cal.; W. G. Matthews, superintendent overhead lines, Denver City Tramway Company, Denver, Col.

Equipment committee: Chairman, L. L. Smith, master mechanic, Chicago & Milwaukee Electric Railway Company, Highwood, Ill.; W. H. McAloney, superintendent rolling stock, Denver City Tramway Company, Denver, Col.; M. V. Ayres, electrical engineer, Boston & Worcester Street Railway Company, South Framingham, Mass.; H. A. Benedict, mechanical engineer, United Traction Company, Albany, N. Y.; L. W. Jacques, master mechanic, Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.; J. S. Doyle, superintendent car equipment, Interborough Rapid Transit Company, New York, N. Y.

Way matters committee: Chairman, E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio; J. H. Hanna, chief engineer, Capital Traction Company, Washington, D. C.; J. M. Larned, engineer maintenance of way, Pittsburg Railways Company, Pittsburg, Pa.; M. J. French, engineer maintenance of way, Utica & Mohawk Valley Railway Company, Utica, N. Y.; M. Schreiber, engineer maintenance of

way, Public Service Railway Company, Newark, N. J.; G. L. Wilson, engineer maintenance of way, Twin City Rapid Transit Company, Minneapolis, Minn.

Standardization committee: Chairman, W. H. Evans, master mechanic, International Railways Company, Buffalo, N. Y.; G. H. Kelsay, superintendent of power, Indiana Union Traction Company, Anderson, Ind.; L. L. Smith, master mechanic, Chicago & Milwaukee Electric Railway Company, Highwood, Ill.; E. O. Ackerman, engineer maintenance of way, Columbus Railway & Light Company, Columbus, Ohio; James Heywood, superintendent lines and cables, Philadelphia Rapid Transit Company, Philadelphia, Pa.; B. Penoyer, chief engineer track and roadway, Schenectady Railway Company, Schenectady, N. Y.; M. J. Kehoe, superintendent of power, Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.; H. H. Adams, superintendent rolling stock and shops, New York City Railway Company, New York, N. Y.; J. Z. Murphy, chief engineer and electrician, Chicago Railway Company, Chicago, Ill.

MEETING OF THE COMMITTEE ON EDUCATION

The committee on education of the American Street & Interurban Railway Association held a meeting in Boston on March 11. There were present Prof. H. H. Norris, of Cornell University (chairman), R. E. Danforth, B. V. Swenson, Prof. A. S. Richey, Worcester Polytechnic Institute, and D. C. Jackson, Massachusetts Institute of Technology. Howard F. Grant, the other member, was prevented from attendance by illness.

The committee held morning and afternoon sessions. Professor Norris reported as a result of the correspondence which he had been conducting that a great deal of interest was being felt in the work of the committee. Mr. Danforth said that the experience he had had with the apprenticeship course recommended by the committee last year had been very satisfactory. He has on the Public Service Railway Company 20 graduate students in electrical engineering from different universities, and so far is very well pleased with the results secured. Other companies have shown an interest in the apprenticeship plan, but so far as is known none has adopted it on so large a scale as has the Public Service Railway Company.

The principal subject discussed by the committee was the establishment of two courses of education, one for graduates of technical colleges who have not had practical experience in electric railway work and one for non-graduates who are already engaged in the work. For the first class of men the committee has in mind an apprenticeship course somewhat similar to that now conducted by the Public Service Railway Company, which is a modification of that suggested by Professor Norris at the Atlantic City convention in 1907. For the other class the committee is considering the possibilities of establishing a correspondence course something like that conducted by the Gas Institute. With the correspondence course in the latter body a course in self-education is outlined by the institute and periodical examinations on questions applying to apparatus in use in the manufacture of gas are conducted. The answers to these questions are sent by the students to the institute, where they are corrected and returned to the students and the men are graded according to the ability shown in their replies. It was suggested that some modification of this plan might be adopted for the electric railway industry, but no definite decision was reached by the committee.

PAY-WITHIN CARS IN PHILADELPHIA

For a number of years past the management of the Philadelphia Rapid Transit Company has been making a very careful study of all of the phases of car design with a view of developing a standard type of car which would be best suited to the peculiar operating and traffic conditions in Philadelphia. Up to the time of the opening of the Market Street elevated and subway, about a year ago, all of the transportation lines in Philadelphia ran upon the city streets. The subway and elevated have relieved the con-

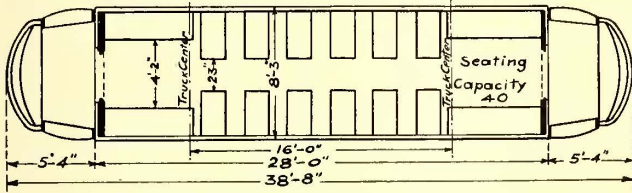


Fig. 1—Floor Plan of Standard Double-Truck Car in Philadelphia

ditions on Market Street, which is the principal east and west thoroughfare, to a great extent, but the north and south sections of Philadelphia and a large part of the area of the western section of the city which is not directly contiguous to the Market Street elevated line is still served only by surface cars. Philadelphia has a population of 1,500,000 and covers an area of 129 sq. miles. It is essentially a city of homes and is spread over a large area of comparatively thinly populated territory. The business district, however, is quite compact and occupies the site of old Philadelphia, which was built with very narrow streets. Many of the streets are so narrow that they can accommodate only a single track and cars are operated on the loop plan, running east or north on one street and west or south on the adjoining parallel street. This involves a large number of intersecting track crossings and sharp curves where the lines turn at right angles in the center of the congested district. Like every other large city, the traffic congestion during the morning and evening rush hours is very severe. The situation in Philadelphia is further complicated by the fact that there are many long-haul passengers who take the surface cars running out into the suburban towns. Cars suitable for this service must be rather more comfortable than the cars intended for strictly short-haul busi-

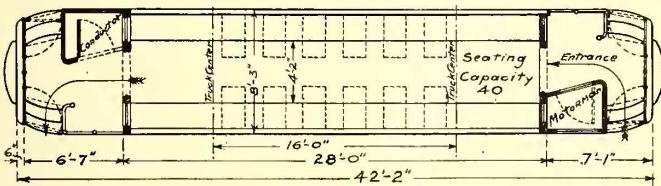


Fig. 2—Floor Plan of Double End Pay-As-You-Leave Car, Designed by W. S. Twining

ness and they must be equipped electrically to make higher speed on the outlying portion of the various lines.

When the Philadelphia Rapid Transit Company was formed in 1902 to take over the Union Traction Company and other independent traction companies it acquired with its leases a large number of small cars of many varying types and equipped with widely different types of motors, trucks and control apparatus. All new cars which have been built since the formation of the Rapid Transit Company have been built according to the accompanying plan, Fig. 1. These cars are intended for double-end operation, are 28 ft. long over bodies and 38 ft. 8 in. long

over bumpers. They are mounted on double trucks with 16-ft. truck centers and have six cross seats on each side of the aisle in the center and a longitudinal seat on each side of the center at the ends. The total seating capacity is 40. The cars are of the semi-convertible type and are used for both summer and winter operation. The company now operates cars of this general type on all of its principal lines. The newest of these cars are equipped with four 40-hp motors, as on many of the outlying lines severe grades are encountered and fairly high speeds are necessary to maintain a reasonable schedule.

The problem before the company in designing a new standard car involved consideration of the fact that 800 of these old standard double-truck cars were in service, and any design for a new standard type of car, which could be generally adopted by the company, must necessarily be of such a type and dimensions as to make it possible to rebuild the old cars so as to conform with the general arrangement of the new standard, at an expense which would not be prohibitive. Another fundamental requirement was the adoption of some improved method of fare collection. The collection of all of the fares was practically impossible on a crowded trip of a standard car of the old type. These cars are entered at both ends and there is always extreme congestion near the doors and on the rear platforms. If the passengers stood in the narrow aisle between the cross seats of the center of the car it was difficult for the conductor to pass from one end of the car to the other. The difficulty of collecting fares is, of course, present in the

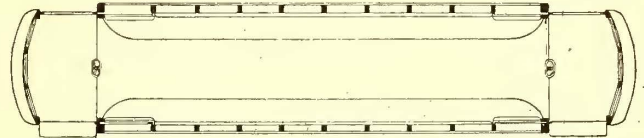


Fig. 3—Floor Plan of Pay-Within Car Remodeled from Standard Double-Truck Car, Shown in Fig. 1

operation of any car in which passengers are allowed to enter at both ends. The prepayment plan, as developed on the pay-as-you-enter cars in Montreal, Chicago, Buffalo and New York, was very carefully studied with a view of its possible adoption. W. S. Twining, chief engineer of the Philadelphia Rapid Transit Company, who was engaged in the study of this problem in conjunction with the mechanical and operating departments, developed a so-called pay-as-you-leave car. This plan also was closely studied. Certain objections were raised to both schemes, however.

Most of the car houses in Philadelphia are entered by a transfer table. The spacing of the columns on each side of the transfer-table pit is such that a car longer than 40 ft. over all cannot be accommodated on the table. Any scheme, therefore, which would require lengthening cars to more than 40 ft. would have involved practically the complete reconstruction of most of the company's car houses. Even fractional increases in length would have greatly reduced the storage capacity of the car houses and, furthermore, nearly all of the special track work downtown in the congested districts would have to be replaced with new special work designed to accommodate longer cars. The cost of this would have been almost prohibitive, and even if it was done, the operation of cars of much greater length than 38 ft. 8 in. over all would have been dangerous in rounding the curves in many of the narrow streets downtown. It will be noted from the plan of the old double-truck standard car that the truck centers are only 16 ft. apart. In order to lengthen the platforms of the old cars

the underframes would have required strengthening and the distance between truck centers would have had to be lengthened correspondingly in order to make the cars ride satisfactorily. This would have involved practically the entire reconstruction of the car body and would have been a very expensive operation.

The pay-as-you-leave car designed by Mr. Twining for double-end operation, shown in Fig. 2, was intended to be converted from the company's standard double-truck car. The body length distance between truck centers and the seating capacity is unchanged. The length of the platforms, however, was increased to 7 ft. 1 in., making the over-all length of the car 42 ft. 2 in. In this car the entrance was on the front end only and the exit was on the rear, passengers paying their fares to the conductor, who stood on the rear platform, as they left the car. The principal objections to this car were the increased length of platforms, the possible difficulty of collecting the fares from passengers who had already arrived at their destination and the position of the motorman on the front platform. As will be seen from Fig. 2, the motorman is enclosed in a cab placed on the outside edge of the front platform against the car-body bulkhead. From this position it is practically impossible for him to observe obstacles which may foul the car on the inside next to the dummy strip.

From the foregoing it will be seen that the Philadelphia Rapid Transit Company had given close attention to all of the developments in improved methods of fare collection and in car design. None of the plans proposed up to the fall of 1907 met with the views of the company's management and efforts were renewed to design a car which would be satisfactory in every respect and which would embody a plan by which the company's standard cars could be rebuilt and converted at a small expense. The outcome of this last effort to design a satisfactory type of car was the pay-within car, which embodied not only the prepayment plan of fare collection and a fixed position for the conductor, but also the use of pneumatically operated sliding doors and folding steps which were designed to prevent boarding and alighting accidents. This type of car has already been fully described in the *ELECTRIC RAILWAY JOURNAL* of Sept. 26, 1908. It will not be necessary here to enter into a technical description of the operating mechanism of the car, as the purpose of this article is to present the reasons for its adoption and the history of its success in operation to date. The plan of the car is reproduced in Fig. 3.

Briefly its principal features are as follows: Entrance is from the rear platform only and exit from the front platform or in emergencies past the left side of the conductor to the rear platform. There is no bulkhead in either end of the car body, the entrance from the platforms being entirely unrestricted except for a center post on the rear platform, against which the conductor stands facing to the rear. In the top of this post are the operating valves for controlling the movement of the doors and step of the rear platform. The door and step of the front platform are controlled by an air valve operated by the motorman and mounted alongside the brake valve. The position of the conductor standing on the raised floor of the car body and facing to the rear is such that he has a commanding view of the platform and rear steps. Grab handles are placed on each side of the doorway and around the vestibule and on the conductor's stand. Entering passengers pass to the conductor's right and pay their fares as they enter the body

of the car, receiving transfers or exchange tickets only at the time of paying the fare. The conductor does not leave his post except in emergencies. The entrance and exit openings of the rear and forward platforms respectively are closed by pneumatically operated sliding doors which move back into pockets formed in the sides of the car body. The platform step is interlocked with the sliding door and when the door is closed the step is folded up against the platform sill, leaving absolutely no foothold for a person attempting to enter the car after the doors are closed. The bumper beams have been sheathed with sloping sheet steel covers so that there is no possible place for persons to ride on the outside of the car.

In rebuilding old cars in Philadelphia for pay-within operation no important structural changes were necessary in either the body or platforms. The end bulkheads were entirely removed, sliding-door pockets were built inside the walls of the car at each end and the platform floors were widened slightly so that their outer edges were parallel with the sides of the car body instead of tapering inward toward the bumpers. The fixed steps were removed and for single-end cars the inner side of the platform was permanently enclosed with a fixed glazed panel. Cars for double-end operation have sliding doors and folding steps on both sides of each platform and a stanchion containing the operating valves at each end of the car. Operating valves for the motorman are also put in at each end beside the brake valves.

The pay-within car was finally perfected in the summer of 1908 and orders were given by the Philadelphia Rapid Transit Company to rebuild 50 of its old standard cars at the works of The J. G. Brill Company and in the company's own shops. By the last of September enough cars had been rebuilt to equip one line and on Sunday, Sept. 27, operation was begun with a complete equipment of 36 cars on the Twelfth & Sixteenth Street line. Within three weeks after the cars were first put in service on this line the board of directors was so well satisfied with the results obtained that it authorized the rebuilding of 300 more cars, making a total of 350. Up to Feb. 4 150 cars had been rebuilt and the remainder of the number authorized were being turned out by the Brill works at the rate of two cars a day. As soon as the spring rush is over in the company's own shops the reconstruction will be carried on there. Late in the year the South Nineteenth & Twentieth Street line was equipped with 20 cars and on Jan. 18, 1909, the South Seventeenth & Eighteenth Street line was opened with 22 cars. The Darby line was partly equipped with 21 cars on Jan. 31 and on Feb. 15 the Baltimore Avenue line was changed, 18 cars being put on. Other lines are to follow as fast as cars are rebuilt. The schedules on all lines in the city require a maximum of 548 cars operated single end and 219 cars operated double end. By the beginning of next winter the company hopes to have every box car on the system, both of the standard double-truck type and the single-truck type, converted for pay-within operation. Plans are being made to rebuild the single-truck cars, many of which are not equipped with air brakes, along lines which will retain all of the essential features of the pay-within scheme as now applied to the double-truck cars which have air brakes and pressure available for operating the sliding doors and folding steps.

Before putting the pay-within cars in service the Philadelphia Rapid Transit Company devoted a great deal of time to the thorough instruction of the trainmen to be assigned to them. It did not, however, advertise the change

to the general public in the same widespread manner as was employed in Chicago, Buffalo and other cities where improved fare-collection schemes have been put in use. For a week or 10 days prior to making the change small dodgers describing the pay-within system were hung in the standard cars operating on the line where the pay-within cars were to be installed. These pamphlets contained illustrations of passengers boarding and alighting from the cars, a plan of the car showing entrance and exit doors and an announcement of the new service to be inaugurated. This announcement read as follows:

To Patrons of the Twelfth & Sixteenth Street Line:

Commencing Sunday, Sept. 27, 1908, this company proposes to place in operation a new pay-within car. By the use of this car the company expects to—

- 1st. Provide a more comfortable car.
- 2d. Reduce the overcrowding and jostling of passengers.
- 3d. Insure better ventilation, together with a warmer car in winter and a cooler car in summer.

Patrons are respectfully requested to co-operate in making this car a success—

- 1st. By entering the car by the rear; leaving by the front end.

Fourth. The rear door and step are to be operated by the conductor only, whether for entrance or exit. The front door is to be operated by the motorman, and for exit only.

Fifth. In order to overcome accidents, the conductor and motorman must not open the doors until the car has come to a full stop. The conductor must not give the starting bell until the rear door is fully closed. The motorman must not start the car until the front door is fully closed.

No car to be operated with either door open.

PAY-WITHIN SYSTEM

It is expected by the use of this system that many vexing troubles will be entirely removed.

First. By the use of the "Pay-Within-Car" accidents caused by the car being started while passengers are in the act of boarding or alighting from the car should be entirely eliminated.

Second. The position of the conductor is such as will insure his having a good clear view of the rear step when it is in a position for passengers to enter, and when the door is closed it will be impossible for any person to get off.

Third. Accidents that occur at the front end from persons attempting to get on a moving car will be entirely overcome, as the front door and step will be in such a position that it is impossible for a person to get on.

Also, the passengers will use the front end for exit only, and while so doing will be directly in view of the motorman, so there should be no further trouble from accidents due to people getting off the car. Motormen must not permit passengers to board car by front platform.

The equipment of the car is such that it should be impossible for an accident to a passenger boarding or leaving.

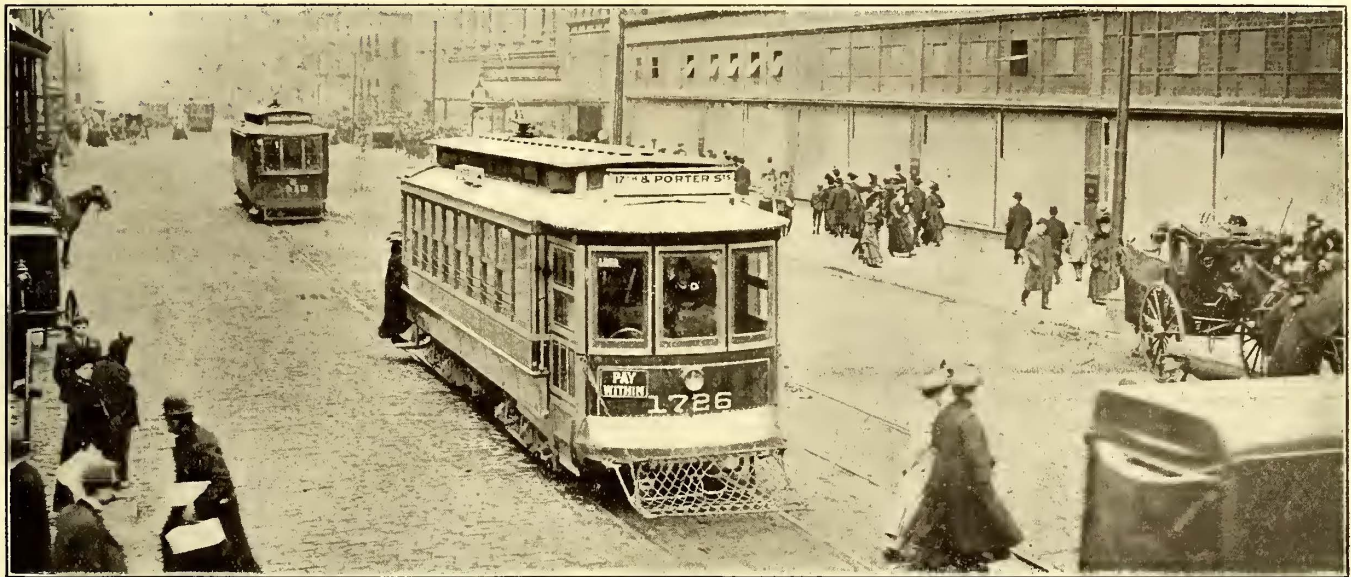
OVER-CROWDING OF CARS

By the adoption of the "Pay-Within-Car" the management expects to be able to reduce the over-crowding of cars very materially.

It is believed that the position of the conductor is such that he is in absolute control of the loading of a car.

CROWDING OF PASSENGERS WHILE ENTERING OR LEAVING THE CAR

The rear platform will only be occupied by passengers while paying their fares, all others being requested to proceed to the main body of the car or



Pay-Within Car on Market Street, Philadelphia

2d. By having the exact fare ready before boarding car, pay same to conductor and pass at once to the interior of the car.

3d. By waiting for the next car when approaching car is loaded and when so requested by the conductor.

(Signed) CHARLES O. KRUGER,

Second Vice-President and General Manager.

The same form of dodger was used in the cars of the South Nineteenth & Twentieth Street line; the South Seventeenth & Eighteenth Street line and the Darby line prior to changing over with the exception only of addressing the circulars exclusively to the patrons of these lines.

Before putting the cars in service the trainmen were given a special course of instruction lasting three or four days. A book of instructions was prepared, illustrated with engravings made from photographs of the first car built. The text of this book is reproduced here in full:

DESIGN OF CAR

Attention is called to the simplicity of the construction of the car and the method of operation, as follows:

First. Passengers must enter the car by the rear door only.

Second. Passengers may leave by either the front or rear doors, but, in order to improve the service, passengers are to be requested to leave by the front door.

Third. The sliding doors and folding steps are interlocked and operated mechanically. When doors are closed it is impossible for any one to get on or off the car.

through to the front platform, excepting only the last few passengers taken on after the interior of the car is fully loaded.

COLLECTION OF FARES

Fares will be collected while the passengers are on the rear platform and before they enter the main body of the car, except when the conductor is compelled to be absent, due to an accident or other causes.

At the commencement of the "Pay-Within-Car" service a certain amount of discretion must be used by the conductors to guard against delay to traffic or disturbances due to the misunderstanding of the regulations by passengers. We are fully convinced that a large amount of this can be avoided by the conductor securing the co-operation of the passengers with the courteous request, "Please have your fare ready."

TO COMPLAINING PASSENGERS

If the opportunity presents itself, explain that we are endeavoring to improve the service, and that is the reason for the request just made.

When it becomes necessary to allow passengers to enter the interior of the car without paying their fares, the conductor will, as soon as his duties on the rear platform permit, enter the car and collect fares in the usual manner, returning at once to his position at the rear of the car.

HEATING AND VENTILATING

In the older type of cars the platforms have always been open, but with the "Pay-Within-Car" this condition is changed, as the platforms of the car will be closed entirely while the car is in motion, and it is expected that most excellent results will be secured as to ventilation and heating.

COMFORT OF CAR CREW

In the "Pay-Within-Car" it will be readily seen that, with the sides of the platform closed, both the conductor and motorman are removed from exposure to the weather.

VENDERS

The position of the conductor in the rear of the interior of the car, together with the sliding door and the folding step, will insure against a continuance of the practice of boys or others getting on or off cars for the sale of various wares.

No unauthorized persons will be permitted to ride on the car without the payment of a fare.

SMOKING

Smoking will not be permitted on the cars.

ECONOMY OF TIME

The conductors and motormen are all interested in increasing the economy of operation by keeping the cars moving and well spaced upon the street, and this can only be brought about by the entire co-operation of all concerned, and we feel that much good can be accomplished by the hearty co-operation of both the conductors and motormen.

The company is very desirous of supplying the best possible service to its patrons. This includes clean cars, courteous, gentlemanly treatment by the conductors and motormen, frequent service and the co-operation of its patrons.

Mr. Ryan, assistant general superintendent, was put in charge of the training of the men who were to operate the pay-within cars. The crews were given an opportunity of studying the book of special instructions and examining the construction and operation of the cars in the depot car-house. Each crew was then taken separately and given a long and exhaustive drill in its duties under all possible circumstances. The conductors were supplied with iron washers representing coins of various denominations, blank strips of tickets such as are sold six for 25 cents, pads of transfers and 8-cent exchange tickets. They were placed in turn on the car and the other members of the class acted as passengers, boarding and alighting, paying fares in cash



Passengers Boarding and Alighting Simultaneously from Pay-Within Car

and with tickets, demanding transfers and in all other ways testing the ability of the conductor to keep his head, control the movements of the rear platform door and properly collect and register all fares. The motorman was required to go through the motions of stopping and starting the car in response to signals from the conductor and to operate the front exit door whenever any of the "passengers" wished to alight. Each crew was drilled in this manner until it understood perfectly what to do and could handle a rush of "passengers" quickly and accurately. Some of the men took to their new duties very readily and required only a short drill. Others required longer time, but no difficulty has so far been experienced in teaching any of the men their duties in a reasonable time.

The pay-within cars have now been in service five months on the Twelfth Street & Sixteenth Street line, and for shorter periods on other lines. The company has had an opportunity of thoroughly demonstrating the new car's advantages from an operating standpoint over the old type of car. The two most important claims made for the new type of car are that it enables the conductor to collect all fares and that it wholly prevents boarding and alighting accidents.

Receipts on lines equipped with pay-within cars have shown an increase of about 8 per cent over corresponding periods of last year. A severe test of the carrying capacity of these cars and the ability of conductors to collect all of the fares occurred shortly after the new cars were put in service on the Twelfth & Sixteenth Street line. Founders' Week, beginning Oct. 4, was given over in Philadelphia to a celebration which drew large crowds from the surrounding country. A feature of the celebration was a mammoth parade of military and civic bodies. On the day of the parade, which included Broad Street in the line of march, northbound street car traffic was thrown largely on the Sixteenth Street line, which parallels Broad Street, two blocks west. On one half trip northbound the register of a pay-within car showed 276 passengers carried without an accident of any kind. It would have been a physical impossibility for the conductor of this car to have collected all these fares if he had been obliged to move through the car to get fares from passengers boarding at the front end. Another record of a different nature was made by one of the cars of this line early in October in handling a crowd at the base ball park at the end of a game. A load of 89 passengers was taken on and all the fares collected in advance in 1 minute 49 seconds from the time the door was opened until it was closed and the car was started.

The almost unlimited possibilities which this type of car affords in the matter of preventing certain classes of accidents are of equal interest to operating officials. Especially has this proved to be the case in preventing accidents due to the recklessness of passengers in endeavoring to board moving cars, as well as in alighting from cars which are in motion. The cars have proved their value also by practically eliminating the occurrence of accidents due to the premature starting of cars while passengers are in the act either of boarding or of alighting. In connection with this feature it may be noted that all trainmen are carefully instructed to keep both the front and the rear door closed while the car is in motion and under no circumstances to open either door until the car has come to a full and complete stop or to start the car until both doors are fully closed. Under such conditions it will readily be seen that it is practically impossible for any person to either board or to alight from a car after the doors have thus been closed and the car is in motion. An additional safeguard against accidents of this character is afforded by the presence of the conductor in the extreme rear end of the car at all times, from which position he has an unobstructed view of the rear platform, door and step. This is also true of the motorman on the front end of the car. Since the installation of these cars upon the lines of the company, previously enumerated, not only have boarding and alighting accidents been practically eliminated, but to date no accident has occurred in the operation of these cars wherein any passenger, pedestrian or driver has sustained a fractured bone.

The construction of the pneumatic device which controls the opening and closing of the doors, as well as the raising of the step, is such as to preclude the possibility of a door closing or of a step raising while there yet rests upon it any weight whatsoever. This fact of itself, as demonstrated in the actual presence of a number of claimants who appeared at the company's office shortly after the installation of the cars, alleging that they had been thrown by the premature closing of the step while they were in the act of boarding or of alighting, proved unanswerable, and this particular contention has not since been advanced.

It has also been interesting to note that the car has unquestionably assisted in reducing certain other types of accidents, notably collisions between cars, collisions with teams and collisions with pedestrians at or in the immediate vicinity of intersecting streets. In the operation of the ordinary type of car motormen necessarily are obliged to divide their attention between the track ahead of them and the step of their car because of the fact that passengers oftentimes deliberately risk their safety in attempting to climb aboard a car even after it has been started. In the operation of pay-within cars it has been found that immediately upon closing the door after having made the customary stop on the near side of the street, motormen are enabled to give their undivided attention to the track ahead of them. Furthermore, it has been found that where in the past conductors have been annoyed and have had their attention frequently distracted from their duties because of the fact that boys have persisted in riding upon the rear bumpers of cars, thus often being the indirect cause of accidents, this feature has likewise been practically eliminated, for reasons which will readily become apparent upon examination of the construction of the bumpers of the pay-within car. The control stand has been so designed as to provide a convenient grab handle for the use of passengers who have just boarded the car. The top is formed in the shape of a large elliptical ring, which is above the door-operating valve handle and affords protection against accidental movement of the valve as well as providing a hand hold for passengers on the platform. A rod extends downward from this ring on each side to a band around the stand, thus providing additional parts to grasp. Another feature of the new stand is the use of a removable chain to block the exit passageway except in case of emergency, when it may be desired to unload quickly from both ends of the car or to let off an infirm passenger who cannot move to the front door.

For the five days immediately following the opening of the Darby line on Jan. 31 there occurred but a single accident, namely, a collision between a car and a wagon. This line traverses territory which contributes almost all classes of passengers. It starts from Delaware Avenue, where are situated the Camden Ferries, thence out Walnut Street through the congested business district, next through a residential section of the better class and ultimately to the suburbs, passing a considerable number of factories on the way and embracing much territory densely populated by the foreign element. No other line in the city handles so cosmopolitan a class of people or affords so excellent a test of the prevention of accident features of these cars.

There have been a few complaints from passengers relative to the change from cross-seats to longitudinal seats in the pay-within cars. This change was made to increase the carrying capacity about 30 per cent, and at the same time the same seating capacity of 40 has been maintained. The greater comfort of the cross-seats is an appreciable advantage only to long-distance passengers on cars running out into the suburbs, and the company may put them in some of the cars yet to be rebuilt. The greater carrying capacity of the cars with longitudinal seats is a benefit to the general traveling public during the rush hours, and for this reason the company was fully justified in making the change.

The public has shown its approval of the new type of car in many ways. There has been no difficulty in enforcing the rule to enter only at the rear end and leave at the front. Regular passengers on the lines already in opera-

tion quickly learned to move forward in the cars on entering, and during rush hours there is more of a crowd in the front end than at the rear. A large illuminated sign under the monitor deck in the center of the car directs passengers to leave the car by the front door, and a sign on the dasher reads, "Pay-within Car. Enter at Rear." The ticket and transfer system in Philadelphia is quite complicated, but the conductors have no difficulty in making odd change, issuing tickets or punching transfers for passengers without delay as they enter. Conductors have to collect cash fares and three kinds of ticket fares, sell six tickets in a strip for 25 cents, sell exchange tickets for 8 cents and issue free transfers which require the line and hour to be punched. Most of the regular passengers on the several lines on which the cars are operated have learned to have the exact fare ready when boarding the car, and this has greatly facilitated the loading during rush hours.

An important advantage to the company and to the traveling public is the ability to keep the cars running close to schedule and prevent overcrowding, with consequent delays. City ordinances require all cars to come to a full stop before crossing an intersecting track. If a pay-within car is behind schedule, the motorman can bring his car to a full stop and proceed immediately on signal without opening the rear door to take on more passengers. After a blockade this saves a great deal of time, as the first car can pick up a load and proceed as rapidly as possible without being delayed further by passengers attempting to board when the car is already overcrowded. Another means of saving time is the fact that the conductor at all times has a clear view of the entrance, and can close the doors immediately after the last waiting passenger has boarded. The conductor is in absolute control of the size of the load, and can prevent excessive overcrowding. As he does not have to move through the car to collect fares, a larger crowd can be handled with more comfort to the passengers than with the old type of car.

The cars can be comfortably heated in winter, owing to the fact that both vestibules are entirely enclosed and the doors are only open while the car is standing still. In summer the glass in the front and rear vestibules can be lowered and the side windows raised, thus creating a draft through the car from end to end.

The trainmen are enthusiastic over the pay-within cars for a number of reasons. Both the conductor and motorman are completely enclosed from inclement weather. The motorman is relieved of anxiety about watching the front steps to prevent passengers from jumping off before the car has stopped. The conductor is also relieved from worry about preventing accidents on the rear platform, and his duties can be accomplished with much less physical effort than formerly.

Briefly, the advantages of the new type of car, as demonstrated in Philadelphia, can be summarized from three viewpoints—advantages to the company, to the public and to the trainmen.

The advantages to the company are:

- (1) Boarding and alighting accidents are eliminated.
- (2) Fare prepayment plan is simple and convenient, and insures conductor securing a fare from every passenger who boards the car.
- (3) Standard cars can be converted at small expense without changing the structural parts of the car, lengthening the platforms or car body or increasing the weight.

(4) Removal of end bulkheads increases standing capacity 30 per cent without decreasing seating capacity.

(5) Cars can be kept close to schedule.

The advantages to the public are:

(1) Possibility of accident reduced.

(2) Greater comfort of seated and standing passengers, as conductor does not move through car to collect fares.

(3) Cars are better heated in winter and better ventilated in summer.

(4) Schedules can be maintained and greater carrying capacity means better service with more comfort.

The advantages to the trainmen are:

(1) Less danger of accidents.

(2) Greater comfort due to complete protection in inclement weather.

(3) Less physical labor to collect fares.

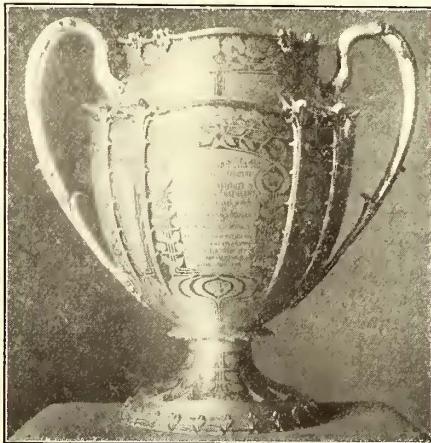
From the foregoing it will be seen that the Philadelphia Rapid Transit Company has adopted a type of car which offers many advantages over the old standard car. It has solved many of the problems of operation and has met with general approval from the public.

TWENTY-FIFTH ANNIVERSARY OF THE A. I. E. E.

On March 11 the American Institute of Electrical Engineers celebrated the twenty-fifth anniversary of its establishment in 1884 by a banquet at the Hotel Astor at which a number of the past-presidents and charter members were present. In all there are 21 charter members living and those present at the dinner were: Charles L. Clarke, George A. Hamilton, C. O. Mailloux, T. Commerford Martin, Jesse M. Smith, Elihu Thomson and Elmer A. Sperry. In addition letters of congratulation were also received from Alexander Graham Bell, Charles F. Brush and Thomas A. Edison, who also are charter members. Louis A. Ferguson, president, presided and the speakers were: Jesse M. Smith, American Society of Mechanical Engineers; Prof. Elihu Thomson, past-president, A. I. E. E.; Frank J. Sprague, past-president, A. I. E. E., and Dr. A. C. Humphreys, president, Stevens Institute of Technology.

A feature of the dinner was the presentation to T. Commerford Martin, editor of the *Electrical World*, senior past-president, of

a handsome silver loving cup from the other past-presidents. The cup bears on one side the following inscription: "In appreciation of 25 years of unselfish devotion to the best interests of the institute and the advancement of the electric arts." The other side bears the names of the donors, the 15 past-presidents and Mr. Ferguson. The presentation was made by Mr. Sprague at the close of his address, in which he referred to the important work which has been accomplished by Mr. Martin for the institute and for the electrical industry, and the esteem in which he is held by all those engaged in it.



Loving Cup Presented to T. Commerford Martin

BLOCK SIGNALS IN HARRISBURG, PA.

Within the last few months the Central Pennsylvania Traction Company, of which F. B. Musser is president, has commenced equipping its single-track lines with Eureka automatic block signals, after extensive experiments since the early part of 1905 with signals of several types. The general supervision of the original signals was under P. Frank Gerhart, C. E., chief electrician of the company, who, with the aid of his assistants, began a systematic and exhaustive study of the merits of the several installations.

These men followed up the tests with considerable enthusiasm, and soon discovered the strong as well as the weak points of the several signals installed. This led them to conceive certain fixed ideas regarding the construction and functions which an ideal, overhead-operated automatic signal should include. They early concluded that the signals should be of the semaphore type of ample size to be visible at good distances. They believed that the signal should indicate whether the block was occupied or unoccupied, and that when occupied it should show the direction of car movement in the block. The operating conditions dictated that the semaphores at each end of the block should normally be at danger when the section of track guarded is unoccupied by cars, and that, upon a car entering the block, the semaphore at the end entered should go to safety, while the one at the distant end should be locked at danger. This latter condition should hold as long as a car remains in the block, to make certain that when a block is being taken there is a danger signal at the distant end, despite failure of mechanism, interruption of power, broken wires or overrunning of danger signals by cars moving in the opposite direction. Intermediate signals should be placed within the block to indicate danger should cars enter the block against the semaphores held at danger. When the danger signals have been locked at danger the system should permit any number of cars to follow the first through the block, each succeeding car being given a visual signal of operation.

Other features called for were the following: Permit cars to set the proper danger signal upon entering the block from either track of siding or double main line, and to set them to safety upon leaving the block at either end on up or down track. Cars overrunning the danger signals, whether through carelessness or inability to stop, should be enabled to back out of the block without deranging the danger signals. When cars attempt to take the block at opposite ends at the same moment, the right-of-way should be given a predetermined car.

When the Central Pennsylvania Traction Company decided to equip its single-track lines with automatic signals, Mr. Gerhart's specifications, as covered by the second and third paragraphs, were submitted to the Eureka Automatic Electric Signal Company. The signals of this company installed in 1905 were found to embody nearly all of the functions specified, and had proved themselves durable, safe and generally satisfactory. The signal company thereupon modified its well-known No. 2 controller by additional parts fully to meet Mr. Gerhart's specifications. The principal feature it lacked before modification was the ability to hold the danger signals against overrunning cars. Six or seven sets of these signals, as modified, were installed by the Central Pennsylvania Traction Company in the latter part of 1907 and the beginning of 1908. They were found so satisfactory that the company has now adopted the Eureka signals as its standard apparatus.

The Valley Traction Company, entering Harrisburg from the Cumberland Valley, having learned of the very satisfactory operation of these signals, installed six sets of the same kind in 1908, and is now adding several more sets.

In equipping its single-track railways with automatic signals, the Central Pennsylvania Traction Company has specified an additional modification of the Eureka outfit to cover a device to predetermine preference of right-of-way when cars simultaneously attempt to take a block at the opposite ends. The signal company has developed such device as a part of its controller, or installed as a separate unit;

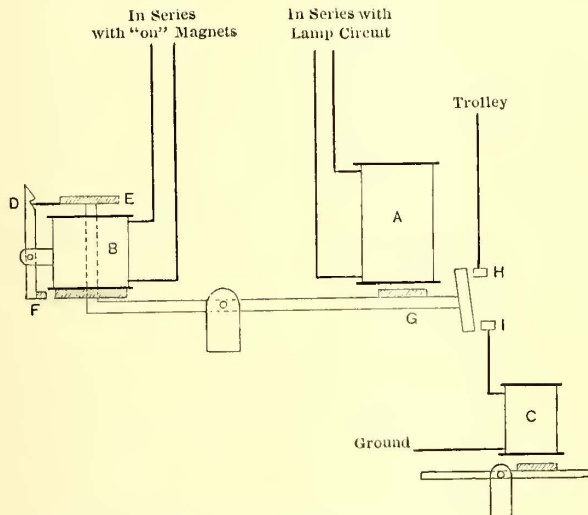


Diagram of Signal Connections Used in Harrisburg

but a similar device worked out under the direction of Mr. Gerhart by his assistants, D. B. Moist and C. W. Young, will be used.

Ordinarily, when two cars get in the contact makers at opposite ends of the block at the same time both controllers operate to throw the lamp circuit into connection with the trolley current. As this simultaneous action opens the ground connections at both ends, the lamps will not burn, the result being that neither car obtains the right to proceed. The Harrisburg device to overcome this effect is installed at one controller only. Its object is to remove one trolley connection and to establish a ground, which sets the danger signal to one car and allows the other one to proceed. This operation may be explained as follows in connection with the diagram:

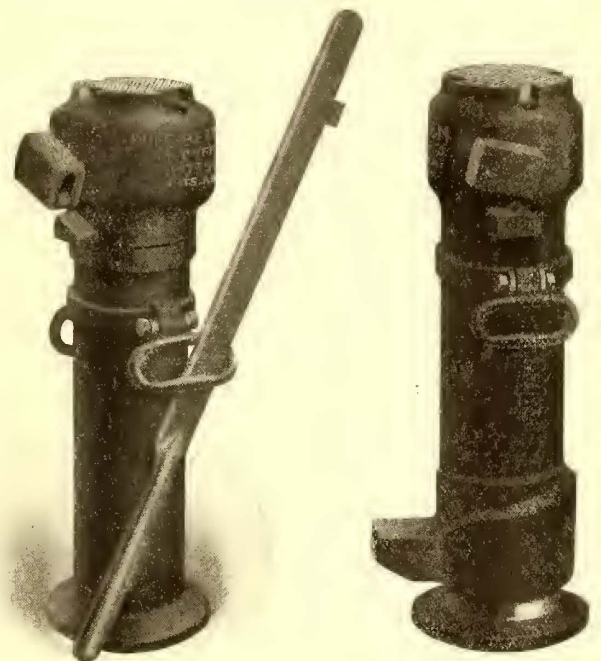
The car at the end where the attachment is installed allows current to pass through the magnet *B* when it enters the contact maker, thereby attracting armature *E* at the top and armature *F* at the bottom. Armature *F* releases latch *D* and keeps it released until the car clears the contact maker: In the ordinary operation the lamp circuit lights up before the car leaves the contact maker, sending current through magnet *A*, which holds its armature *G* and does not allow the grounding contacts *H* and *I* to be closed; but in case a car strikes the contact maker at the opposite end of the block at the same time, the lamps do not light up, thus allowing the contacts *H* and *I* to close and the magnet *C* to be energized. Magnet *C*, by a mechanical connection of its armature to the controller switches, opens a feed and closes a ground connection to the lamp circuit. The lamps light up and display the proper signal for one car to proceed and the other one to back out and wait. As soon as the lamp circuit is established magnet *A* opens contacts *H* and *I*, and also allows latch *D* to re-engage, so that *H* and *I* will not be closed

again until the next time two cars strike the contact makers at the same time. This attachment was installed in a block in which a large number of extra cars passed through. Previous to its installation there were one or two reports a week that the signal had failed to respond because cars attempted to enter the block at the opposite ends at the same time. Since the installation of this method, or one year of service, no signals have failed on this account.

The foregoing casts an interesting light on Eureka signals which have been developed in the service of prominent railways. The instructive suggestions of the Central Pennsylvania Traction Company, of M. C. Brush, vice-president and general manager of the Newton Street Railway Company, Newtonville, Mass., of the officials of The American Railway Company and other electric railways, have all helped to bring these signals to their present state of reliability.

NEW FORGED STEEL HYDRAULIC JACKS

The Duff Manufacturing Company, Pittsburg, Pa., manufacturer of the Barrett jacks and Duff ball-bearing screw jacks, has put on the market the Duff-Bethlehem hydraulic jacks, which are forged entirely of steel. Patents covering their special features and construction have been allowed the Bethlehem Steel Company, which does the special forging necessary, but the sales are handled exclusively by the Duff Manufacturing Company. Owing to their forged steel construction, these jacks are unusually durable, yet weigh from 30 per cent to 60 per cent less than other hydraulic jacks of equal capacity and stroke. As the cylinder of the forged steel jacks has its bottom forged integrally with the shell, the troublesome feature of packing the



Forged Steel Hydraulic Jacks

bottom of the cylinder is entirely eliminated. Another packing that has been dispensed with is that for insuring closure of the ram piston from the pump socket. The new jack has a solid ram bottom forged integrally with the pump socket. There are practically only two small packings in the entire jack, and as joints are also avoided, there is neither leakage nor expense for packing renewals.

By the improved construction and location of valves, the

new jacks are capable of extending their full length in a vertical, horizontal or inclined position, without any adjustment whatever, and all sizes will operate at any angle. Any parts may be easily replaced if necessary, without special tools. The valves may be attended to without removing the packing and the packing can be replaced without removing the valves. The valves are absolutely positive, and require no special adjustments or parts to insure their operating under all conditions. The load may be tripped or may be lowered as slowly as desired, or stopped at any point when lowering.

These jacks are constructed of open hearth fluid compressed forged steel and bronze, and their inside working parts are drop forgings. They are made in all types and capacities adapted to railway and general lifting purposes. The lower telescope type is fitted with an improved duplex pump, automatically regulating the change of speed in proportion to the load being lifted. They are made regularly with capacities ranging from 30 tons to 300 tons, and higher capacities if required.

RECORDING TYPE FARE BOXES FOR PREPAYMENT CARS

The Recording Fare Register Company, New Haven, Conn., has recently placed on the market three types of fare boxes for prepayment cars. Style No. 1 weighs about 40 lb. and is provided with two hooks to slip over the rail on the platform. It is supported by a pipe stand and operated by a foot lever in connection therewith. Nickels dropped in the wired glass receptacle on the top are let into the machine by the movement of the lever, recorded on the automatic register on the left and then fall into an open-top drawer on the right, where they are available for change. Cents and dimes dropped in the receptacle are

ture is the automatic register, which cannot be operated except by the actual presence of coin in the machine. Without the coin the lever may be operated any number of times without affecting the register.

The strongest point made for this style of box is the fact that all nickels after being registered are available for making change. This obviates the necessity of supplying each conductor with \$10 to \$25 of small coin. At the same time the conductor has no access to any money which for any reason is not tallied on the automatic register.

Style No. 2 has a wired glass receptacle for receiving the coins which drop onto a shutter. After inspection by the conductor, pressure on a thumb button drops the coins into the cash drawer. The latter locks automatically when removed from machine, thus making it impossible for any but the authorized agent to gain access to the cash. Style No. 3 is similar to No. 2 except that it contains a hand register. The money is dropped by the passenger into a wired glass receptacle. After the coins are inspected by the conductor the operation of the lever registers and opens the shutter, causing the money to drop into the cash drawer. The three types of fare boxes are made of heavy sheet brass finished in antique copper with strong and durable mechanism.

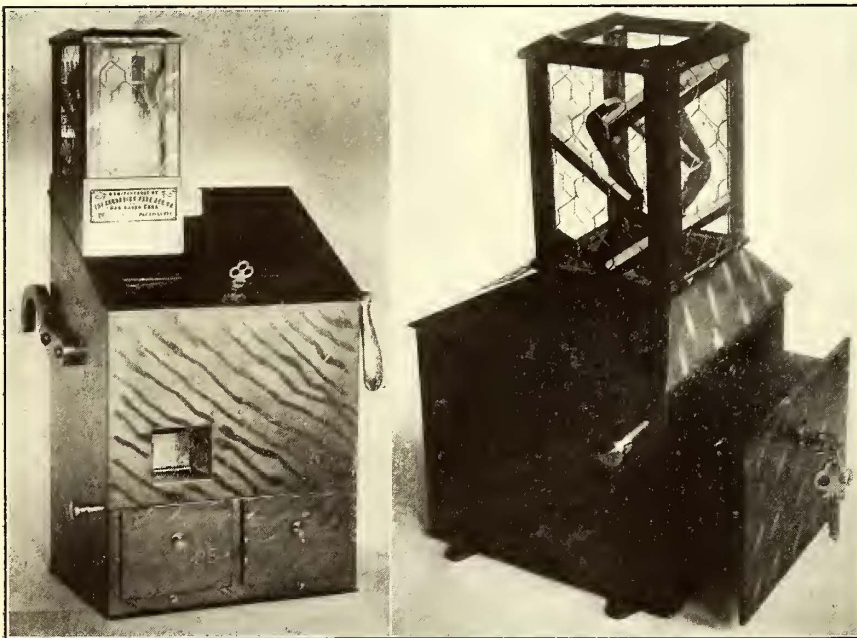
SINGLE-PHASE MOTORS FOR INDUSTRIAL PURPOSES

The continued increase in single-phase railway lines has brought forward the possibility of using single-phase motors in the shops of such roads and for factory and arm installations along the railways. As the Wagner Electric Manufacturing Company, of St. Louis, has specialized in this field for some 15 years, it may be of interest to present the following details of its single-phase motors and their operating characteristics.

The Wagner single-phase motor is of the induction type, with a commutator mounted on the rotor shaft and connected to the rotor winding. Starting with the machine at rest, brushes in pairs, cross-connected through a low-resistance conductor, bear upon the commutator, temporarily short-circuiting the rotor winding and developing a very powerful starting torque on the "repulsion" principle. On attaining full-load speed the individual segments of the commutator are all positively connected by the operation of an automatic centrifugal governor, thereby transforming the rotor winding to the squirrel-cage form. The motor then continues as an induction type machine. At the same time the governor removes the brushes from contact with the commutator to save wear.

No harm can be done this motor by sudden interruptions or by suddenly re-establishing the circuit at any stage of the cycle of its operation without the intermediary of resistance. If the power service should fail the motor returns to the starting condition and picks up its load when the power comes on again, without the assistance or attention of the operator.

The greatest difficulty in the use of a.c. motors upon lighting circuits is in the disturbance produced at the moment of starting. Polyphase motors of the squirrel-cage type take from three to eight times normal current at the



No. 1 Recording Fare Box

No. 2 Recording Fare Box

recorded on a permissive register on the right of the machine and are again exposed to view before passing into a top drawer on the left, which is self-closing and intended only for opening in the cashier's office. This drawer also takes care of any overflow nickels should the conductor fail to properly register fares at any time. There also is a device on the right side of the machine to clear away and pass mutilated coins into the overflow. A novel fea-

instant of starting, when full normal torque is required. If this starting current is at low-power factor considerable disturbance will result unless the feeder and transformers are both of ample capacity. In Fig. 1 are reproduced curves showing the ratio of starting current to start-

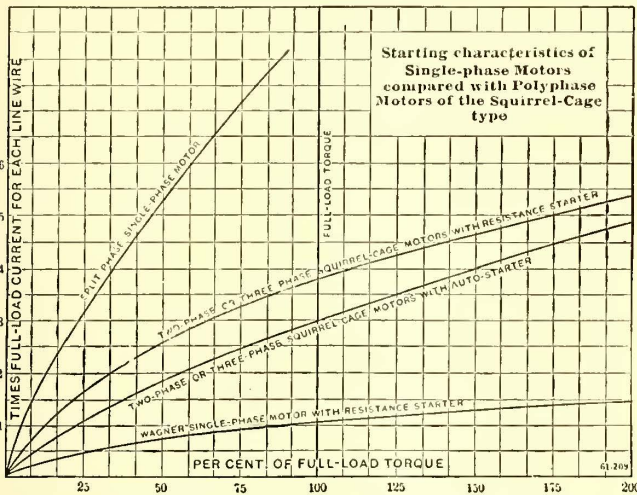


Fig. 1—Curves Showing Ratio of Starting Current to Starting Torque

ing torque for various types of a.c. motors. It will be noted that the best results in the matter of starting efficiency and line disturbance were obtained with the single-phase type and that full normal torque may be obtained at approximately full-load current.

It is asserted that for a given torque these single-phase motors cause less disturbance to the one-phase from which the entire power is taken than do the usual polyphase motor to every phase. The actual currents per line wire for full-load torque in motors wound for 220 volts is shown in the following table:

	—Amperes per line wire—			
	5 hp	7.5 hp	10 hp	15 hp
Three-phase squirrel-cage with auto-starter	54	80	105	140
Two-phase squirrel-cage with auto-starter	50	75	98	132
Single-phase without starting box	45	68	90	125
Single-phase with starting box...	33	50	65	90

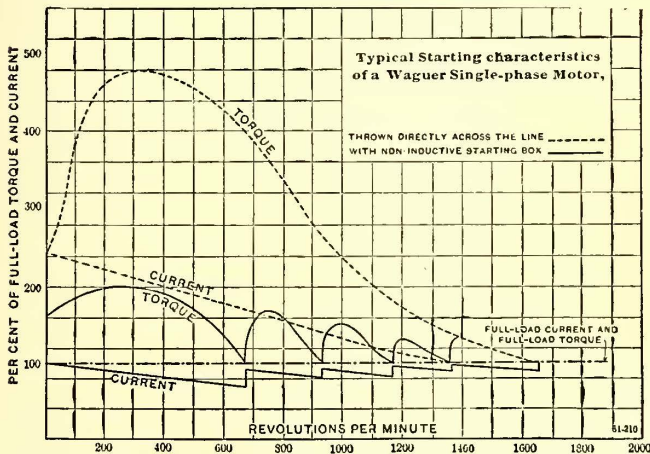


Fig. 2—Torque and Starting Current of Single-Phase Motor

From this tabulation it will be seen that the starting currents required for single-phase motors without a starter are favorable as compared with polyphase motors and that when a starter is employed the advantage of less line disturbance is in favor of the single-phase type.

Fig. 2 shows the torque and current of a single-phase motor with and without a starting box. It will be noted that the maximum current of two and one-half times normal is obtained only at the instant of starting and that it falls off rapidly to normal at full-load speed (or less if the motors are underloaded). The time required under usual conditions for the motor to attain full speed is from 8 to 12 seconds. Motors may therefore be fused for full protection without danger of blowing at starting. The maximum torque is exerted at about 15 per cent of normal speed, descending in an easy ratio to full normal torque at normal speed. The full line, indicating torque obtained

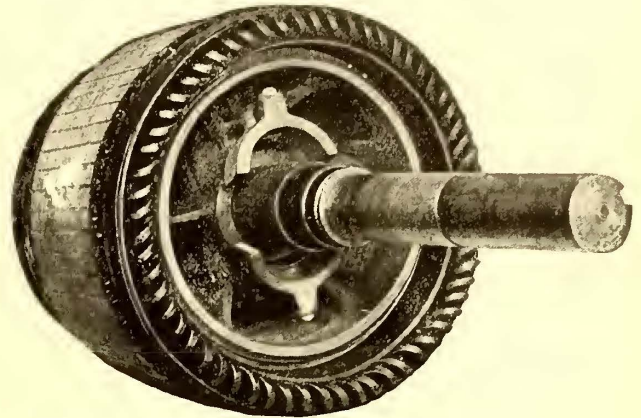
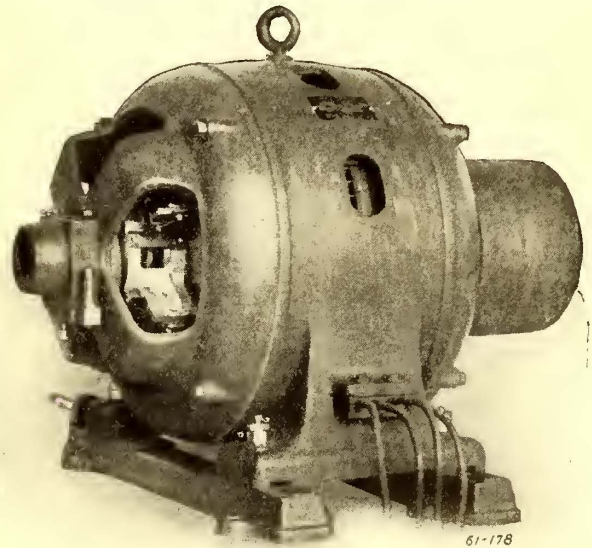


Fig. 3—Armature of Single-Phase Motor

when a starting box is employed, may naturally be varied according to the requirements by advancing the starting arm more or less rapidly.

These single-phase motors are furnished for all frequencies from 25 to 140 cycles and in various sizes from 1/4-hp to 40-hp capacity. The variable speed design differs



Single-Phase Industrial Motor

from the constant speed motor, principally, in that it has a commutator of the horizontal type, which remains in service all the time. As the torque of alternating motors varies directly as the square of the applied pressure, wide speed variation may be obtained by varying the voltages applied at the motor terminals.

Owing to a contest between the supporters of rival bills for a public-service commission in New Jersey, it is predicted that neither bill will pass the present Legislature.

EXHIBIT OF RAILWAY APPLIANCES AT CHICAGO

In connection with the annual convention of the American Railway Engineering & Maintenance of Way Association, held in Chicago this week, a large exhibit of appliances used in the construction, maintenance and operation of steam and electric railways was displayed in the Coliseum. Among the exhibitors were the following, who make apparatus used by electric railways:

The Adams & Westlake Company, Chicago, Philadelphia, New York: Signal lamps, lanterns, railway specialties. Represented by W. H. Baldwin, assistant general manager; G. L. Walters, railroad sales manager; H. G. Turney, A. S. Anderson, C. B. Carson, W. J. Pierson.

American Asphaltum & Rubber Company, 219 to 227 Woman's Temple, Chicago: Model tunnels, reservoirs, floors, platforms and bridges showing water-proofing process, roofings and railway paints. Represented by Harry N. Fox, advertising manager; N. S. Kidder, Harry E. Fox, W. R. Trasher and J. Y. Hill.

American Steel & Wire Company, Chicago: Right of way fences, rail bonds, triangle mesh concrete reinforcements. Represented by R. S. Knight, C. D. Sturdevant, B. H. Ryder, R. Stanley Green and B. B. Ayres.

Barrett Manufacturing Company: Bridge water-proofing with bituminous binder protection; floor construction particularly adapted for repair shops and freight houses. Represented by W. S. Babcock, L. P. Sibley, H. B. Nichols, C. T. Bilyea.

Bausch & Lomb Optical Company, Rochester, N. Y.: Transits, wye levels, architects' levels, precise levels, dumpy levels, alidades, plane tables, theodolites, etc. Represented by L. M. Potter, sales manager; W. Louis Johnson, F. M. Storr, H. D. Skelton and Wm. E. Zeller.

Beaver Dam Malleable Iron Company, Beaver Dam, Wis.: Tie plates and rail braces. Represented by W. L. Douglas, D. P. Lamoreux, J. V. Cowling, J. N. Small and E. A. Hawks.

Blake Signal & Manufacturing Company, 246 Summer Street, Boston, Mass.: Dispatchers' selective train order signals for use with telephone train dispatching. Represented by E. J. Burke, C. C. Blake.

Bryant Manufacturing Company, sales agents for the McClintock Manufacturing Company, St. Paul, Minn.; also Sandwich Electric Company, Sandwich, Ill., 21-27 Ontario Street, Chicago, Ill.: Railway signals, appliances and supplies, train dispatchers' telegraph system. Represented by Geo. Bryant, R. I. Baird, Edw. McClintock, W. M. McClintock, M. A. Hovey, E. C. Hennis, E. Parsons, H. O. Rugh, C. S. Rhoades.

Buda Foundry & Manufacturing Company, Chicago, Ill.: Railroad motor and velocipede cars, also parts of same; track drills, portable tool grinders, ball and cone bearing and ratchet jacks, switchstands, car replacers, adjustable switch rods and electric crossing gates. Represented by H. K. Gilbert, vice-president; Wm. P. Hunt, Jr., secretary; L. M. Viles, treasurer; W. S. Weston, chief engineer; C. H. DeLano, advertising manager, and the following salesmen: J. L. Artmirt, A. R. Dyer, W. C. Dyer, H. S. Evans, J. J. Gard, L. Hamill, J. T. Harahan, Jr., J. M. Lovett, W. B. Paulson, G. B. Shaw and H. L. Shepard.

Carnegie Steel Company, Pittsburg, Pa.: Steel cross ties, Duquesne rail joints, Schoen steel wheels, steel sheet piling. Represented by N. M. Hench, C. D. Friday, C. G. Bacon.

The Cleveland Frog & Crossing Company, Cleveland, Ohio: Frogs, crossings, switches, switchstands, etc.; also manganese frogs and crossings, Prentice anti-rail creepers. Represented by G. C. Lucas, Geo. Stanton.

Conley Frog & Switch Company, Memphis, Tenn.: "Conley patent frog." Represented by John E. Conley.

Continuous Rail & Safety Switch Company, 1406 Syndicate Trust Building, St. Louis, Mo.: Continuous rail device eliminating present frog and guard rail. Represented by W. G. Brown and H. F. Roach.

Cook's Standard Tool Company, Kalamazoo, Mich.: Climax track drill, Standard track tool grinder, Magic high-speed bits and Standard jacks. Represented by Eugene Cook.

Detroit Graphite Company, Detroit, Mich.: Paints for

structural steel, stations, power houses, water tanks, bridges, approaches, roofs, etc. Represented by T. R. Wyles, L. D. Mitchell, Edwin Booth and S. L. Brown.

Joseph Dixon Crucible Company, Jersey City, N. J.: Paint, lubricating graphite, crucibles, graphite and plumbago for different purposes, air brake and triple valve grease. Represented by De Witt C. Smith, Jersey City, and B. B. Worley, Chicago.

The G. Drouve Company, Bridgeport, Conn.: Anti-Pluvius puttyless skylight, Lovell window operator. Represented by William V. Dee, Geo. J. Adam and R. S. Adam.

Duplex Metal Company, Monadnock Block, Chicago: Copper clad wire. Represented by J. F. Kimber and Frank Chambers.

Electric Storage Battery Company, Philadelphia, and Chicago, Ill.: Chloride-Tudor-Exide storage batteries for car lighting and signal service. Represented by G. H. Atkins.

Fairbanks, Morse & Company, 481 Wabash Avenue, Chicago, Ill.: Gasoline, steam and electric pumping machinery, standpipe, motor cars, cattle guards, rail drills, jacks. Represented by C. D. Walworth, C. W. Kelly, R. E. Derby, J. A. Steele, R. H. Lincoln, R. A. Paterson, G. J. Akers, A. A. Taylor, H. C. McClary (second vice-president), H. D. Smith, C. T. Fugitt, A. F. Young, R. C. Head, F. F. French, F. E. Church.

Frank M. Foster, 515 W. First Avenue, Columbus, Ohio: Foster interlocking switchstand, Foster sod liner and grader, modern right-angle drive. Represented by Frank M. Foster and Geo. E. Kalb, Columbus, Ohio.

General Railway Signal Company, Rochester, N. Y., and Chicago, Ill.: All electric interlocking machines, electric switch movements, various types of power signals, automatic signals, manual control signals, relays and other such devices. Represented by L. Thomas, Chicago, and representatives from Rochester, N. Y.

Gifford-Wood Company, Hudson, N. Y.; Chicago, Ill.; Arlington, Mass.: Models of machinery for elevating, conveying and lowering natural and manufactured ice, ice tools. Represented by W. T. Wood, N. H. Williams, G. B. Vernier.

Goheen Manufacturing Company, Canton, Ohio. Represented by A. W. Price.

Grip Nut Company, 1590 Old Colony Building, Chicago: Grip nuts. Represented by E. R. Hibbard and F. E. Miner.

The Hall Signal Company, New York and Chicago; works, Garwood, N. J.: Automatic signaling devices. Represented by W. J. Gillingham, Jr., resident manager.

The Hart Steel Company, Elyria, Ohio: Railroad tie plates and standard spikes. Represented by W. S. Miller, W. T. Bentz, G. S. Wood and A. W. DeRocher.

Hayes Track Appliance Company, Geneva, N. Y.: Hayes derails and attachments. Represented by S. W. Hayes, P. W. Moore, W. Harding Davis, Wellington B. Lee and Arthur Gemunder.

The Jeffrey Manufacturing Company, Forge and Foundries department, Columbus, Ohio: Jeffrey "Lock-Jaw" track and car wrench, Jeffrey improved spike bar and other railroad specialties; also standard Jeffrey chains for elevating and conveying equipment. Represented by J. A. Werner, E. D. Clapp, G. R. Kittle and J. W. Jeffrey.

H. W. Johns-Manville Company, 173 Randolph Street, Chicago, Ill.: Asbestos and magnesia products, fuses and electrical devices, roofings, smoke jacks, packings and rubber goods of all kinds. Represented by F. W. Gilmore, P. C. Jacobs, J. E. Meek and J. C. Younglove.

Joyce-Cridland Company, Dayton, Ohio: Hydraulic car and track jacks. Represented by F. I. Joyce, George Llewellyn and N. Kohl.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.: Hand cars, velocipede cars, Moore track drills, Kalamazoo jacks, pressed steel wheels. Represented by John McKinnon, C. A. Wallace, I. W. Clock, C. L. Cushman and Geo. W. Mingus.

W. K. Kenly Company, 1540 First National Bank Building, Chicago, Ill.: Latimer switch point lock, Pioneer rail anchor, Security anchor tie plate, velocipede cars, Moore track drills, Universal carrier foundation. Chicago distributors of Jeffrey "Lock-Jaw" wrenches, Jeffrey spike bars, etc. Represented by W. J. Fauth, J. T. Wells, P. O. Wadsworth, A. P. Van Schaick.

Kennicott Water Softener Company, Chicago Heights, Ill.: Water softening machinery. Represented by Cass L. Kennicott, Edwin J. Flemming and Frank S. Dunham.

Edwin R. Kent & Company, Commercial National Bank Building, 115 Adams Street: Rigid Stag manganese steel frog, special Stag manganese steel frog, guarded Stag manganese steel frog, Stag manganese rolled rail. Represented by Edwin R. Kent, J. H. Kent, J. T. Stafford and Geo. H. Brown.

Kerite Insulated Wire & Cable Company, New York and Chicago: Kerite insulated wires and cables. Represented by R. D. Brixey and B. L. Winchell, Jr.

Lackawanna Steel Company, 2 Rector Street, New York City: Rails, rail joints, structural and bridge material, reinforced concrete bars, steel sheet piling and track supplies. Represented by C. R. Robinson, G. A. Hager, F. E. Abbott and D. H. Van Pelt.

Lufkin Rule Company, Saginaw, Mich.: Measuring tapes of all descriptions, steel rules, etc. Represented by Theo. Huss, S. B. McGee and Walter M. Sandford.

Manganese Steel Rail Company, Hillburn, N. Y.: Frogs, switches and switchstands, and rolled manganese steel rail. Represented by J. B. Strong, Arthur Gemunder, F. C. Stowell and W. C. Kidd.

Maryland Railway & Electric Supply Company, 345 North Charles Street, Baltimore, Md.: "Spike Strut" rail fasteners, track appliances. Represented by Chas. Elliott.

W. N. Matthews & Brother, 219 North Second Street, St. Louis: Matthews guy anchors, telephone jack boxes and plugs for dispatching systems, cable clamps, cable splicing joints, lamp guards, and other money saving specialties. Represented by Claude L. Matthews and W. N. Matthews.

Municipal Engineering & Contracting Company, 609 Railway Exchange, Chicago, Ill.: The Chicago improved cube concrete mixer and photographs of various special machines for railroad work. Represented by C. E. Bathrick, A. C. Cameron and J. B. Austin.

The National Lock Washer Company, Newark, N. J., and Chicago, Ill.: Lock washers and nut locks in various sizes and patterns. Represented by F. B. Archibald, Geo. E. Bake and John B. Seymour.

The Pennsylvania Steel Company, Steelton, Pa., and Maryland Steel Company, Sparrows Point, Md.: Solid Manard crossing, No. 10; Manard anvil face frog, design 160, section No. 235; No. 10 Solid Manard frog, section No. 235; No. 10 spring rail frog, design 278, section No. 235; sample Never-Turn split bolt; Never-Slip slide plate; New Process switch with rolled Manard (improved manganese) stock rail; intermediate main line safety switchstand, Model 56-B; low New Century switchstand, Model 51-A; low Steelton positive switchstand, Model 52-A; intermediate pony main line switchstand, Model 54-B; intermediate New Century switchstand, Model 50-E, with semaphore attachment; rolled Manard (improved manganese) rails; rail testing machine. Represented by Howard F. Martin, C. R. Reinoehl, B. L. Weaver, M. W. Long, Wm. M. Henderson, W. H. Allen, F. A. Robins, Jr., G. K. Reed. The Chicago sales office of the Pennsylvania and Maryland Steel Companies will be represented by John F. Hennessy, J. Drew Allen, Neil E. Salsich, Robert E. Belknap.

Percival Wood Preserving Company, Houston, Tex.: Method of wood preservation. Represented by H. W. Graves, sales agent.

The Q and C Company, Old Colony Building, Chicago; 90 West Street, New York: Bonzano joints, step joints, insulated joints, anti-rail creepers, rail saws, rail benders, guard rail clamps, guard rail braces, clutch plates, rail braces, tie tongs, castings, bolts and nuts, cement and metal ties. Represented by C. F. Quincy, E. M. Smith, G. C. Isbester, J. V. Westcott and G. L. Hall.

The Rail Joint Company, 29 West Thirty-fourth Street, New York City: Continuous, Weber and Wolhaupter types base supporting rail joints. Represented by L. F. Baine, H. C. Holloway, W. E. Clark, F. A. Poor, V. C. Armstrong, F. C. Webb, E. L. Van Dresar and J. G. Miller.

The Railroad Supply Company, Bedford Building, 215 Dearborn Street, Chicago, Ill.: Tie plates, derailers and signals. Represented by E. H. Bell, C. P. Cogswell, Jr.; M. J. Comerford, E. W. Vogel and A. H. Smith.

Ramapo Iron Works, Hillburn, N. Y.: Frogs, switches and switch stands and rolled manganese steel rail. Represented by J. B. Strong, Arthur Gemunder, F. C. Stowell and W. C. Kidd.

The Ritter Folding Door Company, Inc., Cincinnati, Ohio: Horizontal folding door for round houses, machine shops, freight depots, etc. Represented by A. Ritter, president; J. M. Crowe, vice-president.

Scherzer Rolling Lift Bridge Company, 1616 Monadnock Block: Models, photographs, designs, plans, drawings and literature. Represented by John T. Dickerson, H. D. Harting and R. W. Flowers.

Scully Steel & Iron Company, Chicago, Ill.: Simplex track and car jacks, track drills, track gages and tools and tool steel spikes, bolts, sledges. Represented by H. C. Finlay, W. H. Dangel, F. K. Maus, F. W. Blume, W. B. Templeton, George Mason, Jr.; T. T. Cavanagh and H. H. Gilbert.

Sellers Manufacturing Company, Western Union Building, Chicago: Tie plates, angle bars, "Sellers Anchor Bottom Tie Plate." Represented by J. M. Sellers, J. T. Markham and L. S. Gordon.

Spencer Otis Company, 1709-11 Railway Exchange, Chicago: Railway tie plates. Represented by W. L. DeRemer, H. H. Hart and Carter Blatchford.

Standard Steel Tie Company, 714-715 Curry Building, Pittsburgh, Pa.: Standard steel railway and traction ties, standard rail fasteners, fastener attachments, angle bars, wedge members and appliances. Represented by George M. Côté and J. Harvey Harrison.

Stover Motor Car Company, Freeport, Ill.: Motor inspection cars. Represented by M. Mowbray.

The Strauss Bascule Concrete Bridge Company, The Strauss Self-Balancing Window Company, Fort Dearborn Building, Chicago: Models and photos of bascule bridges, models of car windows.

The Union Switch & Signal Company, 1535 Monadnock Building, Chicago, Ill.: Keystone insulated rail joint; New Century switch lock with New Century stand; one-arm style S, electric automatic semaphore signal; Patenall lock and block system; relays, combination rail clips; dwarf interlocking machine; high-speed electric train staff instruments; D. C. crossing gate. Represented by J. S. Hobson, W. E. Foster, T. H. Patenall, W. M. Vandersluis.

U. S. Metal & Manufacturing Company, 165 Broadway, New York City: "Diamond" tapered steel poles, Columbia lock nuts, Continental whistling post, Hillman locked clevis and turnbuckle. Represented by Frederick Atwater and Chas. R. Day.

Variety Manufacturing Company, Sacramento Boulevard and Carroll Avenue: Cross-horizontal folding door, Variety steel rolling shutter, Variety wood slat rolling shutter, cross-compound slide-up door. Represented by W. H. Barry, E. L. Beckerleg, W. B. Gervais and F. E. Kahl.

The Vulcan Steam Shovel Company, Toledo, Ohio: Photographs and blue prints of steam and electric shovels. Represented by W. S. Russell.

William Wharton, Jr., & Company, Inc., Twenty-fifth Street and Washington Avenue, Philadelphia, Pa.: Manganese steel switches, frogs and crossings, switch stands, guard-rail clamps, models of derailing switches, photographs, blue prints, etc. Represented by V. Angerer, vice-president; Arthington Gilpin, engineer; R. C. McCloy, sales agent; all Philadelphia. W. McLain, sales agent, Pittsburgh, Pa.; Arthur S. Partridge, sales agent, St. Louis, Mo.

Whiting Foundry Equipment Company, Harvey, Ill.: Photographs and drawings illustrating electric travelers, jib cranes, electric locomotive cranes, Gantry traveling cranes, transfer cranes for railroad yards and complete equipment for gray iron, steel and malleable foundries; also railroad turntable centers and transfer tables. Represented by C. A. Hardy and P. A. Dratz.

Williams Boltless Rail Joint Manufacturing Company, 1202 Great Northern Building, Chicago: Williams boltless rail joint, Twentieth Century steel tie, automatic lock nut, Smith's reinforced spike, automatic car seal. Represented by Willis D. Williams, Emil Meyer, Cortlandt F. Ames, Charles Rystrom and T. J. Dyke.

Jas. G. Wilson Manufacturing Company, 3 West Twentieth Street, New York City: Rolling steel doors for car shops, freight sheds, warehouses, etc.; rolling wood doors for engine houses. Represented by H. B. Dodge & Co., Western agents, 108 La Salle Street, Chicago, Ill.

News of Electric Railways

Rapid Transit Proposals in New York

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., formally outlined to William R. Willcox, chairman of the Public Service Commission of the First District of New York, on March 10, the details of the plan of his company for extending its subway and elevated lines at a cost of \$50,000,000, of which mention was made in the *ELECTRIC RAILWAY JOURNAL* of March 13. Briefly, the company proposed to extend the present subway south from Times Square, on the West Side, under Seventh Avenue, to the Battery, and north from the Grand Central Station, on the East Side, under Lexington Avenue and the Harlem River, to connect with the West Farms branch of the subway at 149th Street and Third Avenue. The company also proposes to third-track the Second Avenue and Third Avenue elevated lines. It suggests the lengthening of the station platforms in the present subway so as to permit the operation of 6-car trains on the local and 10-car trains on the express tracks. For the new subway construction the company asks a franchise similar to the one under which it operates the present subway, i. e., a 50-year operating lease with a 25-year renewal option. This evidently was the provision for new legislation to which Mr. Shonts referred on March 9, for the last conditions cannot be made part of the agreement unless the Elsberg law is amended so as to permit the construction of subway lines with private capital. In his letter to the commission Mr. Shonts said:

"We are now prepared, upon proper terms, to undertake the following construction:

"First—The extension, at our own expense, of the city's existing subway system by the construction of a two-track express subway north from Forty-second Street, under Lexington Avenue, to a terminus in the Bronx, and by the construction of a two-track West Side express subway from Forty-second Street to the Battery (with provision, in each case, for the construction of additional tracks for local service when justified by traffic conditions), thus providing the city with two longitudinal lines of subways extending from the Battery to the Bronx, one on the East Side and the other on the West Side of the city, with a connecting subway in Forty-second Street. It is estimated that these extensions can be completed within four years.

"In order that we may raise private capital, and inasmuch as it will be necessary to provide for the amortization of the entire cost of the extensions within the period of the operating lease, it will be necessary that the extensions be made under an operating lease from the city for substantially the same term as that under which the existing subway is being operated. Under such a contract the city would be the owner of the entire subway system from the outset and would come into possession upon the expiration of the term of the existing contract.

"Second—The construction of a third track on both the Second Avenue and Third Avenue elevated lines. This improvement will furnish the earliest possible relief to the Bronx, inasmuch as it can be completed within 18 months. It will be necessary that these additional tracks should be built under a franchise similar to that under which the existing elevated tracks were built.

"Third—The lengthening of the platforms in the existing subway stations so as to permit the operation of 6-car trains on the local tracks and 10-car trains on the express tracks. This improvement will increase the capacity of the existing subway by more than 25 per cent, and can be completed within 10 months. It should be made as an extra under the existing subway contract.

"Except in the case of the cost (less than \$1,000,000) of the lengthening of the stations of the existing subway, all of the improvements above outlined, estimated to cost \$50,000,000, would be made without resorting to the funds or credit of the city.

"We are confident that we can obtain the necessary capital to carry out the foregoing improvements if undertaken as an entirety and the laws are so modified as to permit your commission and the city authorities to enter into the necessary contracts.

"We are prepared to submit to you whenever you wish the plans which have been prepared by our engineers."

Nothing of an official nature has been given out for publication as to how the Interborough Rapid Transit Company proposes to finance the extensions and improvements.

The plan of the Amsterdam Corporation, submitted in the name of the Inter-Terminal Belt Line, for a combined elevated and subway for passengers and freight, really is an

elaboration of the original proposal made to the Public Service Commission last summer by the Amsterdam Corporation for a freight subway. In urging its application the Inter-Terminal Belt Line says:

"We believe that there exists a necessity for an inter-terminal belt line which will make direct communication between all of the steamship and railroad terminals, as well as the ferries, upon Manhattan Island below Sixtieth Street. We believe that such a line will not only prove a great convenience to an immense number of people, but that it will aid in the solution of the West Side freight problem and develop sections of the city, especially on the East Side, which now entirely lack proper transportation facilities."

The conditions under which the company would be willing to accept a grant were given in the last issue. They prescribe, in brief, a full 5-cent fare, a reasonable return to the investor on the capital expenditure, the city to share in the new earnings in lieu of all taxes and charges, except those on real estate, and an extension of the franchise at the end of the grant or purchase by the city at a fair valuation. As in the case of the Interborough Rapid Transit Company, a franchise such as the company desires cannot be granted under the Elsberg law, and the request of the company is predicated upon the Legislature enacting such laws as will make it possible to grant the privileges desired. The proposed route is described in detail as follows:

"A four-track elevated railroad from the terminus of the New York Central & Hudson River Railroad's West Side tracks at or near Sixtieth Street and the North River southerly along the waterfront to the Battery; thence a two-track elevated railroad along or near the waterfront of the East River to a suitable point south of Forty-second Street; thence by subway through First Avenue and Forty-second or Forty-third Street, connecting with the Grand Central Station, to Seventh or Eighth Avenue; thence through Seventh or Eighth Avenue, connecting with the Pennsylvania Railroad terminal, to Thirtieth Street; thence by subway and elevated structure through Thirtieth Street to a connection with the main line at the North River; also by subway from a connection with the elevated structure at the North River, through Fifty-ninth or Sixtieth Street to connections with the Blackwell's Island Bridge over the East River and with the East Side section; thence southerly in First or Second Avenue to connection with the line at or near Forty-second Street or Forty-third Street. Where feasible, the privilege is desired of enlarging portions of said railroad by adding one or more tracks. The above described right of way to be furnished free of cost in so far as the same relates to any property owned or controlled by the city or State, or property which the city or State contemplates acquiring."

The only statement from the commission regarding the several proposals was made by Mr. Willcox, who said:

"Of course, like the Wilgus plans on the belt line project, the proposals of the Interborough Rapid Transit Company rest on new legislation and changes in the Elsberg law. Nothing can be done about either as the law now stands. Everything must wait the legislative action in regard to the construction of subways by private capital and certain points in the lease and franchise clauses. It is clear that the first plans received, those of the Hudson & Manhattan Railroad, can be taken care of by the commission, as they rest entirely within the rights given to the board by the present law. We will take them up first. The others will be taken up in order and considered, so that if the laws are amended to allow the adoption of such a course as is proposed we will be prepared to act immediately."

Cornelius Vanderbilt, G. M. Lane and Andrew Freedman, directors of the Interborough Rapid Transit Company, have resigned as directors of the Hudson & Manhattan Railroad. The resignation of Walter G. Oakman, president of the Hudson Companies, controlling the Hudson & Manhattan Railroad, as a director of the Interborough Rapid Transit Company was mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 6.

The applications of both the Inter-Terminal Belt Line and the Interborough Rapid Transit Company were placed on file by the Public Service Commission on March 12, and both were referred to the committee of the whole. Theodore P. Shonts and August Belmont both called on Chairman Willcox of the commission on March 12, Mr. Shonts saying that as he was about to leave the city for a few days, he desired Mr. Belmont, who is chairman of the board of directors of the Interborough Rapid Transit Company, to be in touch with the situation. Following this meeting Mr.

Willcox wrote to Mr. Shonts on behalf of the commission, accepting so much of the proposal of the Interborough Rapid Transit Company as applied to the lengthening of the platforms so as to admit the use of 6-car local trains and 10-car express trains. This work involves no additional legislation and may be carried out as a modification of the present contract.

The New York Central & Hudson River Railroad also appears as a possible bidder for rapid transit rights. The company now operates a steam surface freight line on Eleventh Avenue, New York, which for years has been a source of annoyance to the public and is generally unsatisfactory to the company. Various proposals have been made from time to time by the city regarding the road, but nothing has ever come of them. At a hearing in Albany last week, however, it was announced that the company is prepared to spend \$30,000,000 on an elevated railroad along the West Side waterfront. The proposals from the city to the company have been for an underground road. However, no announcement has been made by the company that it contemplates formally applying for the right to build the elevated line.

Nelson P. Lewis, chief engineer of the Board of Estimate, in a special report to Mayor McClellan, recommends changes in the Fourth Avenue subway which will necessitate the abrogation of all the contracts which have been awarded by the Public Service Commission for the construction of that line. To cut down the expense of the Fourth Avenue line Mr. Lewis proposes to eliminate the eight tracks proposed by the Public Service Commission and substitute four tracks. Two of these tracks, he points out, could be used for the Fourth Avenue subway and two for the Broadway-Lafayette Avenue loop. By making these changes the city would be spared the expense of condemning the property at Fulton Street and Flatbush Avenue. Mr. Lewis says that the Fourth Avenue route and the Broadway-Lafayette Avenue loop could be built at a cost of \$17,232,000 for both routes. The Fourth Avenue route, according to his figures, could be built for \$8,941,000, the Broadway-Lafayette Avenue loop for \$8,341,000. Henry B. Seaman, chief engineer of the Public Service Commission, opposes vigorously all the suggestions made by Mr. Lewis. He concludes his report thus:

"It is hardly necessary to review in detail Mr. Lewis's estimate, because this estimate is reached, not by economy, but by sacrifice. This sacrifice is one which could not be remedied at any future time."

Cleveland Traction Situation

Before Master Commissioner Belford on March 8 William Greif, who served as a director of the Municipal Traction Company, testified that a difference of opinion developed among the directors of the company early in its history as to whether a 3-cent fare would ever actually pay expenses. He said that he and Edward Wiebenson served as directors at the request of others in the belief that they could be of service in the settlement of the street railway trouble, but when they became satisfied that they could do nothing in that direction they resigned. He and Mr. Wiebenson, it seems, took the reports of the company as the basis for their conclusion.

Mayor Johnson, who was on the stand on March 6 and March 8, declared that the company was justified in paying for the lunches of the directors and heads of the departments at the daily meetings. Mr. Johnson had even suggested that meals be served in the office, but no official action was taken to provide for them. He said that the minute book of the board would not show all that had been done at these meetings, because the business was not always in the form of resolutions, and that the full proceedings were not recorded. Asked if he did not think that the motormen and conductors deserved free rides if the directors did free lunch, he said that free rides are demoralizing to the service. Among those receiving salaries the Mayor named the following: A. B. DuPont, president, \$15,000; Claim Agent Stage, \$3500 or \$4000; Messrs. Wiebenson and Greif, assistant secretary and assistant treasurer, \$150 a month; Ben Cable, director, \$150 per month. He stated that he and City Solicitor Baker did not receive any salary, and that no fees were paid for attending directors' meetings.

On March 9 Master Commissioner Belford began the hearing on the claims of the Cleveland Railway against the Municipal Traction Company. It was intimated that the Cleveland Electric Railway might put forward a claim for depreciation that will offset any claims for betterments that the Municipal Traction Company has made. Particular attention will be given to the fact that only \$31,867 of the money turned over to the Municipal Traction Company remains in the hands of the receivers. Receiver Scott submitted the following statement of the disbursement of the

funds of the Municipal Traction Company between Nov. 13, 1908, and March 1, 1909:

ASSETS TAKEN OVER BY THE RECEIVERS.	
Cash in bank, office, etc.....	\$358,613
Accounts receivable	23,859
Miscellaneous	3,853
Inventory accounts	18,376
Stock exchange	782
	\$405,483

Disbursements by the receivers for obligations contracted before the receivers took charge:

Accounts payable	\$85,468
Taxes	172,336
Interest	100,668
Miscellaneous	15,143
	\$373,615
Balance on hand.....	31,868
	\$405,483

Accounts taken from the books of the Municipal Traction Company show the following assets:

Cleveland Trust, Salem account.....	\$23,950
Press guarantee	2,314
In escrow	26,765
Accounts receivable	40,626
Securities	2,000
Betterments	559,681
Stock	169,315
Dividends	29,315
Receivers' account	31,868
Prepaid and accrued accounts.....	13,027
Real estate	38,519
Neutral street railway.....	172,233
	\$1,319,613

A portion of the evidence presented before Special Master Belford was introduced to show the real purpose in making certain expenditures. Much time has been spent in an endeavor to classify these claims, so that the court would be able to handle them in a settlement with creditors; but the work has proved tedious and is of little value in aiding decisions. Among other things, the attorneys for creditors endeavored to learn what use had been made of the \$3,500 given F. C. Alber, assistant to the president of the Municipal Traction Company. The master finally upheld Attorney Westenhaver in his contention that the Alber matter is immaterial and in his objection to probing into the fare box matter minutely. Receiver Scott said that 25 fare boxes had been delivered by the Pay-Enter-Fare-Box Company after the receivers had given notice to stop delivery, and that he had received no reply from Mayor Johnson relative to the \$2,000 turned over to the Fare Box Company by the Municipal Traction Company and not expended when the receivership was ordered. Considerable evidence was introduced relative to the advance payment of dividends to the stockholders of the Forest City Railway, who had been guaranteed in the purchase of stock, after the Cleveland Railway refused to promise to apply the payment of rental to that purpose. It is said that the receivers have demanded that the banks which took over the business of the Mayor's bank, the Depositors' Savings & Trust Company, return the money paid out for such dividends against the order of the Cleveland Railway.

A preliminary statement presented by Receiver Scott showed that of the \$1,633,479 claimed as assets by the Municipal Traction Company \$1,228,778 remains uncollected. The receivers have used \$404,700 of the money that has come into their hands for various payments and expenses. Of the \$562,681 claimed to have been paid for betterments by the Municipal Traction Company the attorneys say that many items belong strictly in the list of operating and maintenance charges.

On March 15 at a meeting of the City Council as a committee of the whole, Mayor Johnson made known his so-called peace plans which he had given to the newspapers on March 14. He proposes that two months be given to an attempt to settle on Judge Tayler's plan of a sliding rate that will insure a return of 6 per cent on the investment. While consideration is being given the Tayler plan the Mayor has advised the City Council to prepare three other ordinances, one of which would provide for 3-cent fare, to be given the Cleveland Railway on streets where franchises expire in January, 1910; the second, an ordinance providing for 3-cent fare, to be given the rejuvenated Forest City Railway on the same streets; the third, a franchise covering these streets, to be awarded the company making the best all-round bid at the lowest fare. The proposition was adopted, and the City Solicitor was instructed to prepare such ordinances and have them ready for consideration at the regular meeting of the Council on March 22.

Judge Tayler was present at the meeting on March 14 on invitation, and in a talk to the Councilmen said that he hoped the members would realize the responsibility that rests upon them and make an earnest effort to establish a rate of fare that will yield the owners a fair income on

their investment and give the people of the city such a service as they need and desire.

Judge Taylor on March 14 refused the application of the receivers to rebuild 23 miles of track. He said that they would have to repair the track and put it in as good condition as possible. He granted an application to spend \$41,250 for new boilers. Application was made to extend the Payne Avenue tracks through to 105th Street and to spend \$10,000 in building a storeroom at the Lake View shops.

Warren Bicknell, one of the receivers, has left for Havana in the interest of the Havana Electric Railway, of which he is president. He will probably be absent two weeks.

The Franchise Question in Detroit

The session of the committee of 50 appointed by Mayor Breitmeyer to consider the terms of a new franchise grant to the Detroit United Railways which was held on March 8 attracted considerable attention on account of the prominence of the speakers that addressed the committee. One of them was Charles V. Weston, president of the South Side Elevated Railroad, Chicago, Ill. Mayor Breitmeyer attended, but did not speak at the meeting. He did, however, express his views on the traction situation later on the same evening before the Detroit branch of the Grand Army of the Republic.

Mr. Weston said that it was unquestionably true that in a number of instances public utility franchises had fallen into the hands of men who had abused their trust, and that the public had reasoned from the concrete to the abstract to the detriment of conservative investors who desired only a fair return on their investment with a guarantee of the security of their property against confiscation. He cited the report of the National Civic Federation, and said that in any consideration of street railway conditions in Europe full appreciation was essential to the differences between conditions here and in Europe. Mr. Weston also said that as a street railway man he was talking with a full knowledge of the conditions that have to be met in street railway operation and the trying enactments of service, and concluded by saying that the rate of fare should not be less than 1 cent per passenger mile.

Charles E. Baxter reiterated what Mr. Weston said. Taking up the question of service abroad, he pointed out the difference between housing conditions in the United States and Europe, and showed that while the tendency there was to centralization, it was the opposite here, the burden falling on the railway companies. He also compared wages here and abroad.

At the meeting of the veterans the late Mayor Pingree was eulogized, and Mayor Breitmeyer found it necessary again to try to drive home the significance of his effort and the work of the committee of 50. He said that there was not a man on the committee that was not the equal of any of his auditors, and repeated the statement that the committee would consider conditions and make recommendations, and that the recommendations would then go before the voters for approval. The Mayor said that earnest consideration of the subject—not idle talk—was desired, and that critics of the committee were only obstructionists. The Mayor also reiterated his statement that he favored a working agreement with the company guaranteeing 6 per cent on the actual capital invested, all returns above that amount to be applied to reducing the fare or to be held in trust as a sinking fund for the ultimate purchase of the property. He said:

"The situation in Detroit with respect to the bonding limit is well known. Unless a decided raise in the limit be made, not a dollar's worth of general bonds can be issued for the purchase or establishment of any city-owned public utilities. I believe that if the rights of the city of Detroit are to be protected a security franchise should not contain terms more liberal than we would at this time be willing to give a private corporation, and I doubt our ability to sell bonds on a municipal street car line if the bonds are secured by the physical property on an eight-for-a-quarter or even seven-for-a-quarter security franchise."

The Detroit United Railway has presented a map to the extensions and rearrangements committee of the committee of 50, illustrating the extensions which the company believes to be necessary and practicable. The company's plan provides for about 50 miles of new trackage, and emphasizes the fact that entirely new routings will be necessary for several of the lines as a consequence of the extensions, and that these new methods of reaching a destination will in themselves tend to relieve congestion and save the time and trouble of transferring now necessary.

The Detroit *Journal* recently said that the committee as a whole favored a working agreement to run from 15 to 20

years, and gave the following as the terms likely to be proposed by the committee:

"A railway commission, non-partisan, to supervise schedules, rates and lines, under veto power of the Common Council.

"The company to be guaranteed 6 per cent on its investment. All profits above that to go to the city.

"The first rate of fare, eight tickets for 25 cents between 4 a. m. and midnight. Between midnight and 4 a. m. the rate to be 10 cents straight. Single rides at other times 5 cents.

"Universal transfers at all hours.

"The railway commission may, if it finds that the company is not making 6 per cent, at the rate of eight for a quarter, raise the rate to 15 tickets for 50 cents, and then, if a test finds that also unprofitable, to seven tickets for a quarter.

"The sum of money which the city may receive as a surplus, after the company's 6 per cent is deducted from the profits, may be deposited as a sinking fund for municipal purchase.

"The company to be bound to keep up the equipment and to pave between the tracks. Taxes are to be assessed ad valorem. The company must set aside a certain figure each year for depreciation."

Traction Rehabilitation Controversy in Chicago

The daily newspapers in Chicago devoted considerable space during a few days last week to alleged errors in the accounting methods adopted by the Chicago City Railway Company and the Chicago Railways Company in the rehabilitation of the street railways in that city. But after the excitement which the first articles caused subsided, the affair proved to be merely the result of misunderstandings of the true situation on the part of the newspapers and, to a certain extent, of the city authorities as well.

As is well known, the reconstruction work now being conducted by the Chicago railway companies is being done under the direction of the Board of Supervising Engineers, of which Bion J. Arnold is chairman and chief engineer, and under the franchise the city shares in the net profits to the extent of 55 per cent. For this reason, an important distinction is made between the expenses of construction and operation to be charged to the joint account of the companies and the city occurring after the ordinances took effect, and those properly belonging to the period before the companies accepted the ordinances. The duty of passing upon all purchases and auditing all expenditures for the joint account, devolves, by law, on the Board of Supervising Engineers. In the progress of this work, last October, a question arose as to the proper classification of expenditures of the Chicago Railways Company, some time previously, aggregating \$119,000, which had been charged to the joint account by the company as an operating expense. As there seemed to be some doubt as to whether this was the proper classification, Mr. Arnold, at the request of the city and also of the company, agreed to go over all the vouchers of both companies.

About Feb. 11, before the work of auditing these vouchers, numbering over 20,000, was concluded, Mayor Busse received a letter from Philadelphia charging that secret discounts from quoted prices were being given by different manufacturers on sales made to the Chicago City Railway Company and alleging that no credit was given for these discounts in the accounts which the company filed with the Board of Supervising Engineers as the cost of the apparatus. Both the name signed to the letter and the address given in it proved on subsequent investigation to be fictitious. A full investigation was made of the matter, however, and it was found that only the net payments made by the company were being charged on the books, and that the Board of Engineers had full knowledge of these discounts and had approved them and had seen that the city had received its proper credits for them in the joint account. The examination showed, however, that the Chicago City Railway Company had in some instances been securing somewhat lower prices in its purchases than the Chicago Railways Company. The only figures made public were those on rotaries. For rotaries of the same size and type the Chicago City Company had paid \$16.15 per kw and the Chicago Railways Company \$16.25 per kw. During this investigation the Mayor gave to the public press the letter mentioned and this, in connection with distorted rumors of the reasons for the audit of the Railways Company's accounts, caused considerable excitement until the facts became known.

In the meanwhile, one of the sensational daily papers published in Chicago appears to have conceived the idea that the Board of Supervising Engineers was extravagantly

administered and this view seems also to have been taken by some of the local politicians who were perhaps piqued because the patronage of the board had not been placed at their disposal. The payroll of the board was published and in several days the fierce light of criticism beat unmercifully on that body. It was shown, however, that the salary of Mr. Arnold had been specified in the ordinance which was ratified at the election and that the work of the board was being conducted very economically and efficiently. Other allegations made at the same time proved utterly groundless or due to a misunderstanding of the facts. Thus, it is said that both of the railway companies kept two sets of books and that one set was for public record and the other for the company's own information. It was shown, however, that the second set of books was simply that used by the companies for keeping the record of the disposition of the 45 per cent net profit to which the companies under the ordinances are entitled, hence was perfectly proper, and there was only one set of books of construction and operating accounts relating to the joint accounts of the city and the companies, and that these books were being kept upon forms prescribed by the Board of Supervising Engineers and approved by the city comptroller.

The excitement raged most fiercely between March 7-10, but as the facts became known it quickly subsided, and by March 11 reference to it disappeared from the first pages of the city press. The net result of the controversy was to make even more evident and clear that the public interests in Chicago are being well protected.

Meeting of the Iowa Street & Interurban Railway Association

The annual convention of the Iowa Street & Interurban Railway Association will be held at Cedar Rapids, Ia., on April 22, 23 and 24. The headquarters of the association will be at the Montrose Hotel. Satisfactory arrangements for those who cannot be accommodated at the Montrose can be made with the Allison, the Delavan or the Grand hotels. An auditorium within a block of the Montrose has been engaged for the accommodation of exhibitors and will afford an ample number of rooms for the combined meetings of the street railway and the electrical associations.

The arrangements for exhibitors are more complete than have ever been made before. For their convenience a large central space, exceptionally well lighted, will be reserved. Space for exhibits and current for light and power will be furnished to the exhibitors free of charge. The only expense which exhibitors will have to assume will be that of transporting the exhibits to and from the convention hall, and the cost of erecting and taking down such booths as may be required.

The lighting and railway companies in Cedar Rapids will arrange a special program for the entertainment of delegates. One of the most important features which the association has taken up recently is the careful consideration of the Interstate Commerce Commission System of Accounting, which will be the subject of a paper at the coming meeting. The association is also paying particular attention to the matter of traffic development and to the use of safety appliances, and papers will be presented covering these subjects. The papers to be presented at the meeting, follow:

"Handling Accident Claims," by A. G. Rippey, claim agent, Des Moines City Railway, Des Moines.

"Interstate Commerce Commission System of Accounting and its Application to Street and Interurban Railways," by H. E. Weeks, secretary, Tri-City Railway & Light Company, Davenport.

"Recent Developments of Electric Railway Traffic." "A—Street Railways," by E. M. Walker, general manager Citizens Railway & Light Company, Muscatine. "B—Interurban Railways," by C. M. Cheney, general freight and passenger agent, Waterloo, Cedar Falls & Northern Railway, Waterloo.

"Inspection and Maintenance of Rolling Stock," by W. F. Raber, general manager, Ottumwa Railway & Light Company, Ottumwa.

"Operating Rules for Street and Interurban Railways," by J. D. Wardle, superintendent, Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids.

"Life-Saving Devices," by William J. Brown, manager, International Lecture Institute, New York City.

Los Angeles Company Encourages Y. M. C. A. Membership.—Robert P. Sherman, general manager of the Los Angeles-Pacific Company, Los Angeles, Cal., has notified the Young Men's Christian Association that his company will pay one-half the membership fee of any of its employees who wish to join the organization.

Minneapolis Company Withdraws Request that Suit Be Discontinued.—C. G. Goodrich, vice-president of the Twin City Rapid Transit Company, in a letter to the Aldermen of Minneapolis, has withdrawn the request that the city discontinue its suit against the company for six-for-a-quarter fares, and says the company now prefers to await the decision of the United States Supreme Court, which will fix the status of the company, with reference both to fares and the life of its franchise. Mention of this suit was made on page 480 of the ELECTRIC RAILWAY JOURNAL of March 13, 1909.

Annual Banquet of the New England Street Railway Club.—The ninth annual banquet of the New England Street Railway Club will be held at the Hotel Somerset, on Thursday evening, March 25, at 6:30 p. m. A reception commencing at 6 p. m. will precede the banquet, and during the afternoon the annual business meeting of the club will be held. The speakers at the banquet will include Hon. James F. Shaw, Boston, president, American Street & Interurban Railway Association; Hon. Arthur B. Chapin, treasurer, Commonwealth of Massachusetts; Hon. James F. Jackson, Boston; Hon. Joseph T. Robinson, Arkansas; Holman F. Day, Lewiston, Me. The price of tickets is \$2.50 and they may be secured from the secretary. A large attendance is anticipated, owing to the constantly growing membership of the club and the increasing popularity of the banquets, and the tickets should be secured early.

Entertainment of Employees of Milwaukee Electric Railway & Light Company.—Employees of the Milwaukee Electric Railway & Light Company gave an entertainment on the evening of March 4, in the auditorium of the Public Service Building. The entertainment was of the same character as those usually given by the employees about twice a month, but a special feature was added in honor of the inauguration of the new President. A large flag, on which a portrait of Mr. Taft had been fixed, was lowered at the rear of the stage and the band played patriotic airs. The entertainment, which was planned and managed entirely by the employees and was attended by employees and their families, was very creditable. The members of the Railroad Commission of Wisconsin attended. At the request of John I. Beggs, president of the company, Prof. B. H. Meyer, chairman of the commission, addressed the audience. W. J. Curtis, of Sullivan, Cromwell & Curtis, New York, general counsel for the North American Company, also made a brief address.

Electric Railway Construction in Canada.—During 1907 72.27 miles of electric railway were constructed in Canada, and during 1908 32.94 miles. This year, however, the prospects are that several hundred miles of line will be built. The British Columbia Electric Railway, Victoria, Vancouver and New Westminster, B. C., alone has about 100 miles under construction, and to this must be added new systems in Edmonton and Calgary, Alta., and Regina, Sask., on which work has already begun. The Winnipeg (Man.) Electric Railway plans at least 10 miles of line. Eastern Canada will add to the total as extensions are contemplated to the systems in Montreal, Quebec, Toronto and Ottawa. The record of construction for 1908 follows: Brantford & Hamilton Electric Railway, 16 miles; Mount McKay & Kakabeka Falls Railway, Fort William, Ont., 3 miles; Montreal (Que.) Street Railway, 1.31 miles; Montreal Park & Island, Montreal, Que., 1.97 miles; Ottawa (Ont.) Electric Company, 1.80 miles; Sarnia (Ont.) Street Railway, 1.25 miles; Toronto (Ont.) Railway, 0.23 mile; Toronto & York Radial Railway, Toronto, Ont., 1.38 miles; Winnipeg (Man.) Electric Railway, 6 miles.

New York Public Service Law Upheld.—The Appellate Division of the Supreme Court of New York handed down on March 12 a unanimous decision written by Justice John Proctor Clarke affirming the constitutionality of the Public Service Commissions law. The action was brought in 1907 by Adolph Gubner as a taxpayer to obtain an injunction restraining the Mayor, the Comptroller and the City Chamberlain from paying any money to the Public Service Commissioners of the First District, or in any way complying with Chapter 429 of the Act of 1907, under which the Public Service Commission was organized. Gubner attacked the constitutionality of the Public Service Commissions law as in violation of 14 different provisions of the State Constitution and of three provisions of the National Constitution. Justice Gerard, before whom the matter came in the lower court, dismissed Gubner's application, and the case went to the Appellate Division. In that court but two issues were raised, according to Justice Clarke's opinion—first, whether the Public Service Commissions act violated Section 16 of Article III of the State Constitution, which provides that no local or private bill may embrace more

than one subject, which shall be expressed in the title, and, second, whether the act violated Section 10 of Article VIII of the State Constitution, prohibiting cities, counties and towns from increasing their indebtedness except for city, county or town purposes. In finding against Gubner with respect to these contentions the Appellate Division declares that the Public Service Commissions act is general, not private or local, and contains no matter not germane to the title which it bears. Again, on the technical point raised that the increase of city indebtedness incurred by issuing revenue bonds in anticipation of taxes for the payment of the expenses of the commission, the Appellate Division finds that this process does not differ from the issuance of revenue bonds for the payment of salaries and other current expenses of government. The indebtedness which a city, county or town is prohibited from incurring, remarks Justice Clarke, means, under the Constitution, debt created for other purposes than the maintenance of governmental instrumentalities.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Indiana.—The Sixty-sixth General Assembly adjourned on March 9. Two important bills relating to electric railways were passed. One applies to the construction of electric railways on toll roads; the other to the exchange of traffic between steam railroads and electric railways in course of construction. Two other bills which were passed relate indirectly to electric railways. One grants the right of eminent domain where property is desired for electric power plant purposes; the other provides a penalty where shade trees are destroyed in erecting a transmission system. Not one of the three bills introduced at the request of the Railroad Commission became a law. The electric railways opposed the bill providing for the separation of grades at highway crossings because it was deemed unfair to them. The bill providing heavy penalties for trespassing on electric railway or steam railroad tracks was regarded as too drastic, and was killed.

Kansas.—All public utilities bills have been defeated in the Senate. The administration desired a public utilities law in accordance with the recommendation of Governor Stubbs. The House "home rulers" were in favor of local control, and were strong enough to override the administration and passed three bills covering the whole utilities question. One regulated utilities in second and third-class cities; another regulated utilities in first-class cities and the third placed all large general utilities under the control of the railroad board. The Senate judiciary committee reported all these bills favorably. They were taken up for consideration in committee of the whole in the Senate. By joining forces with those senators who are constitutionally opposed to the State meddling with local utilities, the administration senators succeeded in forcing a motion through to knock the enacting clauses out of the bills. When the committee reported its action back to the Senate, Senator Quincy moved to reject the report of the committee on the first bill. Upon roll call, the Quincy motion was defeated by a vote of 18 to 15. The motion on the second bill was lost by a vote of 19 to 14. On the motion to save the bill, placing all general utilities under the railroad board, the vote stood 26 to 7.

Massachusetts.—The committee on railroads has reported leave to withdraw on the bill petitioned by John H. Carter for an investigation by the Railroad Commission of the issuing of passes by railroad companies and street railways. The report has been accepted by the House. The House has accepted the report of leave to withdraw by the committee on street railways of the O'Rourke bills requiring street railways to equip their cars with lifting jacks and fenders. The Senate and House have accepted the adverse report of the committee on street railways upon the Flynn bill for legislation requiring the Boston Elevated Railway to give night transfer checks free of charge between cars leaving and arriving at Hanover Street or Adams Square, Boston, between midnight and 6 a. m. The Senate has accepted the adverse report of the committee on street railways relative to the bill accompanying the petition of William French requiring conductors and motormen to be employed not more than 9 hours per day, the work being done in 11 continuous hours. A number of bills are still in committee in connection with proposed street railway legislation. Among these are the Bacon bill authorizing street railway companies to issue stock and bonds beyond the amounts fixed by charter or special law for building extensions, acquiring land for pleasure resorts, acquiring or building power houses, car houses, park buildings, acquiring or equipping additional rolling stock, changing motive power or furnishing electricity to a town for light, abolishing grade crossings, paying betterment assessments for widening or other alteration of streets, making permanent investments or improvements or

acquiring real or personal property in addition to that already owned, refunding funded debt or for payment of borrowed money. The bill provides for supervision of such issues by the Railroad Commission. Hearings have been closed on this measure, and it will shortly be reported upon to the Senate. Another measure before the street railways committee and upon which hearings have been closed is the Jenney bill authorizing the selectmen of Hyde Park and Dedham to grant locations to the Boston Elevated Railway or the West End Street Railway in these towns. In this connection a bill has been heard by the committee to permit the Old Colony Street Railway Company, now operating in these towns, to lease its lines and property to the Boston Elevated Railway. Hearings have been concluded on the Elder bill to authorize the Boston Elevated Railway to build an elevated railway from Sullivan Square, Charlestown, through Somerville to Medford. Hearings have also been concluded on the petition of D. P. Abercrombie, Jr., for legislation to authorize the Connecticut Valley Street Railway to issue bonds. The bill accompanying the petition of Butler Ames, for authority for the Boston, Lowell & Lawrence Electric Railroad to construct elevated and subway structures in Boston, Lowell, Somerville and Lawrence has been withdrawn at the request of the petitioners. Among the street railway matters now before the committee on Metropolitan affairs are the bill of Mayor Hibbard, of Boston, to extend the term of office of the Boston Transit Commission; the Nichols bill to provide rapid transit in Boston by a crosstown tunnel between Park Street and the South Station, to be built by the Boston Transit Commission; the Robinson bill for the construction of a tunnel by the Boston Transit Commission under Boston Harbor between Boston and the city of Chelsea; the Hays bill providing for a tunnel by the Transit Commission between the North Station and Sullivan Square; the bill for a subway between Tremont and Park Streets, Boston, and Milton Lower Mills; the bill for a subway from Park Street to South Boston; the Bryant bill for the relocation of the Boston terminus of the new Cambridge subway from Park Street to Scollay Square; the Ham bill authorizing the use of trains in the Tremont Street subway; and the Grace bill providing for the discontinuance of the elevated railway structure on Washington Street and the extension of the Washington Street tunnel to Dudley Street. President Bancroft, of the Boston Elevated Railway, has petitioned for an amendment of the company's charter authorizing it to have all the powers of the general laws now or hereafter in force with reference to the carriage of newspapers, baggage, express matter and freight, and also allowing the company from time to time to hold the stock and securities of other street railway and electric railroad companies, subject to the approval of the Railroad Commission.

New Jersey.—Arguments for and against the Martin and Pierce bills to provide for public utility commissions were made to the House judiciary committee and the House committee on revision of laws, sitting jointly at a public hearing on March 8. The Martin bill is a copy of the measure introduced by Mr. Martin last year and which passed the House then, but did not get through the Senate. The Pierce bill is sanctioned by Governor Fort and is less radical in its provisions. The committee on revision of laws reported the Pierce bill on March 15. After a debate Mr. Martin and Mr. Pierce changed their votes on the adoption of the report bringing in the Pierce bill and sent the bill back to committee. This leaves Mr. Martin at liberty to advance his bill. A bill permitting the expenditure of \$2,000,000 for a subway in Newark has been prepared for introduction in the Legislature. Mayor Haussling and the municipal committee of the Common Council of Newark have approved the measure.

New York.—The amendments providing for the modification of the Public Service Commission law placing telephone, telegraph, ferry and stage companies under the jurisdiction of the commission and the several other general amendments which constitute definitions of the powers and duties of the commission in greater detail were finally introduced in both branches of the Legislature on March 15. Perhaps the most important feature of the new legislation as it affects electric railways is that containing the general amendments of the law which has particular bearing on conditions in New York City and under which there is a provision giving the commission of the First District complete powers in fixing joint rates and regulating the issues of transfers between independent or allied lines. The power to fix joint rates for railroad and transportation companies was one of the provisions of the original act, but when an effort was made by the commission to exercise jurisdiction in this respect in New York City, the companies question the commission's authority in the courts on the grounds that "street railroads" had

not been specifically included in the provisions of the original bill. The clause of the present law dealing with the regulation of gas and electric light companies has been practically rewritten in the bill just introduced so as more closely to define the powers of the commission over gas and electric light companies. Another amendment of importance has to do with the present provision of the law giving corporations under the supervision of the commission the right to issue without consent short-term notes to meet emergencies. It is stated that in several instances the right has been abused by companies issuing notes at their own discretion and refunding the loan by another short-term issue instead of taking the issue up at expiration. The amendment introduced on March 15 prohibits refunding notes. The changes in the public-service law are contained in two bills, one of which is so drawn as to extend the supervision of the commission to the telegraph and telephone companies as before mentioned; the other is so drawn as to amend the law generally. Assemblyman McCue, of New York, in a bill introduced on March 11, proposes that the members of the Public Service Commission shall be elected for a term of four years and provides that the terms of the commissions now in office shall cease on Jan. 1, 1910. The Public Service Commission of the First District has made a report to the Legislature on the matter of the removal of the tracks of the New York Central & Hudson River Railroad on Eleventh Avenue, New York, to which reference is made in the article "Rapid Transit Proposals in New York," page 520 of this issue. The report covers the proceedings of the old transit commission and the various branches and permits under which the railroad operates. The commission asserts in the report that it has done all that is required of it according to the law. As at present restricted, the commission can lay out routes to be built with city money to carry passengers and freight, but it cannot grant a franchise to construct either a freight or passenger line with private capital. Governor Hughes has sent to the Legislature a message on the special franchise tax law, in which he says: "Present conditions with respect to legal proceedings for the collection of special franchise taxes are deplorable. The State with regard to these important rights is found to be enmeshed in a web of proceedings, and if we are to bring the litigation to an end and have the rights of the litigants determined with proper promptitude measures of relief must be provided without delay." The demand on all sides that the Elsberg law shall be so amended as to permit the construction of subway lines in New York with private capital and make it legal to grant a franchise for more than 25 years has attracted no little attention to this measure with the result that several papers have published the law in full and then proceeded to point out how in the case of the applications of the Interborough Rapid Transit Company and the Inter-Terminal Belt Line, the law as it now stands will work seriously to the detriment of the city by making it impossible for the Public Service Commission to consider either application unless an amendment is passed at this session. The new city charter will also have to be changed as it provides for a grant of not more than 25 years.

Ohio.—A matter of interest to the residents of Cleveland, Cincinnati and other cities in Ohio is the enactment of Senator Mendelson's bill amending the Hunt elevated railway law, passed by a former Legislature so as to provide for the construction of subways. An attempt was made to transform this into political capital by some of the newspapers, which said that the amendment was inspired by Mayor Johnson, of Cleveland. Senator Mendelson says that the measure was suggested by the idea that the interurban railway companies may desire to reach a joint terminal in Cleveland by means of a subway and that the Mayor had nothing to do with the act. It is also stated that the Cleveland Terminal Railway wished the passage of the bill because of the insistence of the people of East Cleveland that it place its tracks in a subway. The new law provides that such subways be operated by electricity. The Woods tax commission bill did not reach the calendar in the Senate and, of course, is dead for the present, as the Legislature adjourned on March 12. It was opposed by many interests. During the absence of James C. Morris from the office of the State Railroad Commission on March 8, John C. Sullivan, the appointee of Governor Harmon, who had previously been approved by the Senate, took the position as Mr. Morris' successor and was recognized as a member of the commission by the other members. Mr. Morris will appeal to the Supreme Court to decide which is the legal member of the commission. Both received their appointments from a Governor of the State and both appointments were approved by the Senate.

Pennsylvania.—With final adjournment but a month away, the Pennsylvania Legislature will have plenty of

work cut out for it if many of the more than 1000 bills thus far introduced are to reach the Governor. Not a measure affecting electric railway interests had passed both Senate and House up to March 15. In order that the various committees might have an opportunity to give proper consideration to measures already before them the introductions of new measures ceased on March 1. The Hunter bill, one of the most drastic measures affecting electric railway companies in second-class cities of the State, has passed the House and was up for final passage in the Senate on March 15. It was introduced in the House on Feb. 22 at the instance of Mayor-elect Magee, of Pittsburgh, and gives to the mayor and councils in second-class cities (Pittsburg and Scranton) are now the only cities of this class in Pennsylvania) the sole power to "regulate the street railway transportation and traffic, the carriage of passengers, the methods of carrying the same, the number, condition and movements of cars, the manner of taking on and discharging passengers and all other matters relating to the efficiency and adequacy of such public morals and comfort of the people in connection therewith, that such service shall in all respects be just and reasonable and councils are hereby empowered to pass all necessary ordinances to carry into effect the authority hereby conferred either by the creation of a municipal traffic commission or otherwise as they may deem proper and to prescribe penalties for the violation thereof." Should this bill become a law it would deprive the State Railroad Commission of all authority over the street railways in Pittsburgh and Scranton and for that reason the measure is being opposed by the State Railroad Commission. The Pennsylvania Street Railway Association and the Pittsburg Railways Company are also opposed to the measure. Representatives of the Pittsburg Railways Company admit that the service now rendered by the company during the rush hours is not what it should be, but say that they will assist the State Railroad Commission in the latter's efforts to solve the problem, but can see no legitimate reason why the company should be subjected to the exactments of an incoming Mayor and Council admittedly hostile to the company. The bill is general legislation for a special purpose and would give the Pittsburg Department of Public Safety rights over the company that are positively iniquitous. The Grim bill, requiring street railway companies to transport the United States mail, has passed the Senate and is now in the House. The bill giving brothers and sisters the right to recover damages for accidents on steam and electric railways was up for final passage in the House on March 15. An attempt is being made by the representatives of the electric railways to have the Barton bill providing that the real estate of electric railway and other corporations be subject to taxation for local purposes, recommitted to committees. Should this bill pass the Legislature the revenues of boroughs and third-class cities would be largely increased at the expense of electric railways. The bill including electric railway companies among the corporations placed under the authority of courts of common pleas in the settlement of all disputes between municipalities and corporations as to the reasonableness of license fees imposed upon such corporations was up in the Senate on final passage last week. The bill giving to the mother of a minor child the right to institute suit or recover damages for injury or death on steam or electric railways was on first reading in the House on March 15. The Sproul bill prohibiting spitting in public conveyances and places was amended in the Senate to require corporations operating enclosed smoking cars to provide cuspidors. This bill has reached the final-passage stage in the Senate. Among the new bills introduced recently are the following: A duplicate of the 1907 bill providing for annulment of charters of railroads which have not done any work within two years after being incorporated unless they begin construction within six months after the passage of the act and build at least 25 miles of road each year until the road is finished; providing a fine of \$10 per day for failure of a railroad or electric railway to open a road after being notified to remove an obstruction, designed to prevent the blocking of private roads and crossings; allowing five years for completion of railroads organized by purchasers at judicial sales; making regulations for incorporation of motor omnibus companies, providing route does not parallel any street railway for more than 20 per cent, the capital to be not less than \$25,000. As a substitute for the Fahey bill, licensing electrical engineers and contractors in Philadelphia, a measure has been offered with this additional clause: "Nothing in this act shall be construed as applying to street railway or electric light, heat and power companies operating under city ordinances, or the employees thereof." On March 16 further consideration of the Magee measure was postponed indefinitely.

Financial and Corporate

New York Stock and Money Market

March 16, 1909.

Prices in Wall Street took a decided upward turn to-day, although there was not much activity. For the past week the tone of the market has been excellent and the sentiment of the Street sanguine, but there has been little trading. To-day, without increasing the volume of trading, prices of the most favored issues advanced sharply. The present strength of the market and its inactivity are attributed to the tariff agitation, for financial interests have become pretty well convinced that the tariff revision that is now in progress is not going to affect anybody very seriously. While this augers to steady the market, traders seem content to wait until something is actually done in the way of tariff legislation before beginning to buy for either investment or speculation. It is the prevailing opinion that there will be no substantial revival in business until after the settlement of the new basis of values. During the week the market has been little influenced by outside occurrences, although the collapse of the Government's case against the Standard Oil Company undoubtedly added to the feeling of security felt by large financial interests. The demoralization in the copper market has had little effect and Amalgamated shares were among the strongest in to-day's price advance. Traction stocks, while continuing to be rather active, have recorded only fractional price changes.

The demand for bonds has not been as insistent as during the past few months, although there is still no difficulty in placing new issues that have substantial property behind them. The trade balance for February was only \$7,400,000 in our favor, as against \$81,000,000 last year, and, while it explains the gold movement, still the engagement of gold for shipment is attracting attention. Money continues to be remarkably cheap and the supply is plentiful. Quotations to-day were: On call, 1 $\frac{3}{4}$ to 2 per cent; 90-day loans, 2 $\frac{1}{2}$ to 2 $\frac{3}{4}$ per cent.

Other Markets

The stock market in Philadelphia has been dull during the past week, in sympathy with Wall Street, and the trading in tractions has been less active than in any other week since the beginning of the year. Union Traction has been rather more active than the others, but in none of the issues has there been any important trading. Price changes have been insignificant.

In the Boston market, only small lots of traction securities have found their way into the market. Boston Elevated and West End have been traded in to a limited extent and a few shares of Massachusetts Electric have been sold. Prices have remained on about the same levels that have recently prevailed.

Tractions in the Chicago market have been inactive, in spite of the active interest and discussion now in progress concerning consolidation projects. Even the various issues of the Chicago Railways, which were actively traded in for a time, have grown dull and only scattering lots are offered for sale. Prices are generally well maintained.

In Baltimore, the bonds of the United Railways continue to be popular. There is always a good market for these securities and prices are firm with a gradual upward tendency. The 4s are quoted at 87 $\frac{1}{2}$ and the incomes at 53 $\frac{1}{2}$.

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

	Mar. 9.	Mar. 16.
American Railways Company, Philadelphia.....	*46	45 $\frac{3}{4}$
Boston Elevated Railway.....	127	127 $\frac{3}{4}$
Brooklyn Rapid Transit Company.....	71 $\frac{3}{4}$	71 $\frac{1}{4}$
Chicago City Railway.....	*185	*185
Cleveland Railway.....	—	—
Consolidated Traction Company of New Jersey.....	a78	a78
Consolidated Traction Company of New Jersey, 5 per cent bonds.....	a107	a107
Detroit United Railway.....	61	*61
Interborough-Metropolitan Company.....	15 $\frac{3}{4}$	14 $\frac{3}{4}$
Interborough-Metropolitan Company (preferred).....	43 $\frac{3}{4}$	44 $\frac{3}{4}$
Manhattan Railway.....	144	142 $\frac{3}{4}$
Massachusetts Electric Companies (common).....	143 $\frac{3}{4}$	*143 $\frac{3}{4}$
Massachusetts Electric Companies (preferred).....	72	*71 $\frac{1}{2}$
Metropolitan West Side Elevated Railway, Chicago (common).....	19	*19
Metropolitan West Side Elevated Railway, Chicago (preferred).....	*48	*48
Metropolitan Street Railway.....	*28	*28
North American Company.....	80 $\frac{1}{2}$	78 $\frac{3}{4}$
Philadelphia Company, Pittsburg (common).....	41 $\frac{3}{4}$	47
Philadelphia Company, Pittsburg (preferred).....	*42 $\frac{3}{4}$	*42 $\frac{3}{4}$
Philadelphia Rapid Transit Company.....	27 $\frac{1}{2}$	27 $\frac{3}{4}$
Philadelphia Traction Company.....	*93	91 $\frac{1}{2}$
Public Service Corporation, 5 per cent collateral notes.....	a100 $\frac{1}{4}$	a100 $\frac{1}{4}$
Public Service Corporation certificates.....	a80 $\frac{1}{4}$	a81 $\frac{1}{2}$
Twin City Rapid Transit Company, Minneapolis (common).....	105	*105
Union Traction Company, Philadelphia.....	53 $\frac{1}{2}$	53 $\frac{1}{2}$

a Asked. *Last sale.

Report of the United Railways Company, St. Louis

The report of the United Railways Company, St. Louis, Mo., for the year ended Dec. 31, 1908, shows earnings as follows:

GROSS EARNINGS AND OTHER INCOME.	
Passenger receipts.....	\$10,410,716
Advertising privilege.....	54,000
Mail.....	47,604
Express.....	12,380
Rental of power.....	20,528
Interest (on deposits and securities).....	20,847
Miscellaneous.....	27,090
Total.....	\$10,593,165

OPERATING EXPENSES, TAXES AND DEPRECIATION.	
Operating expenses.....	\$5,577,410
Taxes.....	632,193
Depreciation (expended on the property).....	527,856
Total.....	6,737,459
Gross income.....	\$3,855,706

FIXED CHARGES.	
Underlying bonds.....	\$615,550
United Railways Company 4 per cent bonds.....	1,170,760
St. Louis Transit Company 5 per cent bonds.....	500,000
St. Louis & Suburban bonds.....	391,000
Collateral trust notes.....	66,000
Temporary loans.....	55,427
Total.....	2,798,738
Net income.....	\$1,056,968
Dividend on preferred stock (\$16,983,200, at 5 per cent).....	849,160
Surplus to profit and loss.....	\$207,808

The traffic statistics for 1908 and 1907 compare as follows:

	1908.	1907.
Revenue passengers.....	211,459,570	216,779,638
Transfers and passes.....	99,129,708	97,165,511
Total passengers.....	310,589,278	313,945,149
Percentage of passengers using transfers.....	44.50	42.34
Average fare per passenger.....	3.35	3.39

The condensed balance sheet of the company as of Dec. 31, 1908, shows:

ASSETS.	
Property and plant.....	\$104,352,511
Securities in treasury:	
Preferred capital stock, United Railways (30,000 shares).....	\$3,000,000
Preferred capital stock United Railways, reserve funds investment (6000 shares).....	600,000
Mortgage purchase 5 per cent gold bonds Missouri Electric Railroad.....	630,000
First general mortgage 4 per cent bonds United Railways, employees' badge deposit fund (\$15,000 par value).....	12,000
Miscellaneous stocks.....	4,242,000
Current assets:	
Cash in banks, trust companies and depositories.....	\$258,554
Cash on deposit to pay bond coupons.....	49,210
Cash on deposit for employees' savings.....	11,270
Bills receivable.....	1,903
United States, Post Office department.....	11,901
City and county of St. Louis.....	3,782
Bond and stock scrip.....	1,053
Interest accrued on securities owned.....	20,625
Insurance premiums and water license prepaid.....	40,869
Open accounts.....	62,800
Material and supplies.....	225,892
Total.....	\$109,322,970

LIABILITIES.	
Capital stock:	
Preferred shares.....	\$20,000,000
Less reserved for acquisition of capital stock of constituent companies.....	16,800
Common shares.....	\$25,000,000
Less reserved for acquisition of capital stock of constituent companies.....	86,200
Total capital stock issued....	\$44,897,000
Total funded debt outstanding.....	59,180,000
Current liabilities:	
Audited vouchers and pay roll, payable January, 1909.....	\$298,756
Bond coupons matured, not presented.....	37,760
Bills payable.....	1,035,937
Employees' savings deposits.....	11,270
Tickets outstanding.....	21,841
Wares unclaimed.....	4,691
Badge deposits, employees'.....	12,481
Interest on employees' badge deposit fund.....	768
Accrued liabilities:	
Taxes not due.....	\$42,303
Interest on funded debt.....	1,014,521
Dividend on preferred stock, payable Jan. 11, 1909.....	212,290
Sundry creditors.....	66,862
Miscellaneous.....	5,968
Total.....	1,341,944
Total.....	2,765,448

Reserve funds:		
Injury and damage reserve.....	\$785,087	
Fire insurance reserve.....	175,371	
Depreciation reserve.....	172,419	
Miscellaneous reserves.....	74,661	
		1,207,538
Profit and loss:		
Surplus, Dec. 31, 1907.....	\$1,063,251	
Adjustments.....	1,925	
Profits from operation, 1908.....	207,808	
		1,272,984
Surplus, Dec. 31, 1908.....		1,272,984
Total.....		\$109,322,970

John I. Beggs, president of the company, in presenting the report of the company, said in part:

"Passenger earnings for 1908 as compared with 1907 decreased \$248,320, equal to 2.33 per cent. Operating expenses, taxes and depreciation were reduced \$306,422, equal to 4.35 per cent. The amount available for dividends increased \$50,136. Dividends paid on the preferred stock for the year increased \$200,000, owing to the fact that the \$4,000,000 preferred stock issued for the acquisition of the St. Louis & Suburban Railroad Jan. 1, 1907, commenced to participate in dividends the beginning of the year 1908. The amount of earnings remaining available for dividends on the common stock for the year 1908 was \$207,808, equivalent to more than four-fifths of 1 per cent.

"The percentage of passengers using transfers during 1908 increased to 44.50, as against 42.34 for 1907. The percentage of transfers issued in 1900 was only 25.70. The average fare per passenger in 1908 was 3.35 cents, as against 3.39 cents in 1907, showing that the revenue of the company per passenger is gradually being reduced, it having been 3.48 cents in 1900.

"Five per cent of the gross receipts each month has been credited to the depreciation reserve fund and charged to operation, as was done during the three preceding years. Of the amount so credited to this account during 1908 there has been expended on the property the sum of \$513,924, leaving a balance of \$13,931, which, together with a credit of \$11,961 received from other sources, has been added to the balance at the beginning of 1908, leaving a credit to this account on Dec. 31, 1908, of \$172,418.

"Since 1904 the amount of reconstruction and renewal of track in the city and county has been as follows: During 1904, 21.56 miles; during 1905, 8.90 miles; during 1906, 20.18 miles; during 1907, 21.65 miles; during 1908, 32.99 miles; total, 114.28 miles. These figures include work done on the tracks of the St. Louis & Suburban Railway since Jan. 1, 1907. For the three years previous to that date the St. Louis & Suburban Railway rebuilt 34.33 miles of its track in the county.

"During the year a license was obtained from the Pay-as-You-Enter Car Company, and 230 of our cars changed to that system and put into operation with satisfactory results to the company and to the public generally, it being our intention to change such of our cars as are suitable for this system and put them into operation as rapidly as possible on our several lines.

"In March, 1903, the Municipal Assembly of St. Louis passed an ordinance imposing an annual tax of 1 mill, payable quarterly, for each pay passenger carried as a car license fee. Our general counsel, Judge H. S. Priest, contends that this is double taxation, not justified by the city charter or the constitution of Missouri, and expresses great confidence in defeating the tax."

Report of the Chicago City Railway

The report of the Chicago City Railway Company for the 13 months ended Jan. 31, 1909, was made public March 16. President Mitten says:

"The within report covers a period of 13 months, this to include the extra month due to the end of the fiscal year having been changed, by action of the board of directors, from Dec. 31 to Jan. 31, in order to conform with the close of the operating year ending Jan. 31, as prescribed by the Settlement ordinance.

"Fifty-four-twelve miles of track have been reconstructed during the past year under the provisions of the Settlement ordinance, of which 22.90 miles represent replacement of cable tracks removed. The ordinance requires 94.71 miles of track to be reconstructed by April 15, 1910; 81.20 miles have been reconstructed, leaving but 13.51 miles to be reconstructed during the coming year. In addition to the foregoing, 7.99 miles of new track have been constructed since Jan. 1, 1908.

"The remainder of the 300 pay-as-you-enter cars purchased in 1907 have been placed in service, and 152 of the 300 cars purchased during 1905 and 1906 have been remodeled for pay-as-you-enter service. Two new car stations of large capacity and modern equipment have been built during the year. There are now four such stations

all told with a total housing capacity of approximately 1100 cars.

"On June 1, 1908, an advantageous agreement was entered into with the Commonwealth Edison Company, whereby the railway company will purchase for a period of at least 10 years, all of the electrical energy used in the operation and maintenance of its railway system. A new substation has been built during the year and new rotary converters are now being installed therein. There are now four such substations with a total manufacturer's rated capacity of 36,000 kw. Additional rotary converters have been installed in each of the other substations, also an additional rotary converter and a large storage battery have been added to the railway company's equipment in the Plymouth Place substation of the Commonwealth Edison Company.

"The new underground conduit system for the distribution of power is practically completed and the installation of cables therein is well under way. Material improvements in the fire risk at the various buildings of the company have been effected, which have considerably decreased the liability of loss by fire."

The income account and operating statistics for the 13 months ended Jan. 31, 1909, are presented herewith:

GROSS EARNINGS.	
Passenger receipts.....	\$8,979,735
Receipts from other sources.....	216,047
	\$9,195,782
TOTAL EXPENSES.	
Operating expenses, taxes, renewals and interest on capital investment.....	\$8,169,494
Net earnings.....	1,026,288
City's proportion, 55%, as per ordinance.....	564,458
Company's proportion, 45%, as per ordinance.....	461,830
Interest on capital, as certified by Board of Supervising Engineers.....	1,732,446
Income from operation.....	2,194,276
Other income (contractor's profit, brokerage, etc.).....	655,207
	2,849,483
Interest on bonds outstanding.....	849,739
Net income.....	1,999,743
Dividends.....	1,620,000
Surplus for 13 months ended Jan. 31.....	\$379,743
Percentage of net income to capital stock at par.....	11.11

OPERATING STATISTICS.	
Fare passengers carried.....(Increase 2.90%)	180,243,173
Transfer passengers carried.....(Increase 6.97%)	111,977,693
Fare and transfer passengers.....(Increase 4.43%)	292,220,866
Percentage of transfer to fare passengers.....	62.13
Double track cars.....	805
Single track cars.....	251
Total cars required by ordinance.....	1,056
Miles of single track owned.....	252.29

Denver (Col.) City Tramway Company.—The stockholders of the Denver City Tramway Company have approved the reorganization plan which has been under consideration for several months. It involves a new issue of \$25,000,000 25-year 5 per cent bonds which may be issued up to 85 per cent of the amount expended for improvements and extensions.

Newport News & Old Point Railway & Electric Company, Newport News, Va.—The application by the Maryland Trust Company, Baltimore, Md., for the appointment of a receiver for the Newport News & Old Point Railway & Electric Company, which was to have been heard by Federal Judge Waddill at Richmond on March 12, went over for future action.

Northwestern Elevated Railroad, Chicago, Ill.—The meeting of the committee of three having general charge of the negotiations for the consolidation of the elevated roads of Chicago and the committee of five representing the Metropolitan West Side Elevated Railway, which was the last to entertain the proposal to consolidate, was held on March 9, and it was announced that all the roads had given tentative approval to the proposed plan. The plan as now outlined provides for the formation of a central company to lease the property of the several companies, guaranteeing fixed dividends possibly on a sliding scale, based on the respective earnings of the several roads to be merged.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The Washington, Baltimore & Annapolis Electric Railway defaulted on its terminal bonds on March 1.

Traffic and Transportation

Stone & Webster Report on Pittsburg

The firm of Stone & Webster, which was engaged by the Pennsylvania State Railroad Commission to make a report on traffic conditions in Pittsburg, has rendered its report to the commission. The report states that the operating conditions in Pittsburg are particularly severe owing primarily to the topography, the location of the business district within a small area between two rivers, inadequate bridge approaches to this district, narrowness of the streets, etc. The report says that the physical condition of the track and overhead construction is good, but criticises the lighting of some of the short cars and says that the tendency is to overheat them, especially in rush hours. It also criticises the application of the pay-as-you-enter system to double-truck cars of the ordinary pattern, saying that owing to the small size of the entering platform considerable delay is occasioned during rush hours in loading passengers on the down-town loops. A serious cause for disarrangement of schedules is the blocking of grade crossings with steam railroads by freight trains. The better regulation of traffic by the police would improve conditions. Stone & Webster consider that the system of loops and terminals in the Terminal District appears to be the best possible attainable under the present conditions, and, in general, consider "that co-operation between local municipal and borough officials and the company would result in the removal of the same, at least of the onerous conditions under which the service is now being performed."

In conclusion, the report recommends:

"First. That wherever insufficient car clearances exist, and it is possible to do so, the condition be improved, thus providing greater safety and reduced delays.

"Second. That proper action be taken by State or municipal authorities to better regulate the use of street crossings at grade by cars and trains of steam railroads, thereby reducing delays to the minimum.

"Third. That the proper municipal action be taken looking toward better police regulation of street traffic, to the end that street cars may have a more unobstructed use of the tracks, thus reducing delays and consequent congestion.

"Fourth. That at 'rush hours' the company station inspectors or starters at important points with authority to regulate the headways of cars on the various lines and assist car operatives, to the end that a closer adherence to schedules may be maintained.

"Fifth. That at important junctions in the Terminal District during rush hours, switches be operated electrically or by employees other than those operating the cars.

"Sixth. That the company improve the lighting arrangement in the few short cars before referred to.

"Seventh. That the company instruct car operatives to give better attention to the heating and ventilation of cars, more particularly at the rush hours.

"Eighth. That additional service be provided by the company during rush hours, by adopting tripper service or more tripper service on 13 routes." The routes are here specified.

Work of Baltimore Company Commended

The storm that affected Washington, Baltimore and vicinity during inauguration week was one of the worst that has visited that part of the country in years, as is testified to by the accounts of the inauguration ceremonies. Baltimore was particularly hard hit. Despite this, however, the United Railways & Electric Company maintained service continuously and doubtless would have operated on schedule had it not been for the interference of foreign poles and wires, of which 60 fell across the tracks of one suburban line of the company. As a result of the excellent work done by the company, William A. House, the president, was the recipient of many congratulatory letters and expressions of opinion. These he transmitted to T. A. Cross, general manager of the company, with an expression of appreciation of the part played by the men in making the service complete and satisfactory. Mr. Cross, desirous that the employees should share with him the appreciation expressed by Mr. House, addressed the following letter to the heads of departments on March 8:

"I am in receipt to-day of a communication from the president, advising of messages and calls from stockholders and friends of the company, complimenting the management upon the manner in which the service was maintained upon the principal city lines, and the promptness with which it was restored on the suburban lines after the storm of March 3 and 4. I quote one of the letters received by

Mr. House: 'I want to extend to you my compliments, not only to you, but to your able assistants for the splendid work in keeping up your service in the face of such great difficulties.' I also quote from Mr. House's reply:

"On behalf of my assistants and for myself I wish to thank you for your very complimentary note, referring to our work during the blizzard. With your permission, it will give me much pleasure to inform the general manager and through him the departmental heads of your commendation.

"The way in which our overhead structures and equipment held up in one of the most disastrous storms during my connection with the street railways of Baltimore best certifies to the policy of the company, in making large expenditures for the rehabilitation of its property. You will doubtless fully appreciate this fact when it is stated that this company did not lose a single pole, either wooden or iron; nor did it lose any of its overhead structures, except as a result of the falling of wires and poles of foreign corporations upon them. Furthermore, its snow-fighting equipment is second to none in the country and fully able to cope with the severest storms in this climate. With our property and equipment in such splendid physical condition, and with the knowledge of the marked efficiency of the operating department and the employees in the several divisions, and, above all, their great loyalty to this company's interests, any other result would have been disappointing."

"I also desire to commend the heads of the departments and those under their supervision for their hearty co-operation and untiring efforts in opening up the lines and restoring the service as rapidly as possible to its normal condition.

"Will you kindly advise your employees of the above, in order that they may know that their loyalty and interest have been appreciated, not only by the management, but by the public as well."

In commenting editorially on the service of the company the *Baltimore Sun* said:

"President William A. House is a man of action, rather than of words, and is not given to the expression of undeserved praise, so that his open letter commending the men of the street car force carries with it added weight. The Baltimore street car men are loyal, hardworking and efficient, and their good qualities never show so plainly as in an emergency. Motormen, conductors, trackmen, wiremen, electricians—men in all departments worked together last week and kept traffic moving under the most trying conditions. From Mr. House down to the last trackman, they deserve the thanks and commendation of the citizens of Baltimore."

New Limited Service for the Ohio Electric Railway.—

On April 1, the Ohio Electric Railway will adopt a schedule calling for the run between Toledo and Dayton to be made in five hours. In the beginning five trains will be maintained between the two points. This schedule will also provide limited service between Toledo and Fort Wayne, Ind., by way of Lima.

Union Depot Project at Toledo.—The interurban electric railways entering Toledo have signed a lease with the E. H. Close Realty Company for ground on the east side of Superior Street, near Jackson Street, where a union passenger station with a frontage of 96 ft. and a depth of 70 ft. will be erected. It is said to be the intention to begin work on the building at once, with the expectation that it will be sufficiently well advanced to permit its use this summer.

Officers at Railroad Crossing Improve Service at Toledo.

—J. M. Enright, manager of railways of the Toledo Railway & Light Company, Toledo, Ohio, has notified Mayor Whitlock that the service has been greatly improved since the city placed policemen at the railroad crossings. When complaint was made regarding the service, Mr. Enright notified the city that cars were frequently delayed at railroad crossings by trains and asked that officers be stationed at these places to see that the crossings were not blocked needlessly.

Commutation Tickets on the Buffalo & Lake Erie Traction Company's Line.—

The Public Service Commission of the Second District of New York has approved the following commutation rates of the Buffalo & Lake Erie Traction Company, effective March 12 on three days' notice: Fares per book of 46 one-way school commutation tickets, good in either direction, on school days only, between Lake View and Angola, \$3.45 per book; Irving and Angola, \$3.45 per book; Silver Creek and Dunkirk, \$4.60 per book; Sheridan and Dunkirk, \$2.30 per book; Sheridan and Silver Creek, \$2.30 per book. No school commutation fares have been in force between the points specified.

Personal Mention

Mr. A. S. Flatland has resigned as master mechanic of the Jersey Central Traction Company, Keyport, N. J.

Mr. John R. Mitchell, president of the Capital National Bank, St. Paul, Minn., has been elected a director of the Twin City Rapid Transit Company, Minneapolis, Minn., to succeed Thomas Lowry, deceased.

Mr. T. H. McCauley, formerly manager of the Port Arthur & Ft. William Electric Railway, Port Arthur, Ont., has been appointed manager of the municipal electric railway being constructed at Calgary, Alta.

Mr. Fred Rapp, formerly connected with the Public Service Railway, Newark, N. J., as foreman of one of its shops, has been appointed master mechanic of the Atlantic City & Shore Railroad, Atlantic City, N. J.

Mr. C. H. Gibbs has resigned as superintendent of traffic of the Galesburg Railway & Light Company, Galesburg, Ill., and Mr. R. E. Carley has been appointed to succeed him. Mr. Gibbs, however, will remain with the Illinois Traction System in another capacity.

Mr. Horace Lowry, superintendent of the Minneapolis division of the Twin City Rapid Transit Company, has been elected a director of the Minneapolis, St. Paul & Sault Ste. Marie Railway, Minneapolis, Minn., to fill the vacancy caused by the death of his father, Thomas Lowry.

Mr. C. S. Sims has been elected president of the Schenectady (N. Y.) Railway and Mr. H. E. Andrews has been elected vice-president of the company. Mr. Sims was formerly vice-president of the company and Mr. Andrews was formerly president of the company. Mr. Sims is second vice-president of the Delaware & Hudson Company.

Mr. C. H. Walker, district passenger and freight agent of the eastern and central divisions of the Ohio Electric Railway, Cincinnati, Ohio, has been appointed superintendent of the Dayton-Richmond and Dayton-Union City divisions of the Ohio Electric Railway, reporting to Mr. F. J. Moore, superintendent of transportation of the Ohio Electric Railway. Mr. Walker's headquarters will be at the station of the Ohio Electric Railway at Dayton.

Mr. George M. Mattis, whose election as vice-president of the Illinois Traction System, Champaign, Ill., was noted in the *ELECTRIC RAILWAY JOURNAL* of March 6, 1909, was graduated from Princeton University in 1901. His first work after leaving college was with a company doing a farm mortgage business with which he remained until 1905. He then became associated with the Illinois Traction System as assistant treasurer and occupied that position for three years. During 1907, Mr. Mattis was made general superintendent of the eastern division of the Illinois Traction System, which comprises the lines of the system east of Decatur, Ill. In 1908, he was elected treasurer of the system, which position he still holds, now acting in the capacity of vice-president and treasurer of the system.

Mr. J. T. Nyhan, who was recently appointed general manager of the Macon Railway & Light Company, Macon, Ga., has assumed the duties of that office. Mr. Nyhan was formerly connected with the American Waterworks & Guarantee Company, Pittsburg, Pa., for which he was engaged in special work at Shreveport, La., recently, and before becoming connected with the American Waterworks & Guarantee Company in 1908, he was superintendent and general manager of the Macon Railway & Light Company, holding these positions from 1893 to 1907. Before entering the employ of the Macon Railway & Light Company in 1893, Mr. Nyhan was engaged in New York in construction work with the Thomson-Houston and the General Electric Companies. Mr. Nyhan is a member of the American Institute of Electrical Engineers.

Mr. S. B. Thompson, mechanical engineer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, and J. R. Townsend, electrical engineer of the lighting department of the company, have resigned, and their duties have been assumed by Mr. H. L. Patterson, heretofore superintendent of railway power, whose title hereafter will be mechanical engineer. Mr. E. H. Beil, superintendent of light and power, has been given the title of assistant mechanical engineer. Mr. Fred Finch, superintendent of track, and Mr. U. S. Sliter, superintendent of transportation, have also resigned, and their duties have been assumed by Mr. G. J. A. Paul, general superintendent of railways. Mr. Emmet D. Gault has been promoted from chief clerk to auditor, and Mr. Elton G. Dunlap, heretofore assistant chief clerk, has been made assistant treasurer of the company.

Mr. Eugene Eichel, consulting engineer, of Berlin, has been appointed editor of *Elektrische Kraftbetriebe und Bahnen*, to take the place of Dr. Eng. W. Reichel, who has been obliged to give up active editorial work on account

of the pressure of professional duties. Dr. Reichel will remain, however, in an advisory capacity and will be associated on the advisory committee with Mr. K. Wilkens, manager of the Berlin Electrical Works, and Privy Councillor G. Wittfeld, of the department of public works. Mr. Eichel, upon whom the active editorial work will fall, was for five or six years associated with the engineering department of the General Electric Company at Schenectady. He presented an extensive paper on "Electric Railway Development in America" at the Munich meeting of the International Street & Interurban Railway Association, last September.

Mr. George F. Faber, whose appointment as traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., was noted in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909, began his railroad career with the Pennsylvania Railroad as clerk in the superintendent's office, where he served from 1890 to 1892. He resigned from this position to become connected with the accounting department of the East Cleveland Railroad, for which, during 1893 and 1894, he filled several minor offices of responsibility and trust. From 1894 to 1901 Mr. Faber was associated with the Warner & Swasey Company, Cleveland, Ohio. His position with this company afforded him an opportunity to obtain a thorough knowledge of general machine designing, and during 1900 and 1901 he had charge of the company's department of record of costs on all apparatus manufactured. Mr. Faber's object in resigning from this company was to re-enter the electric railway field, and he accepted a position with the so-called Appleyard Lines in Ohio, and afterward acted as superintendent of two of the properties until the termination of the receivership. He then accepted the position of superintendent of the Elgin-Belvidere Electric Railway, which was at that time under construction. After the completion of this property he organized and operated the road for a year, leaving the company to become general superintendent of the Western Ohio Railway, Lima, Ohio, in charge of transportation, car shops and power station.

Mr. Calvin G. Goodrich, vice-president and managing director of the Twin City Rapid Transit Company, Minneapolis, was elected president of the company on March 16, to succeed the late Mr. Thomas Lowry. Mr. Goodrich has long



C. G. Goodrich

been prominent in electric railway transportation matters, both in the councils of the American Street & Interurban Railway Association, of which he was president last year, and in the Twin City Rapid Transit Company, of which he has been the chief executive officer for a long time. He has been connected with the Minneapolis system for 32 years. Mr. Goodrich was born in Oxford, Ohio, on March 12, 1856, the son of Dr. Calvin G. Goodrich and Mary A. Goodrich, and in 1868, with his father, moved to Minneapolis. When 21 years of age, on Mr. Lowry's invitation, Mr. Goodrich entered the service of the Minneapolis Street Railway Company as auditor, and for a long time he was the only man in its accounting offices. On July 2, 1878, he was elected secretary of the company, and on July 10, 1880, a director. On Aug. 14, 1883, Mr. Goodrich was appointed superintendent of the company, and shortly afterward, general manager. On June 12, 1886, he was elected vice-president and general manager of the company, resigning the office of secretary. Later, with Mr. Lowry and Mr. Clinton Morrison, he secured control of the St. Paul City Railway, and assumed the management of the property, and when the Minneapolis and the St. Paul properties were merged as the Twin City Rapid Transit Company, on June 5, 1891, Mr. Goodrich retained the title of vice-president and general manager of the consolidated company. Later he was elected vice-president and managing director of the company, and it has always been his ambition to make the system the best in the United States. Mr. Goodrich is also president of the Duluth-Superior Traction Company, is a member of the leading clubs of Minneapolis and St. Paul, and takes an active part in everything that tends to the betterment and the development of both cities.

Mr. F. P. Woy, who for a year and a half has been manager of the Twin State Gas & Electric Company, Brattle-

boro, Vt., operating the Brattleboro Street Railway and the Brattleboro Gas Light Company, operating the electric railway, electric light and gas properties in Brattleboro, West Brattleboro, Dummerston, Vt., and Hinsdale, N. H., has resigned to open an office as a consulting engineer in Madison, Wis., for the purpose of handling engineering work which he already has in hand and do a general consulting and engineering business for electric railway, electric light and gas companies. Mr. Woy was employed by J. G. White & Company, New York, N. Y., for a number of years in connection with their extensive construction work and operation of properties throughout the United States, and has at various times been connected with the construction and operation of plants in different parts of the United States.

Mr. Willard J. Hield, general manager of the Twin City Rapid Transit Company, was also elected vice-president of the company at a meeting of the board of directors held in New York March 16. Mr. Hield has been in the employ of the company for more than 21 years. Mr. Hield was born in Janesville, Wis. He went to Minneapolis in 1887, and entered the employ of the Minneapolis Street Railway Company immediately as clerk in the old Third Avenue North offices. In 1889 the company faced a great many operating problems, and Mr. Hield was assigned to outside work. A few months later he was made superintendent of the Old Motor Line, filling that position until it was abandoned as a steam line. His next assignment was to construction work, and he took a most active part in the electrification of the lines in Minneapolis. In the summer of 1891 the work of electrification being well in hand, Mr. Hield was appointed superintendent of the Minneapolis Street Railway, and in December, 1891, he was advanced to the position of general manager. In July, 1892, following the incorporation of the Twin City Rapid Transit Company, Mr. Hield was made general manager of the company. Still later his duties were extended to cover the lines operated by the Minneapolis, St. Paul & Suburban Railway.

Mr. Leonard S. Cairns, who has been appointed general superintendent of the Twin City Rapid Transit Company, is a native of Wisconsin, but has spent most of his life in Minneapolis. Mr. Cairns received his schooling in Minneapolis, and has been in the employ of the Twin City Rapid Transit Company for the past 12 years. He commenced work as a clerk in the office of the superintendent of the Minneapolis Division, and has held almost every position in the operating department. From a clerkship in the superintendent's office he was promoted to chief clerk and, later, to assistant superintendent. In the fall of 1905, when the company opened its new interurban line between Minneapolis and Lake Minnetonka, Mr. Cairns was put in charge of that part of the system, and soon after was given the title of superintendent of interurban lines, having jurisdiction over the Lake Minnetonka and Stillwater interurban lines and the three interurban lines between Minneapolis and St. Paul. In the summer of 1906 the company began the operation of a fleet of 12 steamboats on Lake Minnetonka, and it devolved upon Mr. Cairns to master marine operation. To his credit, it can be said that he did this added work so well that the successful operation of the steamboat fleet on Lake Minnetonka is one of the wonders of the many visitors to the Twin Cities. Up to recently Mr. Cairns has held the title of superintendent of interurban and steamboat divisions. His new title of general superintendent came as a reward for faithful and efficient service.



W. J. Hield



L. S. Cairns

Construction News

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

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

RECENT INCORPORATIONS

City & Suburban Railway, Brunswick, Ga.—Application has been made to the Secretary of State by this company for a charter to construct and operate an electric railway not less than 4 miles in length in Brunswick. Principal office, Brunswick. Capital stock, \$50,000. Among the applicants for the charter are: F. D. M. Strachan, Frank D. Aiken, E. F. Coney, C. Downing and Albert Fendig. [S. R. J., Jan. 11, '08.]

Paris-Northern Railway, Danville, Ill.—This company has been incorporated for the purpose of building an electric railway from Ridgefarm to Paris, connecting the traction systems of Illinois with those of Ohio and Indiana. It is stated that the company has completed the surveys and is now at work securing the right of way. Principal office, 115 North Vermilion Street, Danville. Capital stock, \$5,000. Directors: W. M. Bridgett, R. C. Parks, L. C. McGee, George G. Roland and Charles Troup. [E. R. J., March 13, '09.]

***Lake Arthur, Jennings & Northern Railway, Jennings, La.**—This company has been incorporated in Louisiana to construct an electric railway from Lake Arthur through Jennings, to connect with a point on the Colorado Southern, New Orleans & Pacific Railroad, a distance of about 50 miles. Headquarters, Jennings. W. B. Conover, president.

***Sunbury, Lewisburg & Milton Railroad, Selinsgrove, Pa.**—Application has been made by this company for a charter to build an electric railway between Shamokin Dam and Lewisburg. The applicants for the charter are: Boyd A. Musser, J. C. H. Newcomer and C. M. Clements.

FRANCHISES

Atlanta, Ga.—The Atlanta & Carolina Interurban Railway has applied to the City Council for an extension of its franchise. The present franchise held by the company expires April 1, and it is desired that the franchise be extended to Nov. 1. [E. R. J., Aug. 29, '08.]

Chicago, Ill.—The ordinance granting the Kensington & Eastern Railroad a 20-year franchise was defeated by the City Council on March 8 by a vote of 35 to 18. Following the defeat of the measure permission was obtained to reintroduce it as new matter, and it was sent back to the transportation committee. The company proposes to construct an electric railway, 8 miles in length, between the Illinois Central Railroad at Pullman and the Chicago, Lake Shore & South Bend Railway at Hammond, Ind. [E. R. J., Jan. 23, '09.]

Farmington, Ill.—The Peoria & Galesburg Electric Railway has applied to the City Council for 50-year franchise to build and operate an electric railway over certain streets of Farmington. [E. R. J., Dec. 26, '08.]

Decatur, Ind.—The Common Council has passed an ordinance granting the Fort Wayne & Springfield Railway a franchise to extend its railway through Decatur. It is stated that the company contemplates extending its railway to Monroe and Berne.

Seymour, Ind.—The voters of Jackson Township, in which Seymour is situated, have voted against a subsidy tax in aid of the construction of the Brownstown Water, Light & Traction Company's interurban railway to connect Seymour and Brownstown. This is the second election held in the township for the same purpose. [E. R. J., Feb. 27, '09.]

Mineola, N. Y.—The New York & North Shore Traction Company has been granted an extension of six months' time by the Nassau County Board of Supervisors on its franchise over the North Hempstead turnpike from Foley's corner at Roslyn to the North Hempstead town line at Little Neck.

Oklahoma City, Okla.—The Oklahoma Interurban Traction Company, which proposes to construct an electric railway from Oklahoma City through Capitol Hill to El Reno, has applied to the City Council for a franchise to build its lines along certain streets of the city. L. E. Patterson is the local representative of the company. [S. R. J., Nov. 30, '07.]

Astoria, Ore.—The City Council has passed an ordinance granting a 30-year franchise to the Oregon Coast Railway for the construction of an electric railway over certain streets in Astoria. The company proposes to build an electric railway from Astoria to Seaside.

Carlisle, Pa.—The Cumberland Railway has been granted a franchise to construct an electric railway from Middlesex to Newville, via Carlisle, and along the line of the State Road westward from Carlisle. W. E. Glatfelter, Balfour, president. [E. R. J., Nov. 21, '08.]

Collingdale, Pa.—The City Council has passed an ordinance granting the Philadelphia & Garrettford Street Railway a franchise to build a railway in Collingdale. By the completion of this link through service will be established from the Sixty-ninth Street terminus of the Market Street Elevated Railway to Chester.

***Elizabeth, Pa.**—An ordinance has been passed by the Borough Council granting a franchise to the Peters Creek Street Railway. It grants right of way over certain streets, and provides for a connection with the Pittsburg Railways Company lines at Dravosburg.

Greenville, S. C.—The City Council on March 2 passed a resolution declaring the franchise of the Greenville Traction Company to be invalid. The company operates an electric railway in Greenville 12 miles in length. The franchise of the Greenville Gas & Electric Company, which is owned by the Greenville Traction Company, was also declared invalid.

***Ogden, Utah.**—An application has been made to the County Commissioners by Lyman Skeen, Joseph A. Taylor and J. M. Child for a franchise to construct an electric railway from the northern limits of Ogden through Harrisville, Far West to Plain City.

Juneau, Wis.—The Milwaukee Western Electric Railway has been granted a franchise for that section of its proposed electric railway which is to be built between Hustisford and Beaver Dam. J. W. Barber, Majestic Building, Milwaukee, secretary. [E. R. J., March 13, '09.]

TRACK AND ROADWAY

J. F. Donahoo Company, Birmingham, Ala.—The ELECTRIC RAILWAY JOURNAL is advised that this company is in the market for steel rails.

***Medicine Hat, Alta.**—It is stated that the Southern Alberta Land Company is making preparations for the construction of the electric railway which is to run out over its holdings from Medicine Hat.

Calgary (Alta.) Municipal Railway.—The City Council has awarded the contract for the steel poles required for the street railway to the Standard Supply Company at \$32.50 each for 28-ft. poles.

Edmonton (Alta.) Radial Railway (Municipal).—The City Commissioners have recently awarded the following contracts for material: The Federal Electric Company, Montreal, Que., aluminum, contract price, \$4,550. The Northwest Electric Company will furnish the overhead specials for \$1,947.90. Wm. Stuart & Company will supply the wooden poles needed for \$3,400, while copper bonds will be furnished by the Canadian General Electric Company, Peterborough, Ont., for \$5,070.

***Phoenix, Ariz.**—It is said that a company will be organized within a few weeks for the purpose of constructing an electric railway in Phoenix to connect with a line to be known as the Suburban Railway. Application has already been made to the City Council for a franchise. It is the intention of the promoters to haul both passengers and freight. It is probable gasoline electric cars will be operated. Among those interested in the enterprise are: J. W. Dorris, George M. Halm, Homer B. King, F. J. Bennett and B. A. Fowler.

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—It is stated that this company has resumed work on its proposed electric railway between Fresno and Hanford. Surveys are being made and it is expected that grading will commence about April 1. W. F. Davis, of the Cleveland Construction Company, is in charge of the preliminary work. [E. R. J., Nov. 28, '08.]

Groton & Stonington Street Railway, New London, Conn.—Surveys are being made for a proposed extension of this company's railway from Mystic to Old Mystic, a distance of 3 miles. It is stated that the company will petition for a charter to build the extension.

***Elberton, Ga.**—Guy G. Rucker, Ruckersville, Ga., has, it is reported, proposed the construction of an electric railway from Iva, S. C., via Ruckersville to Elberton, Ga.

Cairo & St. Louis Railway, Cairo, Ill.—This company has filed for record a mortgage for \$250,000, with the Portland Trust Company, Portland, Maine, trustee. The proceeds of the issue are to be used for improvements, chief among these being the construction of an electric railway from East St. Louis to Cairo. The new line is to pass through Belleville, Sparta and Murphysboro. [E. R. J., Dec. 12, '08.]

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This company is reported to have awarded a contract to the Western Electric Company for the overhead material to be used on the railway under course of construction from Streator to Ottawa. [E. R. J., Feb. 6, '09.]

***Turner, Kan.**—A number of business men of Turner, 2 miles west of Argentine, are reported to have organized a stock company for the construction of an electric railway from Turner to Argentine to connect with the Metropolitan Street Railway Company's line there. These officers were elected: J. J. Swingley, chairman; L. P. Hewitt, treasurer; F. L. Strickland, secretary, and F. G. Shedd, C. A. Gaither and R. H. Perkins, directors. The capital stock and a name for the company have not been decided on. At the meeting of the promoters \$6,000 was subscribed for the line. It will be 1¼ miles long. The right of way from Argentine to Turner has been secured.

***Minneapolis, Minn.**—A company has been formed with C. A. Nelson, chairman, to build a railway from Minneapolis to Anoka. It is probable that the company will operate gasoline electric cars. The sum of \$75,000 is said to have been pledged by C. J. Swanson, Minneapolis, and others toward the building of the railway.

***St. Louis, Mo.**—Mark L. Belt, manager of the Higginsville Switch Company, a coal railroad 6 miles long, is said to be interested in a plan to construct an electric railroad to extend from Lexington to Warrensburg, Johnson County, 44 miles. The proposed line would embrace the property of the Higginsville Switch Company, which would be extended northwest to Lexington. The southern extension, as proposed, will be a direct line from Higginsville to Warrensburg.

Rochester & Manitou Railroad, Charlotte, N. Y.—This company has awarded contracts for the construction of an 1800-ft. viaduct and a 600-ft. wood-piled trestle across Brad-docks Bay. The contract for the viaduct was awarded to the Buffalo Expanded Metal Company and the trestle work was awarded to A. F. Chapman, Buffalo. It is said that the cost of the improvement under the contracts will be \$25,000.

New York, N. Y.—The Public Service Commission of the Second District has ordered a hearing for March 25 on the application of the Union Railway to extend one of its lines in the Bronx from the junction of Third Avenue and Pelham Avenue easterly along Pelham Avenue to the Southern Boulevard. The Public Service Commission has also ordered a hearing for March 19 on the application of the Third Avenue Railroad Company for permission to build an extension on its Fort George Avenue line.

Newark & Marion Railway, Newark, N. Y.—It is reported that this company is planning to extend its railway northward to Williamson, on the Rochester & Sodus Bay Railway, a distance of 6 miles. It is stated that the company has already begun making the necessary surveys. The company at present operates a railway between Newark and Marion, a distance of 10 miles. Steam is being used as motive power, temporarily.

Weaverville Electric Company, Asheville, N. C.—It is stated that this company has completed the surveys for its electric railway through Yancey County to Hunte Dale and is now making profiles of the proposed route. The company already operates an electric railway between Asheville and Weaverville.

***Pomeroy, Rock Springs & Athens Traction Company, Pomeroy, Ohio.**—This company is said to have completed the preliminary survey for its proposed electric railway which is to extend from Pomeroy to Athens. The power plant will be located on the fair grounds at Rock Springs. A. W. Lee, Pomeroy, chief engineer.

***Brantford, Ont.**—It is stated that Paul Huffman is interested in a plan to build an electric railway from Delhi to Burford, touching Kelvin, Northfield and Harley, and connecting with the proposed Brantford & Woodstock Railway. Application will soon be made for a charter.

Lebanon & Southern Street Railway, Lebanon, Pa.—J. M. Shenk advises that this company has been formed for the purpose of constructing a railway, 20 miles in length, from Lebanon to Buffalo, Schaefferstown, Klinefeltersville, Newmanstown and Womelsdorf. It has not yet been decided what the motive power will be, but it is likely that the company will operate motor cars. As yet no contracts have been awarded. It is the intention of the promoters to begin construction work as soon as the sum of \$150,000 is subscribed. The company has not yet been incorporated. Capital stock, \$300,000. Officers: J. M. Shenk, president; Wm. P. Coldren, vice-president; Charles Coldren, secretary; Frank Houck, treasurer, all of Lebanon. [E. R. J., Dec. 19, '08.]

York (Pa.) Railways.—This company, on March 14, placed in operation that portion of its railway between Dallastown and Red Lion. The stretch is several miles long and is nearly a direct route between the two towns. It is stated that the remainder of the line between Dallastown and York will be put in operation within the next two months.

***Austin Springs Railway, Johnson City, Tenn.**—J. B. Cox, Johnson City, writes he has organized this company to build a railway between Johnson City and Austin Springs, a distance of about 5 miles. Surveys have been made for the route and contracts placed for the rails. It has not yet been decided what motive power will be used.

Northern Texas Traction Company, Fort Worth, Tex.—The Commercial Club of Arlington is said to have made a proposition to this company for the construction of an electric railway from Arlington to Cleburne, by way of Mansfield. It is stated that the company has taken the matter under consideration.

Seattle (Wash.) Electric Company.—This company has been granted permission to construct a new city road bridge on Fifteenth Avenue, W. Elliott Avenue and Beach Drive, and to double-track the present line.

Okanogan Electric Railway, Spokane, Wash.—This company is reported to have awarded a contract to W. C. Gray for the grading of 40 miles of roadbed. The contract for the light work in grading will be let later. The company proposes to build an electric railway from Nighthawk to Brewster, a distance of 60 miles. The power station will be located near Cuess. A. M. Dewey, Empire State Building, Spokane, president. [E. R. J., Aug. 22, '08.]

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company is said to be having plans prepared for an office building and terminal station which it proposes to erect at the corner of Hastings Street and Carroll Street, at a cost of \$200,000. [E. R. J., Sept. 5, '08.]

Portland (Maine) Railroad.—This company has about completed its new car house in Westbrook. The dimensions of the building are 100 ft. x 120 ft. and its floor space covers an area of about 12,000 sq. ft. It contains eight tracks, which will accommodate 32 cars, a boiler house and also a machine and blacksmith shop. In addition to this there are located in the building a waiting room and the offices of the division superintendent.

Dartmouth & Westport Street Railway, New Bedford, Mass.—Announcement is made that this company expects to erect a brick freight shed 63 ft. x 125 ft., one story high, and office building 25 ft. x 83 ft., two stories high, to be located on the northeast corner of Water and Hazard Streets.

New Jersey & Pennsylvania Traction Company, Trenton, N. J.—This company has awarded John A. Maher the contract for the construction of a repair and paint shop to be located on North Warren Street, near Hanover Street. The new structure will be one story high, and will be built of stone and brick. It will extend from Warren Street to the present car house of the company, at Hanover Street and Chancery Street. It is estimated that the building, when completed, will cost \$25,000.

Toledo, Ohio.—The interurban electric railways entering Toledo have signed a lease with the E. H. Close Realty Company for ground on the east side of Superior Street, near Jackson Street, where a union passenger station with a frontage of 96 ft. and a depth of 70 ft. will be erected. It is said to be the intention to begin work on the building at once, with the expectation that it will be sufficiently well advanced to permit its use this summer. Plans for the structure provide for a waiting room 60 ft. x 80 ft., rest room, smoking room, baggage room, ticket office, etc. The building will be two stories high and the second floor will be used for railroad offices.

POWER HOUSES AND SUBSTATIONS

Schenectady (N. Y.) Railway.—This company has awarded a contract to Brown & Lowe, Schenectady, for the construction of a substation on the Outlet Road, on the Saratoga division of its system. The new substation will supersede the one now in use at Ballston Lake, and in design will be similar to the one at Karners Station, on the Albany division. The work will be started at once and the plant will be in readiness, it is said, by June 15.

Denison & Sherman Railway, Denison, Tex.—This company will build a new substation at Woodlake.

Sea View Railroad, Narragansett Pier, R. I.—This company, which operates an electric railway between East Greenwich and Narragansett Pier, expects to install a 400-kw Westinghouse-Parsons steam turbine in its Sea View power station.

Manufactures & Supplies

ROLLING STOCK

Tri-City Railway, Davenport, Ia., is in the market for 10 single-truck closed cars.

Springfield (Ill.) Consolidated Railway will purchase five closed cars for delivery in the fall.

Ogden (Utah) Rapid Transit Company has ordered four cars from the Cincinnati Car Company.

Mount McKay & Kakabeka Falls Railway, Fort William, Ont., it is reported, is in the market for some new cars.

Burlington (Vt.) Traction Company has purchased four large open cars from J. M. Jones Sons Company, Watervliet, N. Y.

Gary, Hobart & Valparaiso Railway, Valparaiso, Ind., it is reported, will purchase four cars. Standard o-60 trucks are to be used.

Springfield (Ill.) Consolidated Railway has purchased a 3000-gal. sprinkler car from McGuire-Cummings Manufacturing Company, Chicago.

Chicago & Milwaukee Electric Railroad, Chicago, Ill., has purchased one sprinkler car from McGuire-Cummings Manufacturing Company, Chicago.

Hudson & Manhattan Railroad, New York, N. Y., has placed an order with W. T. Van Dorn Company, of Chicago, Ill., for 92 pairs of large type No. 20½ drawbars.

J. F. Donahoo Company, Birmingham, Ala., desires to purchase electric interurban, logging, box, flat and coal cars. It will also buy locomotives, locomotive cranes and derricks.

Oak Bluffs (Mass.) Street Railway will purchase during the summer one or more cars to be operated with gasoline motors and run in connection with the company's electric road.

Michigan United Railways, Lansing, Mich., has purchased 9 sets of trucks from the Baldwin Locomotive Works. This company is rebuilding several of its large interurban cars at its Albion car shops.

Indiana Union Traction Company, Anderson, Ind., desires to purchase immediately three to five 30 or 40-ton second-hand ballast cars. It prefers the Hart Convertible car for use either as flat bottom gondolas or side or center dump.

Austin Springs Railway, Johnson City, Tenn., a proposed road between Johnson City and Austin Springs, wants prices on one gasoline motor car, one freight car and three or four trailers. Address J. B. Cox, Johnson City, Tenn.

Fort Wayne & Springfield Railway, Decatur, Ind., which was reported in the *ELECTRIC RAILWAY JOURNAL* for Dec. 19, 1908, as planning the purchase of two interurban cars for delivery early in 1909, advises it will not purchase any cars before the last of the year.

Augusta Railway & Electric Company, Augusta, Ga., will be in the market for cars. It has determined to purchase some cars for city service during the next few months, but has not definitely decided on the number. The company may also buy a number of interurban cars.

Omaha & Council Bluffs Street Railway, Omaha, Neb., reported in the *ELECTRIC RAILWAY JOURNAL* of Feb. 27, 1909, as constructing 25 cars in its shops, we are informed is building but 15 cars in its own shops, the other 10 cars having been ordered from the American Car Company, of St. Louis.

Rochester (N. Y.) Railway has ordered four interurban cars from the G. C. Kuhlman Car Company. Mention of the intended purchase of this equipment was made in the *ELECTRIC RAILWAY JOURNAL* of Jan. 30, 1909. The truck order was equally divided between The J. G. Brill Company and the American Locomotive Company. Smith 2-C heaters were ordered for these cars.

Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, Seneca Falls, N. Y., noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 30, 1909, as being in the market for four double- and four single-truck cars, has placed the order for the car bodies with The J. G. Brill Company. Smith 2-C hot water heaters were purchased for one-half of the number and Consolidated heaters for the remainder. General Electric Company's motors and air brakes were specified and M. C. B. American Locomotive Company's trucks. Sam H. Daly, of Meikleham & Dinsmore, consulting engineers, New York, who let the contracts, designed the cars and prepared the specifications.

Rochester & Manitou Railroad, Charlotte, N. Y., mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909,

as having purchased from the G. C. Kuhlman Car Company three semi-convertible cars, with a seating capacity of 44, we are further informed, has specified the length of the body 30 ft. 8 in., over vestibules 41 ft. 8 in., width over all 8 ft. 5 in., bodies to be of wood with composite underframes. Other equipment includes Brill ratchet brake handles, Curtain Supply Company's "Ring" curtain fixtures, Brill draw-bars, Dedenda gongs, Consolidated electric heaters, Crouse-Hinds headlights, Monitor roofs, "Dumpit" sanders, Winner seats, Mason safety step treads, and Brill No. 27 G-1 trucks. The cars will also be equipped with Buffalo motorman's stools.

Beaumont (Tex.) Traction Company, mentioned in the *ELECTRIC RAILWAY JOURNAL* of Feb. 27, 1909, as having placed an order for 5 double-truck cars with the St. Louis Car Company, advises that these cars will be of the semi-convertible type, 37 ft. 4 in. long over all, and will have a seating capacity of 40. They will be finished in oak. Other specifications follow:

Wheel base.....4 ft. 6 in.	Hand brakes.....Peacock
Length of body...25 ft. 4 in.	Headlights Niles
Over vestibule...36 ft. 4 in.	Motors, type and number,
Width inside.....8 ft.	2 GE-80
Body	wood
Underframe	wood
Control system.....GE-K10	RoofsCanvas, monitor
Couplers...St. Louis Radial	Seats.....St. Louis rattan
Curtain material...Pantasote	Trucks, type and make,
	Brill 27 G-1

Third Avenue Railroad, New York, noted in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909, as having ordered 100 p-a-y-e cars from The J. G. Brill Company, advises that it has specified Allis-Chalmers air brakes for 25 cars. The cars will be convertible, with a seating capacity of 52. The Third Avenue Railroad will use 75 of the cars on its lines and 25 will be put on the Tarrytown, White Plains & Mamaroneck Railway service. The following are the principal specifications: Wheel base, 4 ft. 6 in.; length of body, 30 ft. 1 in.; over vestibule, 41 ft. 9 in.; length over all, 43 ft.; width inside, 7 ft. 10 in.; over all, 8 ft. 4 in.; body, wood; underframe, wood with steel reinforcement; brakes, Peacock; brakeshoes, Lappin; couplers, Brill pull casting; curtain material, Pantasote; destination signs, Hunter; gongs, Brill Dedenda; hand brakes, Brill brake handle; headlights, United States; journal boxes, Symington; sanders, Brill; sash fixtures, Brill; seats, Brill; step treads, Mason; trucks, type and make, Brill 39E.

San Francisco, Oakland & San José Consolidated Railway, Oakland, Cal., as reported in the *ELECTRIC RAILWAY JOURNAL* of Feb. 27, 1907, has about completed building 10 new interurban cars in its shops, and has five more cars of similar type under construction. These cars have a seating capacity of 80, weigh 72,000 lb., are 70 ft. over all and 55 ft. 10 in. over endsills. The underframes are of composite wood and steel construction. The special equipment includes the following: Airbrakes, Westinghouse; axles, Gould Coupler Company; brake shoes, Diamond "S"; car trimmings, Adams & Westlake; center bearings, Baltimore; control system, G. E. Type M; couplers, Gould, No. 65; curtain fixtures, Curtain Supply Company; curtain material, Pantasote; markers, Armspear; paint, Lowe Bros.; seats, Hale & Kilburn; springs, Union Spring & Manufacturing Company; varnish, Chicago Varnish Company; special devices, Gould steel buffers, Anderson-Smith arc lamps, Indestructible Fiber Company's Headlinings, and Midvale rolled steel wheels.

Ithaca (N. Y.) Street Railway, mentioned in the *ELECTRIC RAILWAY JOURNAL* of Feb. 6, 1909, as having purchased two new and two second-hand cars, purchased the second-hand cars from MacGovern, Archer & Company, New York, and expects to receive the new cars ordered from The J. G. Brill Company, Philadelphia, by the end of next month. The new cars will be closed and built under the license of the Pay-As-You-Enter Car Corporation. They will be 41 ft. 1 in. long over all and have a seating capacity of 45. The cars will be practically the same as the closed pay-as-you-enter cars of the Third Avenue Railroad, New York. The bodies will be 28 ft. long, over vestibule 40 ft., with a width over all of 8 ft. 1½ in. The height from sill to trolley base will be 8 ft. 9 in., and from top of rail to sills 29¾ in. The bodies will be of wood with composite underframes. Brill portable vestibules and Baldwin trucks were specified, as were also Peacock brakes, Brill center bearings, Keeler Eccentric curtain fixtures, Dedenda gongs, Brill brake handles, Consolidated electric heaters, United States headlights, Dumpit sanders, Brill side bearings, rattan seating material and Dayton ventilators.

Philadelphia (Pa.) Rapid Transit Company, as mentioned in the *ELECTRIC RAILWAY JOURNAL* of Feb. 27, 1909, has purchased from the Pressed Steel Car Company 10 all-steel

elevated and subway cars with a seating capacity of 44. The cars will have an over-all length of 49 ft. 7¼ in., with bodies 40 ft. 6¼ in. long. The principal specifications follow:

Weight of body...30,000 lb.	Couplers..Van Dorn auto-
Wheel base.....6 ft. 9 in.	matic
Width inside.....7 ft. 7½ in.	Curtain fixtures.....Curtain
Over all.....8 ft. 9 in.	Supply Company
Height inside.....8 ft. 6 in.	Curtain material....Curtain
Sill to roof.....9 ft. 7½ in.	Supply Company
Height from top of rail to	Gears and pinions..General
sills.....3 ft. 4½ in.	Electric Company
Body	Headlights..Dressel Railway
Underframe	Lamp Works
Air brakes....Westinghouse	Journal boxes....Symington
Traction Brake Company's	Markers....Dressel No. 100
Electric Automatic	Motors, type and number,
Brake shoes..American Brake	two GE-66
Shoe & Foundry Company	Side bearings....Symington
Center bearings..Symington	ball bearing
ball bearing	Trucks, type and make,
Control system.....Sprague	Curtis Special
GE Type M	Ventilators..Auto Ventilator
	Company

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C., noted in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909, as having purchased from The J. G. Brill Company two open, center-aisle, 14-seat cars, advises that the entrance to these cars will be at the ends with no side steps. There will be screens on the sides. The specifications for special equipment include the following:

Seating capacity.....56	Curtain fixtures..striped duck
Wheel base.....4 ft. 6 in.	Curtain material.....Acme
Length of body.....34 ft.	GongsBrill Dedenda
Width inside.....8 ft. 3 in.	Hand brakes.....Brill
Width over all....8 ft. 9¼ in.	Headlights....United States
Body	No. 12
Underframe	wood
Couplers	Brill
	Sanders
	Seats
	Ash slat

The company has also specified the following for the four 20-ft. 8-in. semi-convertible motor car bodies with a seating capacity of 32, mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909, as having been ordered from The J. G. Brill Company. The bodies will be mounted on Peckham trucks, which the company already owns.

Length of body...20 ft. 8 in.	GongsBrill Dedenda
Over vestibule...30 ft. 1 in.	Hand brakes....Brill brake
Width inside.....7 ft. 8 in.	handle
Over all.....8 ft. 4 in.	Motors, type and number,
Body	two GE-1000
Underframe	wood
Brakes	Peacock
Couplers	Brill
	Curtain material, printed duck

Conestoga Traction Company, Lancaster, Pa., noted in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909, as having ordered 18 interurban cars from The J. G. Brill Company, has specified 6 cars to be of the 13-seat, open, Narragansett type, with a seating capacity of 65. The cars will have an overall length of 40 ft. 8 in. and 4-ft. 6-in. wheel base. They will be mounted on Brill 27 F-1 trucks. Other details of the specifications follow:

Body	wood
Underframe, wood with steel	plates
Center bearings..Symington	Headlights....Imperial arc
Couplers.....Brill radiating	Journal boxes....Symington
Curtain fixtures.....Acme	Motors, type and number,
Curtain material, striped duck	Westinghouse 306, 4 per car
Gongs	Dedenda
	Sanders.....Brill Dumpit
	Seats.....Brill Winner
	Vestibule at each end

Six more of the cars were ordered from the Wason Manufacturing Company. They will be of the semi-convertible type with a seating capacity of 44. Other items of the specifications are:

Wheel base.....4 ft. 6 in.	Hand brakes.....Peacock
Length of body...30 ft. 8 in.	Heating system....Consoli-
Over vestibule...40 ft. 1 in.	dated Car Heating Com-
Length over all...41 ft. 9 in.	pany
Width inside.....4 ft. 10 in.	Headlights....Imperial arc
Over all.....8 ft. 5 in.	Journal boxes....Symington
Body	wood
Underframe.....wood with	steel plates
Center bearings. Symington	Sanders.....Brill Dumpit
Curtain fixtures...Forsythe	Seats.....Brill Winner
Curtain material...Pantasote	Trucks, type and make,
Gongs	Dedenda
	Brill 27 F-1

It is understood that the remaining six cars will be single-truck, closed cars.

TRADE NOTES

Dorner Railway Equipment Company, Chicago, Ill., advises that it has moved its offices from 806 Great Northern Building, to 1307 Manhattan Building, Chicago.

Wagner Electric Manufacturing Company announces the removal of its district office in Pittsburg to the Lewis Block, and the appointment of Ludwig Hommel as district manager.

Grant Iron Works, Houston, Tex., recently changed their name to the Grant Locomotive & Car Works, and now intend building cars, locomotives, railway frogs, crossings and switches.

Pneumatic Vise Company, Chicago, Ill., has been incorporated with a capital stock of \$50,000, to manufacture and sell machinery. The incorporators are Thomas Moore, Mr. Riley and Emory D. Fraser, all of Chicago.

Perry Ventilator Corporation, New Bedford, Mass., advises that it has received orders from the Syracuse Railroad Construction Company for ventilators to be used in cars now being built by the G. C. Kuhlman Car Company.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis., maker of electric controlling devices, has opened a district office in 1108 Schofield Building, Cleveland, Ohio. The new office will be in charge of C. J. Kruse, who comes from the engineering department of the Cutler-Hammer Company.

T. H. Symington Company, Baltimore, Md., reports that it is supplying Baltimore center bearings for two trucks being built by the Baldwin Locomotive Works for the Toledo & Western Railroad, and for two trucks under construction by the same works for the Conneaut & Erie Traction Company.

Bausch & Lomb Optical Company, Rochester, N. Y., advises that Henry Bausch, vice-president, died on March 2, in Augusta, Ga., where he had gone early in February in the hope of restoring his failing health. Mr. Bausch lived 50 years, 34 of which were spent in the service of his company, especially in microscopic work.

Col. G. S. Ackley, president of the National Brake Company, is making an extended trip in Europe, partly on pleasure and partly on business, because he numbers many European tramway companies among his customers. He was in Germany the first part of this month and plans to return to the United States by way of Liverpool about the middle of April.

Peter Kling has resigned as superintendent of the passenger car department of the Pressed Steel Car Company's plant at McKees Rocks, Pa., and has been succeeded by W. M. Peach. Mr. Peach has been associated with the company for several years. It is announced that Mr. Kling will engage in a line of business other than that of car building.

S. F. Bowser Company, Ft. Wayne, Ind., is building at its plant a heavy car elevator to be used in lowering freight cars from the track level to the level of the floor of the shipping room, to facilitate the loading of oil tanks and tank supplies into cars. The company has recently had a side track built, connecting its plant with the main-line tracks of the railroads entering Ft. Wayne.

National Car Coupler Company, Monadnock Block, Chicago, Ill., has developed a new type of coupler for use on electric railway interurban cars. The coupler is an adaptation of the company's M. C. B. type of coupler which has been used successfully for many years on steam railways. It is designed especially to facilitate the interchange of electric and steam cars and to prevent cars operated in trains from uncoupling on short radius curves.

Railway Business Association, 2 Rector Street, New York, has published a bulletin giving a list of the resolutions adopted by the business bodies throughout the country with regard to railroad legislation. The consensus of the opinions quoted is that in view of the close association between the prosperity of the country and the railroads, legislative action with regard to railroads should be more conservative than it has been recently.

Guarini's Concert Band, New York, is now booking for its regular summer tour of electric railway parks. This organization was the principal attraction at Pabst's Garden in New York for the entire winter season. Guarini's programs are prepared to meet the tastes of the various localities, after consultation with the park management as to the requirements of the patrons. The band is accompanied by vocal soloists. S. Van Horn, 245 West Forty-second Street, New York, is the manager.

Steel Furniture Company, Grand Rapids, Mich., makes a specialty of benches and chairs for park service. The particular feature of this furniture is its substantial and neat

construction. The benches are made of cold-rolled Bessemer channel steel, and are guaranteed against breakage for 25 years. The seats are made of hard maple, finished and painted as desired. The chairs, which are especially suitable for park theatres, also have Bessemer open-hearth steel framing, and are furnished with any type of seat and veneer requested.

Twin City Equipment Company, Minneapolis, Minn., has completed its shops and is now prepared to build or repair railway cars and other heavy equipment. It has for immediate delivery practically new Strang cars and extra long cars for show purposes. Heretofore this company has operated on a brokerage basis, but has now taken in more capital and will purchase released machinery and build new, as well as buy old electrical and municipal pumping plants. The company has offices in New York, Chicago, Minneapolis (headquarters), Winnipeg, Spokane, Seattle and Portland, thus covering a very wide territory in the United States and Canada.

Crocker-Wheeler Company, Ampere, N. J., has recently booked a number of additional large orders. One of these is for a 600-kw, 250-volt d. c. generator for William Rahr & Sons Company, Manitowoc, Wis.; another for a 500-kw generator for the Shenango Furnace Company, Sharpville, Pa. The Dallas Cracker & Biscuit Company, Dallas, Tex., has ordered a 75-kw, 240-volt alternator and switchboard and a number of induction motors, aggregating 33 hp, with which to operate its plant. Another similar order is that placed by the Anderson Lumber Company, Passaic, N. J., for a 125-kw generator and switchboard and 160 hp of induction motors. These motors are all of the squirrel cage type. A 225-hp wound rotor type induction motor has been ordered by the Youngstown Sheet Tube Company for operating its wire mills at Struthers, Ohio. Among the large d. c. motor sales are those for a 100-hp shunt motor for the American Car & Foundry Company; an 85-hp motor to drive an air compressor for J. M. Kohler Sons Company, Sheboygan, Wis., and a 60-hp motor for the Bridgeport Brass Company's plating department Bridgeport, Conn.

ADVERTISING LITERATURE

Frank M. Foster, Columbus, Ohio, has issued a descriptive booklet on his Type A interlocking switchstand.

Duncan Electric Manufacturing Company, Lafayette, Ind., has issued Bulletin No. 8, describing its d. c. integrating wattmeters.

Western Electric Company, New York, has printed a novel advertising card apropos of the Presidential inauguration, showing President Taft in various moods at the telephone.

Duplex Metals Company, New York and Philadelphia, has prepared a booklet describing its copper-clad steel wire, together with tables of comparisons with copper on resistance, weight, strength, cost per mile, etc.

Harrisburg Foundry & Machine Works, Harrisburg, Pa., have issued a general publication describing the special features of Fleming-Harrisburg engines, and are also sending out loose sheets, each showing a typical installation of different type engines.

Jeffrey Manufacturing Company, Columbus, Ohio, has just issued a new catalog devoted to its coal and ash handling machinery in power plants. This apparatus has been installed in various power plants, among which are those of the Scioto Valley Traction Company, Cincinnati Traction Company and Columbus (Ohio) Railway & Light Company.

Atlas Engine Works, Indianapolis, Ind., have issued the 1909 edition of their general catalog. Each type of engine is described and illustrated and a brief statement is given of the usual range of sizes. A feature of the publication is a chapter of useful information at the end about heat, boiler losses, boiler efficiency, steam, indicator diagrams, care and management of boilers, etc.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1513, describing a portable compressor equipped with an a. c. or d. c. motor. The compressor, with its various accessories, can be brought directly to the work instead of having its power transmitted through pipes and flexible tubing. The bulletin No. 1513 also describes the new AA6 compressor adapted for air brakes and other purposes.

Western Electric Company, New York, has reprinted in pamphlet form a paper entitled "The Telephone for Train Dispatching," read by W. E. Harkness, sales engineer, Western Electric Company, before the St. Louis Railway Club, Feb. 12, 1909. Mr. Harkness' paper discussed the methods and apparatus used for dispatching by telephones, relating particularly to Western Electric apparatus for that purpose.