Street Railway Journal

VOL. XXIX. NEW YORK, SATURDAY, APRIL 27, 1907. No. 17.

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

MAIN OFFICE:
NEW YORK, ENGINEERING BUILDING, 114 LIBERTY STREET.

BRANCH OFFICES:
Chicago: Monadnock Block.
Philadelphia: Real Estate Trust Building.
Cleveland: Schofield Building.
San Francisco: Atlas Building.
London: Hastings House, Norfolk Street, Strand.

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

TERMS OF SUBSCRIPTION

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

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

To Dominion of Canada

Street Railway Journal (52 issues), postage prepaid.....$4.50 per annum
Single copies ..... 10 cents

To All Countries Other Than Those Mentioned Above:

Street Railway Journal (52 issues), postage prepaid..... $6.00
25 shillings. 25 marks. 31 francs.
Single copies ..... 20 cents

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

NOTICE TO SUBSCRIBERS

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

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

BACK COPIES.—No copies of issues prior to September, 1904, are kept on sale, except in bound volumes.

DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

NOTICE TO ADVERTISERS

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

Of this issue of the Street Railway Journal 8000 *copies are printed. Total circulation for* 1907 *to date* 138,850 *copies, an average of* 8168 *copies per week.*

Railway Construction

The action of a large number of the manufacturers of railway supplies in Chicago, recently, in signing a petition protesting against further railway agitation and legislation is of more than passing significance. The petition sets forth that business has been, and is, prosperous, and that there is apparently no commercial reason for expecting a discontinuance of existing conditions, except the widespread crusade against railroad corporations in legislatures and the governing bodies of cities and towns which seems to have been inaugurated recently. Various instances are cited as to new work, which has been discontinued, and proposed work, which has been abandoned for these reasons. While many of the supply companies are busy on present orders, the number of new contracts is falling off, and everyone must recognize the seriousness of the condition when extensions to our railroad systems are prevented or limited. Unless adequate security and a fair return on their investment are assured, the investment of money by capitalists cannot be expected in the transportation business. The railroad interests are, next to farming, the largest in the country, and, as a whole, the railroads are by far the largest purchasers. When they begin to economize, every other business is seriously affected, and it is time to sound a note of warning.

Electric Railways and Publicity

President Bancroft, of the Boston Elevated Railway Company, puts his finger directly on the secret of securing friendly relations between electric railways and the communities which they serve at the close of an article in the current number of the "Inter-nation" on "Public Service Corporations and the Public." He states that the transportation manager is getting fairer treatment now than he used to get, and that the view of the vast body of citizens is broadening. Not a little of the trouble in the past was due to lack of acquaintance. The modern manager believes in publicity, in taking his patrons into his confidence, in having them come to know him through the public prints, through discussions and debates, lectures and whatever other means may offer itself. The result has been the real awakening of the public and the opening of its eyes to many of the manager's difficulties, which explain some of his apparent shortcomings. Good service is, of course, a factor of the utmost importance, as well as publicity.

General Bancroft points out that the friendship of its community is the most valuable asset a company can have. The company can win it only by deserving it—and letting the community know that it does deserve it. There was a time when it was almost impossible for the newspapers to get from corporations even the kind of news that it would be of incalculable value to the corporations themselves to have circulated. This was largely due to lack of comprehension on the part of busy men who could not see how their work was of interest to others. It was an extremely short-sighted policy.

The wise and progressive manager puts at the disposal of the newspapers, the great public instructors, large facilities for learning and telling everything in which their readers may on any account be properly interested. Thus the public

service corporation draws into closer intimacy with the people whose problems it must solve, and, who, in turn, create its problems.

How well these principles have been put in practice in Boston is best understood by those who have come in close touch with the operation of the company which General Bancroft heads. The work of the Boston Elevated publicity department is constantly broadening in scope. The location of this company's tracks in a large number of separate municipalities and the operation of its nine generating plants, movement of cars on the surface, underground, overhead, and beneath the waters of Boston Harbor, and the extensive organization of employees, large amount of maintenance and construction work, all contribute to furnish many items of wide interest to the public. Lectures, illustrated by lantern slides, are given almost weekly by one official or another in different sections of Greater Boston. The courtesy and forbearance of executive officers at hearings in the face of a none too considerate and often impertinent public is another factor which tends to reduce friction between the community and the company. And, finally, every official in the Boston organization is readily accessible to the public upon every legitimate demand.

Express Car Speed

To an electric railway taking up a light freight and parcel business for the first time, the proper schedule speed of express cars is a matter which must be settled at an early stage. If the local conditions are clear enough to point the way to an immediate decision the company is fortunate. The type of express car to be used, the total loaded weight to be expected, the alignment and grades of the track, feeder capacity, districts traversed and the hours during which trolley freight is to be handled, all bear upon the speed question.

In general the value of electric express service to the consumer lies in its greater speed of delivery than any other competing agency. The frequency of passenger service, even on trolley roads traversing remote country districts, is so short that almost the only argument in favor of slow daytime express schedules are those of power economy, reduced first cost of motive power and rolling stock, and decreased wear and tear on cars and track. If there is no competition of importance, the express traffic need not, as a rule, be keyed to the schedule of the fast passenger service unless the dispatching requirements and turnout locations so dictate. In most cases it is safe to consider that the express service will be in a measure competitive, and the requisite of a large and growing business under such conditions is a high degree of celerity in the car movements. For daylight express service, then, the four-motor equipment geared close to the maximum speed of the regular passenger cars and capable of negotiating the heaviest grades and "bucking" snow in cold climates, of accelerating to make up time lost at loading and delivery points, and of holding to a schedule equal to the following cars is a most desirable specification to follow. Interference with passenger traffic very quickly wipes out the profits of trolley express operations.

Express traffic handled at night or in the early morning when the passenger business is at its lowest ebb, is not restricted by speed requirements to anything like the degree found in day service. Except on very long runs, economy is better served by moderate speeds. The loading of milk, vegetables and other products between country and city does not demand the speeds of passenger service if the lines are free for slower movements. Parcel deliveries and perishable goods handled in the daytime call for faster transit. No electric railway can go far in the handling of light freight and express matter without being obliged to classify the merchandise offered for transportation. The tendency of many classes of freight to be run at speeds close to passenger service is a marked point in steam railroad practice, and certainly as far as electric express car movements in the precious hours of daylight are concerned, there is little doubt of the wisdom of providing power for high-speed operation on a par with the regular passenger travel.

Gasoline Motor Cars

Mr. McKeen's paper on this topic before the New York Railroad Club is disappointing in its lack of operation results, yet it gives several very interesting hints as to some of the methods which have been followed on the U. P. in construction and design. Mr. McKeen is no believer in the steam dummy in any degree of refinement whatever, but pins his faith to the gasoline car on account of its comparative simplicity. In car design he stands for new ideas, breaking away from the traditional types and adopting the specialized construction particularly fitted for fast, independent motor cars. The most striking feature of Mr. McKeen's design of car is its shape. To avoid serious trouble with air pressure single cars must be relatively smooth in surface, sharp in the front and rounded in stern and the U. P. design, from the sills up, represents practically the form determined by the St. Louis tests as offering the least resistance in this way. The only criticism which we can suggest is that it seems somewhat short for the best results, and that a reduction in air resistance would be secured by carrying the sides down, to enclose the trucks. Whether the saving made by the form adopted at the schedule speeds at which this car runs is sufficient to warrant the expense is another question which we would have been glad to have seen more fully discussed in the paper, but the author-builder is to be congratulated upon combining in concrete form the salient features of high-speed car design. Steel is certainly the best material for such a car, and Mr. McKeen believes that in using steel it should be so utilized as to give the maximum of strength instead of serving for a mere copy of the wooden cars which are to be replaced. The result is a strong and safe car that cannot be telescoped or burned and should have very low depreciation in service. It is distinctly a well-planned new car for a new use and not a mere adaptation.

The point of particular interest to most readers will be the design of the engine. The striking feature of the U. P. design is that complete speed variation is obtained simply by varying the speed of the engine. The big steel car can be started and accelerated to a speed of a mile a minute merely by varying the spark and the throttle, and this is done smoothly and efficiently. The engine is fitted with a

friction clutch, operated by compressed air, but is absolutely free from the complicated transmission gears that are the nightmare of the automobilist. The success of throttling in the U. P. cars, in the opinion of Mr. McKeen, is due to a combination of carefully balanced features. In the first place the 200-hp engine is a six-cylinder machine, of which the reciprocating parts are very thoroughly balanced. Next, the gasoline vapor pipes from the carburetor to the cylinders are adjusted so that there is equally free access to each cylinder over an exactly equal distance so that one cylinder never steals charge from another. Finally the valve motion and the timing devices have been worked out especially with reference to the production of uniform output at various speeds. Apparently the results have been successfully attained. It would be most interesting to know whether this method of control requires materially larger weights than control by variable gears. We should be inclined to think that the engine itself would have to be increased in weight to get the required output at low speeds, yet, since the weight of the transmission gears and their casing is saved, the net result may be favorable. The practice described by Mr. McKeen might be difficult to follow in automobile construction, yet one cannot help thinking that judicious design, especially in six-cylinder engines, might very greatly simplify the transmission mechanism, even if it could not absolutely abolish it. Certainly, at the present time, complication has been pushed to the limit, and it is about time to take back-tracks.

The discussion and paper indicate a serious attempt on the part of engineers and builders to solve this question of internal combustion motor cars and to apply the lessons acquired in automobile service to the more serious work of transportation on rails. There has certainly been great advance in this field during the last two or three years, and the future holds promise of important developments.

The Slip of Wheels

Considering the magnitude of street railway interests, it is somewhat astonishing that more data have not been secured on the exact relations between track and wheels. We noted recently some facts relating to rail corrugation which bore directly upon the question of incipient skidding during braking. It does not follow that all rail corrugation is due to this particular cause; indeed some of it probably is not. Yet it ought not to be a difficult matter to get a record of the variation of rotation during braking that would throw considerable light on the factors that tend to produce corrugation. Of course, once a low spot is started from any cause the wheels tend to keep it going from bad to worse. Corrugation sometimes takes place on straight track where there is no braking to give it a start. Does not a sudden change in acceleration, due to a shift of the controller, tend to produce incipient slipping that is equally mischievous with braking? If so, how great is it and what, if any, is the proper remedy? In many electric railway experiments there appear some indications that in heavy work there is a biting action of the drivers quite different from the rolling friction of the free wheels. To what extent does this actually exist in ordinary operation, and how far is it an element in the wear of track? In bad weather the track and wheels may be covered with a sort of gritty slime, and it is a common experience to see the wheels spinning in this at a rate that suggests starting a low spot in short order.

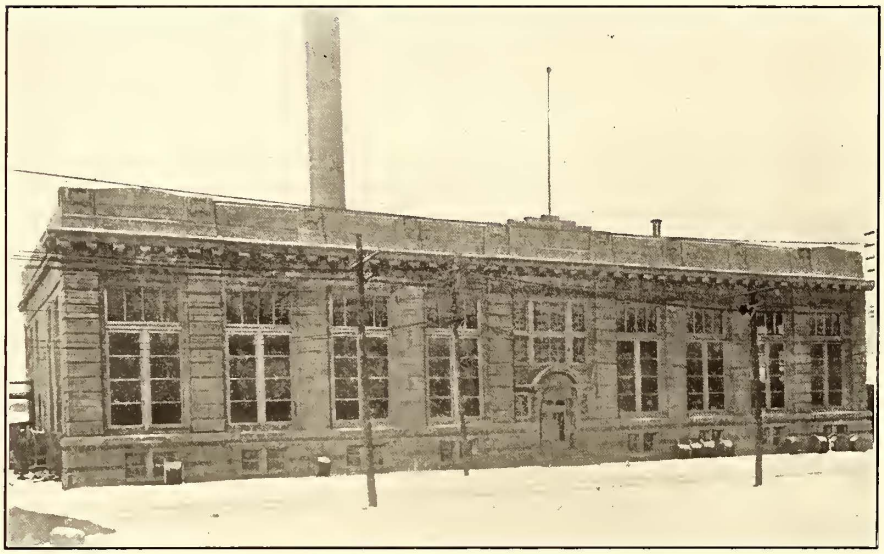
It is quite certain from ordinary railway practice that wear of track increases not so much with the tonnage as with the number of driving wheels employed on it, which suggests that, as on street railway track, there is a grinding action that is rather serious in its results. The exact nature of this action deserves more study than it has ever received, for, while it may be quite unavoidable, there is a chance that it may be in part due to preventable causes. It certainly has an immediate bearing on the character of the rail best adapted to resist its effects. The exact determination of the relation between the track covered and the distance swept out by a point on the wheels is not altogether an easy matter, for slipping during acceleration and skidding during braking would act against each other. It is a good thing for those equipped with testing cars to follow up to a conclusion, as it is under test conditions rather than in every-day service runs, that the facts would most readily come to the surface.

An analogous question is involved in the working of multiple-unit control. Elevated roads in general show very heavy wear of the rails, either from the way in which the power is applied or from some other cause. Will there be the minimum wear from slipping when there are few driving wheels or when the driving is divided among many wheels having relatively smaller tangential stresses but less certainty of dividing the total stresses uniformly? Does anybody know in fact how exactly the work of driving is in practice distributed among twelve to twenty motors? They can be made on the average to divide the total current pretty well, which fact does not exclude the possibility of rather large instantaneous variations. The practical bearing of all this on the matter of track renewals is of rather serious import.

Data on wear of rails on electric lines with respect to speed and tonnage are much scarcer than they should be, especially on lines which, from being on their own right of way, are comparable with ordinary railways. Yet some of the facts indicate, as is well known, an amount of wear that is exceptionally great and which forms a very grave item of expense. To what physical things is this wear proportional? Is it determined by tonnage, by tonnage and a function of the average speed, or by the total expenditure of energy on the trains? And if by the last named, what distribution of energy will give the required service with the minimum wear and tear? Just as the total energy spent on a train tends to degenerate ultimately into heat, so a certain part of it appears in one kind or another of physical disintegration, and it is of no small importance to determine how great this part is and why and where it appears. The chance of finding out is greater on a modern electric line than anywhere else, since the input can be ascertained and the effects are to a certain extent localized. It is as yet one of the unsolved dynamical problems of transportation which should no longer be neglected. Investigation stands a good chance of paying for itself many times over, and it should not be delayed.

NEW POWER PLANT OF THE CENTRAL PENNSYLVANIA TRACTION COMPANY AT HARRISBURG, PA.

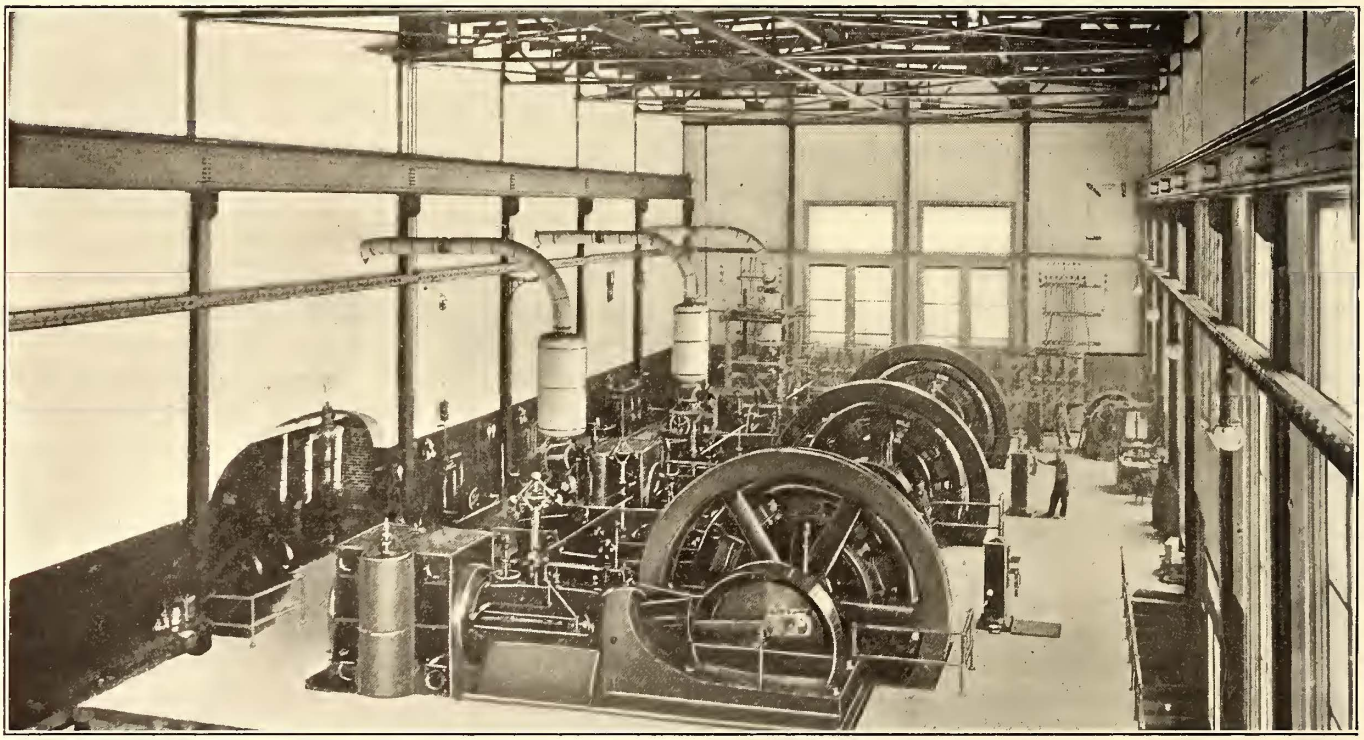
Short articles have appeared in this paper in the issues of Oct. 7, 1905; Jan. 6, 1906, and April 28, 1906, in regard to the construction of a new power station by the Central Pennsylvania Traction Company at Harrisburg, Pa. This station is now completed and possesses a number of novel features. The Central Pennsylvania Traction Company operates about 64 miles of electric railway in Harrisburg, Steelton, Highspire, Middletown, Pembrook, Progress, Linglestown, Oberlin, Paxtang and Hummelstown. Its new power house is located immediately adjacent to the old No. 1 station on South Cameron Street, Harrisburg, and about 1¼ miles from the electrical center of the system, figured on power consumption. Other sites were considered, two of which would have been more desirable on account of being nearer the load center of the system and also nearer the Susquehanna River. For various reasons neither of these could be obtained, and it was finally decided to locate the plant where it now stands, using the funds which would have been required to purchase a new site for building a water-supply line to the Susquehanna River, which is about 1100 ft. distant in a direct line.



EXTERIOR OF CENTRAL PENNSYLVANIA TRACTION COMPANY'S POWER STATION, HARRISBURG, PA.

The building is a composite structure having a steel skeleton with concrete walls, the columns being designed simply to carry the crane and roof loads and only sufficient lateral bracing in the shape of diagonal rods was used to maintain the framework in position while filling in the walls. The walls are of mass concrete, generally 12 ins. thick, and were carried up by filling in plain forms about 3 ft. deep, the forms being secured to and held in alignment by the columns. The building is divided longitudinally into two rooms of nearly equal size, the front portico being occupied by the main engines and switchboard and the rear by the boiler equipment. The foundations for the building consist of continuous concrete walls, 5 ft. to 8 ft. deep, with extended base, 6 ft. to 8 ft. wide at bottom.

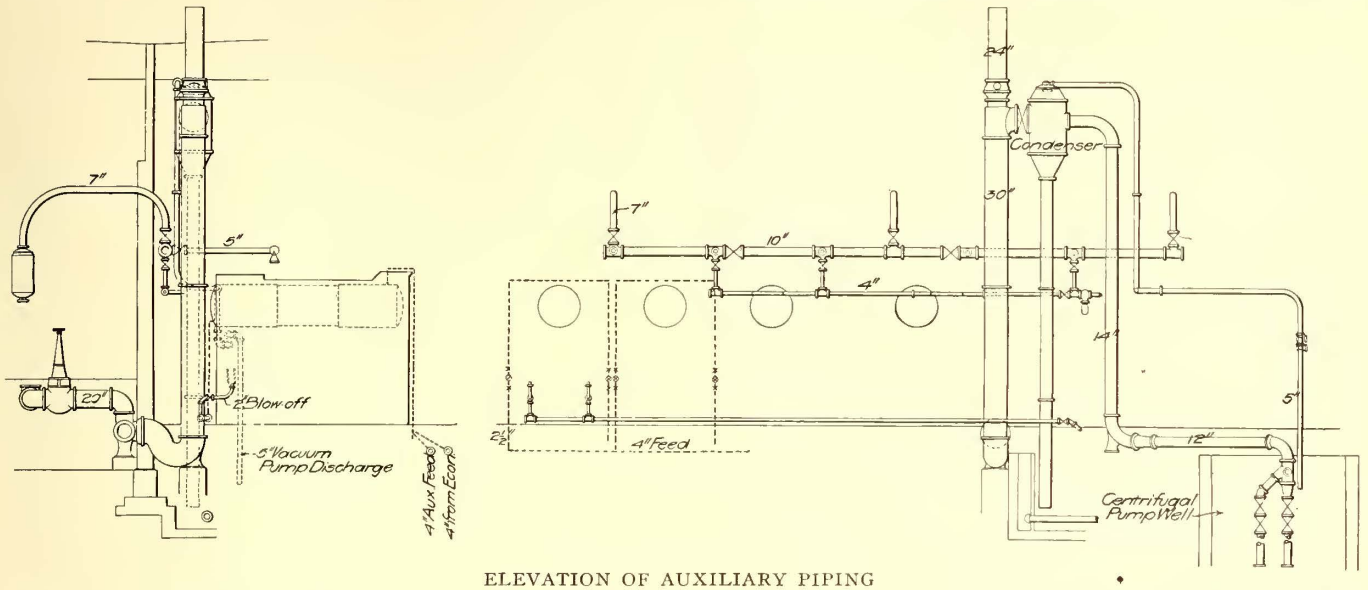
The roofing consists of 8-in. steel channels placed about 6 ins. between centers and resting on steel trusses, the whole being covered with 3-in. slab cinder concrete reinforced with ⅜-in. round rods, and this, in turn, covered with four-ply tar paper and slag roofing. The façade of the building was designed by C. H. Lloyd, a local architect, whose design was submitted in competition with two others. The front wall of the building is of mass con-



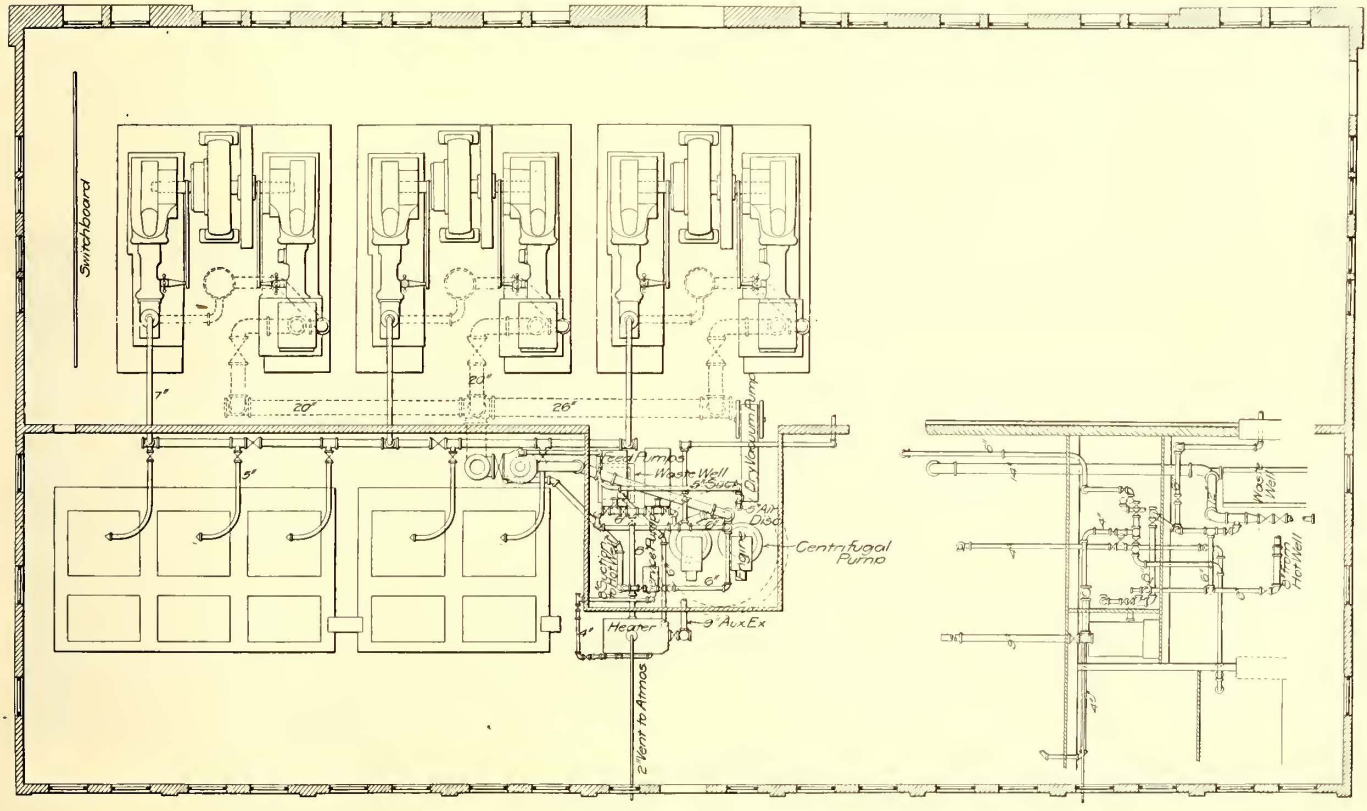
INTERIOR OF ENGINE ROOM, SHOWING STEAM PIPING CONNECTIONS TO BOILER ROOM

crete, as is the rest of the building, with the exception that the face of the wall was made of cement and sand mortar, mixed fairly dry, which was placed in forms and back-filled with rough concrete. This gives the building a smooth and even finish, as though made of dressed stone, although no effort was made to disguise the fact that the building is of concrete construction. The windows in the front of the building and opening into the engine room are very large, measuring 10 ft. wide by 23 ft. high. There are two swinging sashes on vertical pivots and one large transom, all being filled with plate glass. The windows extend neary to the floor line, thus giving abundant light and enabling people in passing cars to get a good view of the dynamo room.

The main floor of the engine room is about 8 ft. above the level of the street, while the floor of the boiler room is 5 ft. lower than that of the engine room. The building is approximately 175 ft. x 103 ft., and only a trifle more than half the floor area is occupied by the present equipment. The rapid increase in the power requirements of the traction company in the past few years indicated the advisability of providing ample space for future growth.



ELEVATION OF AUXILIARY PIPING

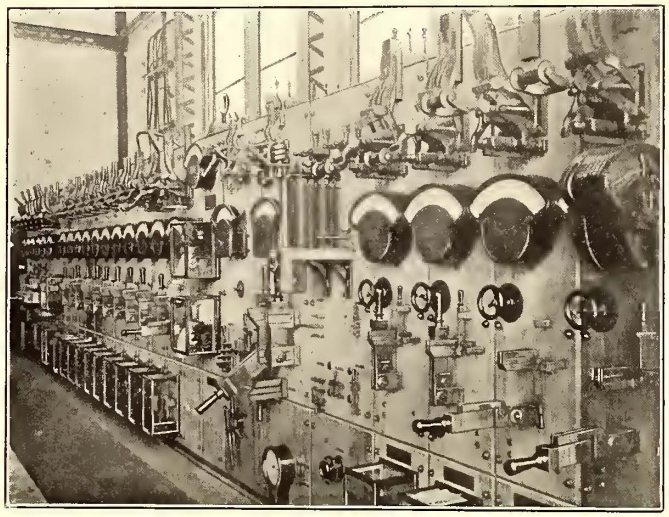


PLAN OF MAIN AND AUXILIARY PIPING

The central bay of the boiler room is used as a pump room. In this are placed boiler feed-water pumps, circulating water and air pumps, feed-water heaters, condenser, etc. The floor above, or roof, of the pump room is built on steel beams and carries the economizer and main smoke flue, the flue occupying the center of the floor space and the present economizer installation space being adjacent to the boilers. The main flue passes out on the

level of this elevated floor directly to the chimney located 23 ft. to the rear of the building. A rectangular coal bin, having a capacity of 600 tons, extends the full length of the space occupied by the boilers. This bin is constructed of plate girder sides and I-beam floor, lined throughout with concrete. A coal gate is placed directly in front of each boiler and the coal is delivered to the boiler room floor by a traveling weighing hopper.

Clearfield coal is delivered to the building over a siding



THE SWITCHBOARD

from the Pennsylvania Railroad running between the rear wall of the building and the chimney. Near the center of the building and under the track is a hopper which receives the coal as it is dumped from the cars. The coal passes to a crusher and thence to the boot of a vertical chain and bucket elevator. This latter delivers the coal to a screw conveyor in the roof of the building from which it is distributed to the coal bin previously mentioned.

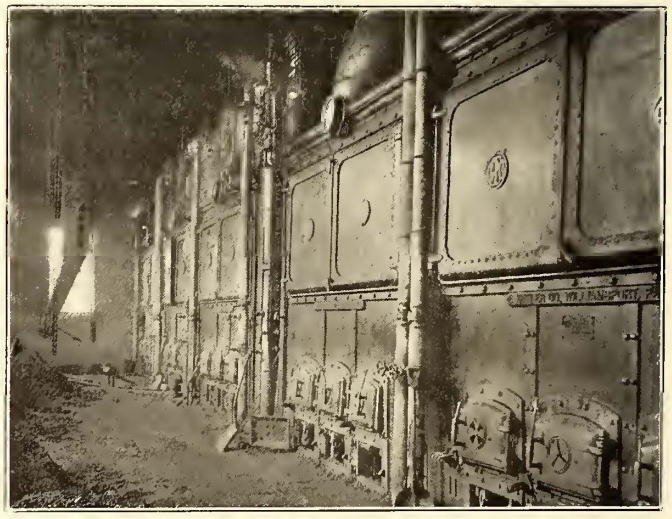
Ashes drop from the hand-fired shaking grates to pits from which they are removed in a steel dump car and delivered to the elevator boot mentioned. The ashes are then elevated to a bin located in the roof of the building adjacent to the elevator, the bin having a capacity of about one carload. The proximity of the elevator and the bin obviates the necessity of handling the ashes by the screw conveyor, and the ashes are removed to the outside of the building by means of a gate and chute. By means of this arrangement, the car on the track outside may be emptied of its coal and filled with ashes without being moved from its position. The coal and ash handling machinery has a capacity of twenty tons per hour, and was furnished by the Jeffrey Manufacturing Company, of Columbus, Ohio.

The chimney was constructed by the Weber Steel Concrete Chimney Company, of Chicago. It has an internal diameter of 10 ft. and is 190 ft. high above the boiler room floor and 215 ft. above the foundation. The chimney stands on a circular base 25 ft. in diameter and about 3 ft. thick, and for 75 ft. of its height above the boiler room level has two shells, an inner shell of 4 ins., a 4-in. air space and an outer shell of 7 ins. The upper 115 ft. has a single ring 5 ins. thick, and the chimney is reinforced throughout with 1¼ in. x 1¼ in. tees, vertically, and ¾-in. round rods, horizontally. The main flue opening is 7½ ft. by 12½ ft., the bottom of the opening being 18 ft. above ground. The chimney is designed to withstand a wind pressure of 50 lbs. per square foot, which is equivalent to a 100-mile gale.

The present boiler equipment consists of five 327-hp water-tube boilers built by the E. Keeler Company, of Williamsport, Pa. Each boiler is equipped with 164 4-in. wrought-iron tubes of No. 9 gage and with a single drum 54 ins. in diameter. Foster superheaters, built by the Power Specialty Company, of New York City, superheat the steam to 100 deg. Regan shaking-grates are used, and the steam pressure carried is 175 lbs.

As previously stated, it is the intention to secure all water for boiler and condenser purposes from the Susquehanna River. This is to be accomplished by boring a tunnel about 5 ft. high and 6 ft. wide through the solid limestone rock, 40 ft. below the surface of the ground. The tunnel starts from a shaft 15 ft. in diameter directly under the pump room and passes out under the center of the chimney. Most of the tunnel is under the yard of the Central Iron & Steel Company, which is interested with the traction company in the execution of the work, as it intends to utilize the same source of water supply later on. From the river bank where the terminal shaft is placed there extends out into the river about 700 ft. a 36-in. wood stave pipe placed in a trench cut in the rock bottom of the river. The construction of this tunnel and intake is now well under way, and the capacity of it will be about 15,000,000 to 20,000,000 gallons daily.

The steam piping for the plant was installed by the Best Manufacturing Company, of Pittsburg, and is designed throughout for a pressure of 200 lbs. All flanges are of wrought steel, and Van Stone joints and Merwith gaskets are employed. A 10-in. main receives the steam from the five boilers, and from this lead 7-in. goose necks connecting with each main engine immediately above the high-pressure cylinder. Above the throttle of each engine is located a Cochrane receiver and separator, which also acts as a reservoir of steam. A 4-in. main runs a few feet below the main header, from which connections are taken



THE BOILER ROOM

for the auxiliary pumps. This main also acts as a drain for the main header. The exhaust steam from the three main engines is passed through an Alberger condenser, while that from the auxiliaries is passed through a Cochrane open heater. Feed-water is ordinarily taken from the hot-well to the open heater, from which the boiler feed-water pumps deliver it to the economizer, thence to the boilers, where it arrives normally at a temperature of approximately 300 degs. The economizer was built by the Green Fuel Economizer Company.

The condenser is a 30-in. jet type barometric, built by the Alberger Condenser Company. The water is delivered to the condenser by means of vertical shaft centrifugal pumps in duplicate, each of which has a capacity of 1000 gallons of water per minute. This type of pump was adopted for the plant on account of the fluctuation in the height of the water supply which is intended ultimately to come from the Susquehanna River. The pump floor is located 33 ft. above extreme low water. As the river has a maximum rise of 27 ft. and it was desired to have all of the moving machinery of the plant under the direct control of the plant engineer, besides making it easy of access, the layout was arranged accordingly. The centrifugal pumps and the horizontal rotating engines driving the same were furnished by the Morris Machine Works, Baldwinsville, N. Y. The boiler feed-water pumps are of Worthington make.

The main engines were furnished by the Allis-Chalmers Company, each of the three engines being identical in construction. The engines are of the horizontal, cross-compound, rolling mill type, with cylinders 22 ins. and 48 ins. by 42 ins. Each is provided with double eccentrics and butterfly automatic stop valves. The engines have a guaranteed rating on 165 lbs. steam pressure with 75 deg. superheat of 984 ihp, with a steam consumption of not over 12.4 lbs, the speed being 100 r. p. m. and the vacuum reading 26 ins. Without superheated steam, the steam consumption is guaranteed at 13¼ lbs. per horse-power per hour. Each engine weighs approximately 220,000 lbs. and has a clearance of 5 per cent on both the high and low-pressure sides. The mechanical efficiency is guaranteed to be 94 per cent. Garlock metallic packing is used on the piston rods and Richardson sight-feed mechanical oiling sets are fitted on the cylinders. The balance of the oiling is done on a gravity system. The main shaft of the engine carries a 50,000-lb. fly-wheel and the armature of the generator.

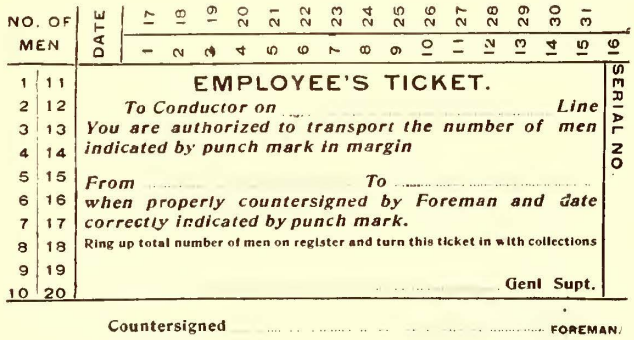
The generators are of the Bullock railway type having a rating of 600 volts and 1084 amps., and being guaranteed to run twenty-four hours under full load without sparking and without heating the windings more than 35 degs. and the armature more than 40 degs. above the temperature of the surrounding atmosphere. They are also guaranteed to carry an overload of 50 per cent following a 24-hour run for one hour, without heating the windings more than 55 degs. C., and to carry a momentary overload of 100 per cent. The guaranteed efficiency of the generators at three-quarter load is 93.8 per cent and at full load, 94.2 per cent. Each generator has ten poles and weighs 115,000 lbs. The armature weighs approximately 38,500 lbs., and the dimensions of the commutator are 80 ins. by 12¼ ins.

The switchboard was built by the Westinghouse Electric & Manufacturing Company. It is made up of twenty-six panels apportioned as follows: four generator panels, one being blank; three storage battery panels; one total load panel; eleven unboosted feeder panels; four boosted feeder panels; two booster panels, and one blank panel. No boosters have as yet been installed. Each generator panel is equipped with a circuit breaker, indicating ammeter, quick-break switch and Thomson watt-hour meter, together with voltmeter plugs and receptacles for the voltmeters on the swinging brackets at the end of the board, besides the usual field rheostat, the resistance for which is placed below the floor. The three storage battery panels were furnished by the Electric Storage Battery Company, of Philadelphia. The panels are provided with the usual controlling devices, including a carbon regulator. The storage battery is installed in a building immediately adjoining the power house and is made up of 288 cells. The total load panel is equipped with an indicating ammeter, a recording ammeter and a recording voltmeter. Each of the feeder panels is equipped with a single-pole, quick-break switch, a circuit breaker, an indicating ammeter and a watt-hour meter. This makes a very elaborate feeder panel, as it is not the usual practice for railway companies to place a watt-hour meter on each feeder.

The total cost of the station, exclusive of the intake tunnel, is about $230,000. Excavations for foundations were begun early in January last year, and power was furnished on the line late in May. The station took the entire load and three old stations were abandoned in October. Owing to the large increase in the number of cars operated and alterations in schedules, the station is furnishing an average of 60 per cent more power than was required to operate the system a year ago. The entire plant was designed and constructed under the direct supervision of Mason D. Pratt, of Harrisburg, to whom this paper is indebted for many courtesies extended in the preparation of this article. Associated with Mr. Pratt were C. O. Mailloux and W. C. Gotshall, of New York City, acting as advisory engineers.

EMPLOYEES' TICKETS AT OKLAHOMA CITY

To avoid the inconvenience of passing out individual pass tickets to each workman of construction and track crews, the Oklahoma City Railway issues to the foremen of the gangs tickets good for as many men as is indicated by



OKLAHOMA CITY RAILWAY'S EMPLOYEE'S TICKET

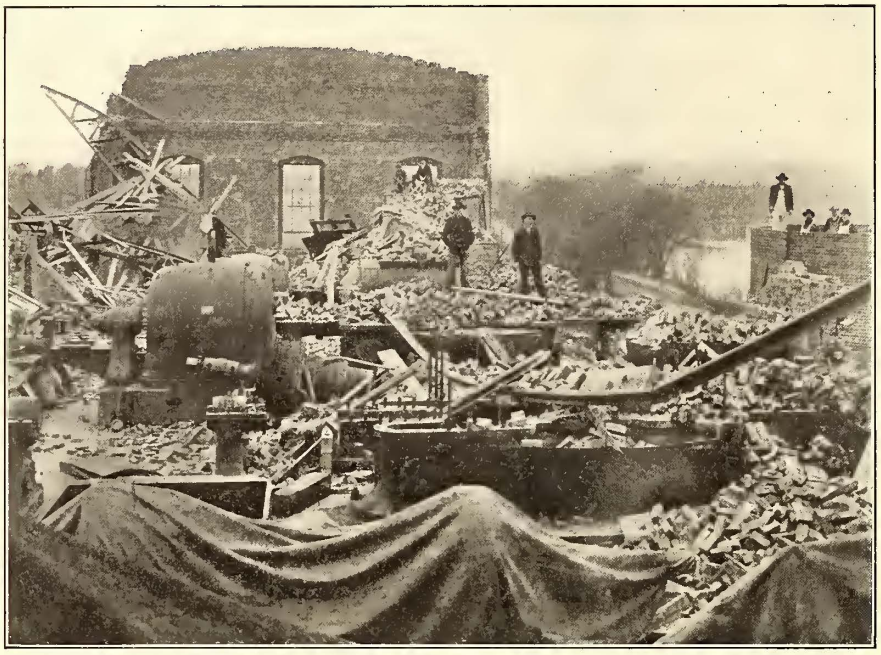
the number punched. The tickets are issued to the foreman by the general superintendent and are good for one passage only. They are taken up by the conductor, who rings up the total number of men for which they are punched and turns the tickets in with his collections.

POWER STATION EQUIPMENT FOR EAST LIVERPOOL

The Ohio Valley Finance Company, which is building an electric railroad from East Liverpool to Stubenville, Ohio, and whose system was described in the Street Railway Journal for Sept. 1, 1906, has concluded a contract with the Westinghouse Companies for the power house equipment that will operate the road. This will include three 1000-hp Westinghouse-Parsons steam turbines, three electric turbo-generators of a corresponding capacity, as well as rotary converters and requisite switchboard apparatus.

NEW OHIO POWER STATION DESTROYED BY WIND STORM

The new Lindenwald power station of the Cincinnati Northern Traction Company at Lindenwald, a suburb of Hamilton, Ohio, was partially destroyed on Sunday afternoon, April 7, by a terrific wind storm. The station was rapidly nearing completion, and was designed for an ultimate capacity of five 1500-kw Westinghouse turbo-alternators and one 750-kw turbo-alternator of the same make. These were placed on the second floor of the building, the first floor being occupied by the boilers.



THE TURBINES BURIED UNDER THE DEBRIS

The outer walls of the building are built of brick, and the floor of the turbine room is of reinforced concrete, resting on 24-in I-beams supported by iron columns. The concrete roof was in process of construction and a roof form of light pine was built over the entire station. A small portion of the roof at the north end had already been completed at the time of the accident, and, as will be noted in one of the engravings, withstood the storm. During the height of the storm the wind lifted the entire roof form from the building and carried it across the coal storage bins, a distance of about 100 ft. to the east. With the roof form went the roof trusses, and, in dropping to the ground, the former was reduced to kindling wood and the latter were twisted out of shape. Simultaneously with the carrying away of the roof the east and west walls of the building above the turbine floor, being left unbraced, fell, and the five turbines which were in process of erection, as well as much of the smaller machinery, were buried beneath a mass of brick.

Two of the turbines had their cases in place and were practically uninjured, but the other three, which were more or less exposed, were badly damaged, one being a complete wreck. The case of the latter was broken in two and the blades of the runner so bent and broken as to be of no use. The spindles of the other two turbines had much of the blading broken and bent, and many of the stationary vanes in the cases were destroyed. The Lafayette Engineering Company, of Lafayette, Ind., was the building contractor, and, with the Westinghouse Machine Company, is a heavy loser. The loss to the building and machinery is estimated at $40,000, and is not covered by insurance. The general view of the station from the northwest shows the coal-handling crane and the lifting crane, both of which were uninjured. It will also be noted that only the upper story suffered. A view of this floor is also given. The turbines that were left uninjured are shown, and in the foreground may be seen the damaged rotor of one of the other turbines. The position of the twisted roof trusses is also shown. The station is very compact, and in its arrangement is a departure from general practice.

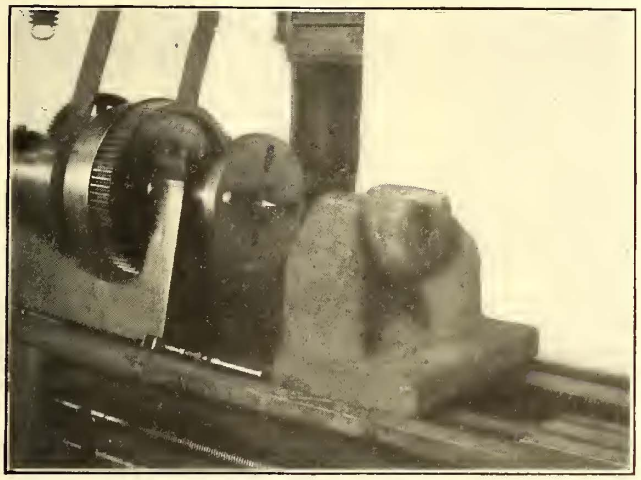
THE STATION, SHOWING THE DAMAGE TO THE ROOF AND THE ROOF TRUSSES, WHICH ARE ON THE GROUND

President W. Kesley Schoepf, of the Cincinnati Traction Company, has presented the citizens' committee that was appointed to discuss transfer matters with him a mass of information for guidance in making requests. This information shows that the company has made it possible now to transfer in about 5000 different ways. Mr. Schoepf explained to the committee that, owing to the topography of the country, lines starting from the center of the business section often cross each other on the outskirts or at other points, and that the issue of transfers is rather a delicate matter, if passengers are to be debarred from making round trips on one fare.

A NOVEL ARMATURE SHAFT STRAIGHTENER

BY R. P. LEAVITT,
General Mechanical and Electrical Superintendent of the Albany & Hudson Railroad Company

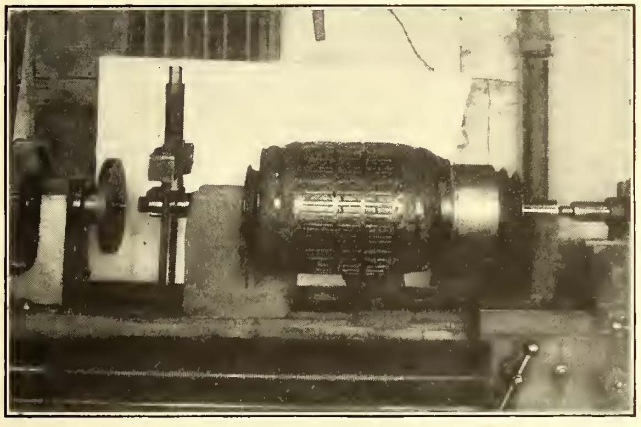
The writer has been very much interested in reading the various articles which have appeared in electrical periodicals regarding the different methods of straightening armature shafts of railway motors. He has been particularly on the lookout for ideas which could be applied to remedy this trouble in cases when the shaft is bent inside and close to the concave thrust collar. As he failed to find any reference to straightening an armature shaft at this



THE CAST-IRON FULCRUM

point, it may be of interest to present a brief description of a fulcrum which the writer devised for use on a G. E. No. 51 railway motor armature shaft of 3¼ ins. diameter.

Since a large percentage of our bent shafts are sprung close up to the thrust, it requires a fulcrum which will project into the concave collar and be of sufficient strength to take the serious strain necessarily exerted in straightening a shaft of this size. The casting shown in the illus-

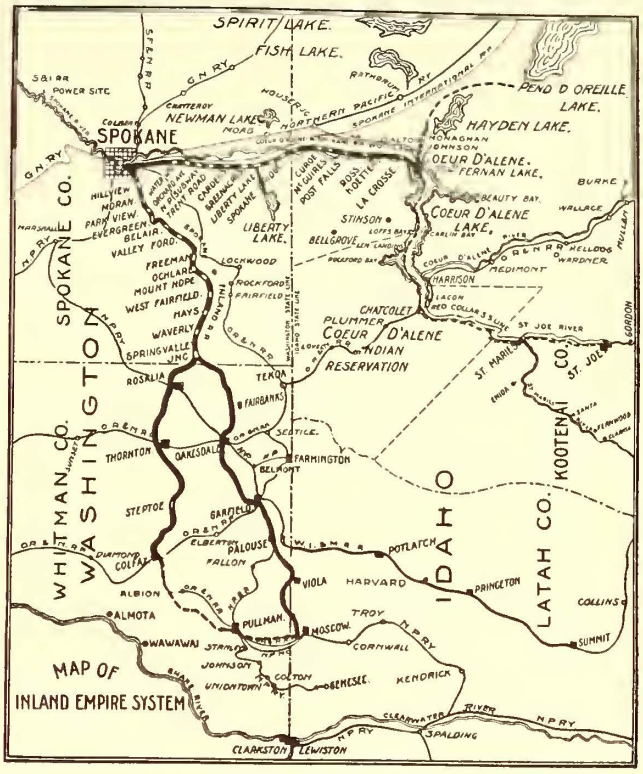


THE ARMATURE IN PLACE

tration, which follows the inside outline of the thrust collar but supports the shaft only at the extreme end of the projecting nose, reduced the expense of performing this work to a minimum. The armature is supported on the lathe bed at the commutator end by a wooden bearing and clamp, while the screw for giving the desired pressure at the pinion end is worked against rods fastened in a suitable timber across the under side of the lathe bed. As the lathe centers are not employed at all, the usual damage to these and the possible damage to a light lathe bed are eliminated.

NOTES ON THE INLAND EMPIRE SYSTEM OPERATING FROM SPOKANE, WASHINGTON

The Spokane & Inland Empire Railroad Company, or the Inland Empire System, as it is called locally, is the outgrowth of the combination of the Spokane Traction Company, which began operations in November, 1903, and the Cœur d'Alene & Spokane Railway, which began operating



THE INLAND EMPIRE RAILWAY SYSTEM AND CONNECTIONS

SPOKANE ELECTRIC TERMINAL USED BY THE LINES OF THE INLAND EMPIRE SYSTEM

in December of the same year. The former now has 26 miles of city lines and the latter has 44 miles, including its extensions to Hayden and Liberty Lakes. The main line, which is 34 miles, extends from Spokane, Wash., to Cœur d'Alene, Idaho. Hourly trains are run in either direction, and during the month of March the average patronage ranged from 1200 to 1500 daily. During the summer months, when traffic to the lakes is much heavier, the daily average is about 2000.

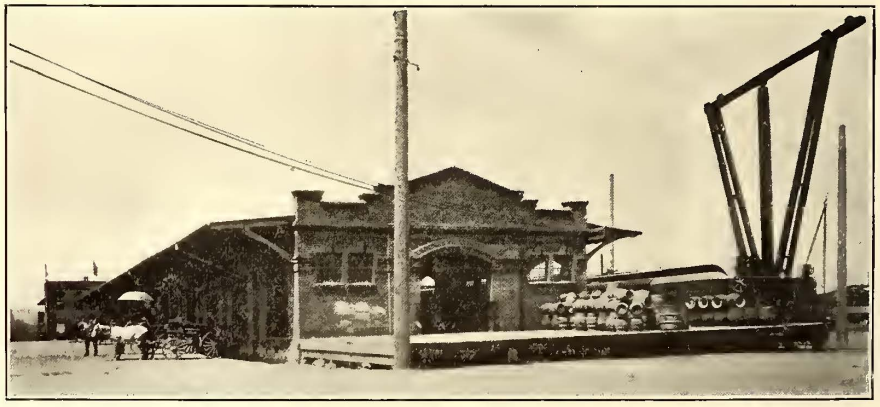
The Spokane & Inland Railway, also a subsidiary com-

pany of the Spokane & Inland Empire Railroad Company, was incorporated Dec. 14, 1904, and began operating to Waverly, a distance of 34 miles, September last. At present it is operating 46 miles of road to Rosalia, Whitman County.

A PORTION OF THE FREIGHT YARDS OF THE INLAND EMPIRE SYSTEM AT SPOKANE. THESE YARDS ARE 300 FT. WIDE AND 2000 FT. LONG

The eastern division of the line is now practically completed to Oakesdale, a point 13 miles south of Spring Valley Junction, and train service will be installed very soon. The track is also laid into Palouse on the eastern division, a distance of 76 miles from Spokane, and track laying is now being completed on the western division of Colfax, which is an equal distance from Spokane. An 800-ft tunnel has been bored north of Colfax, and in order to enter Palouse at the desired grade a solid rock cut of 650 ft. x 50 ft. was made at a cost of $65,000, and an 800 ft. x 30-ft. concrete retaining wall built for about $35,000. When both divisions of the Spokane & Inland are completed to Colfax and Palouse the road will have 112 miles in operation and the Inland Empire System 180 miles. An extension of 16 miles from Palouse to Moscow, Idaho, is now being graded.

Pending the completion of the power plant, described on page 419 of the Street Railway Journal of March 9, the Inland Empire System has a contract with the Washington Water Power Company for power at $20 per horse-power per annum. The Spokane Traction Company lines and the Cœur d'Alene & Spokane division are operated on a direct current of 550 volts. An installation of four storage batteries and three booster stations serves to keep down the peak loads. At the Spokane & Inland division's frequency-changing station four 1000-kw motor-generator sets are used, the current being received at 4000 volts, 60 cycles, and converted to 2200 volts, 25 cycles. The machines operate or float on a 275-cell, 33 type-R storage battery which reduces the peak load and serves to hold the in-put from the Washington Water Power Company at a constant load. Two 375-kw oil-insulated transformers raise the voltage to 45,000, at



SPOKANE FREIGHT TERMINAL, 40 FT. WIDE BY 300 FT. LONG

SPOKANE & INLAND PASSENGER TRAIN OF TWO MOTOR CARS AND ONE TRAIL CAR. THE PANTAGRAPH CURRENT COLLECTORS ARE USED ON THE INTERURBAN DIVISIONS

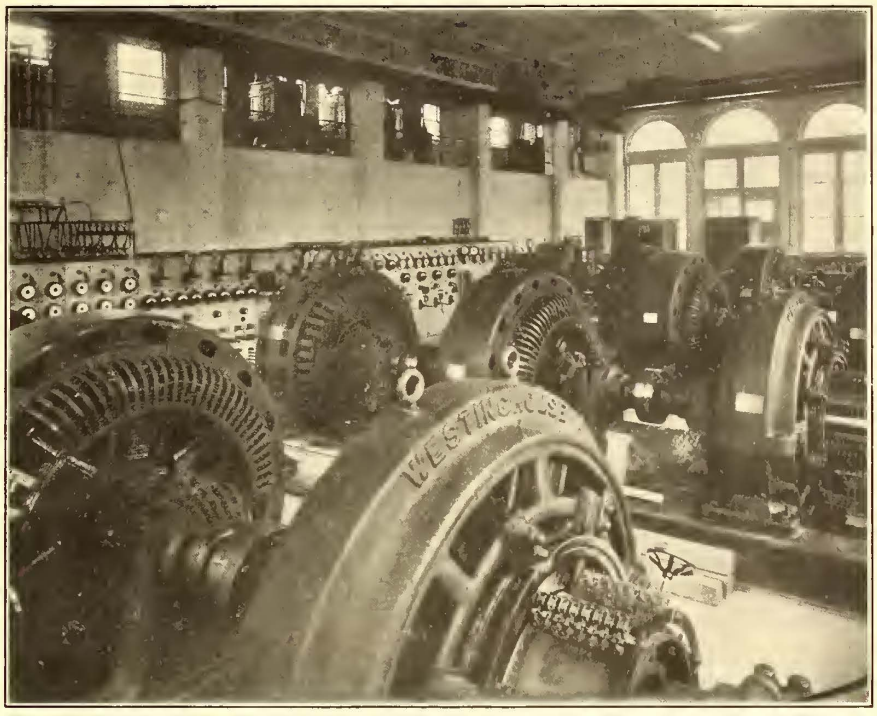
which potential it is transmitted to the sub-stations, located about every 10 miles along the line and again reduced to 6600 volts and turned on to the single-phase trolley.

The overhead construction of the Spokane & Inland is a single catenary with 7-16-in. steel messenger wire and an adjustable clipped trolley. The cars are of Brill make, 58 ft. in length and finished in mahogany, rattan and plush. Cars Nos. 1 and 2 each have four 100-hp motors, while No. 3 is a trailer with an observation platform. Some of the motor cars are furnished with baggage compartments.

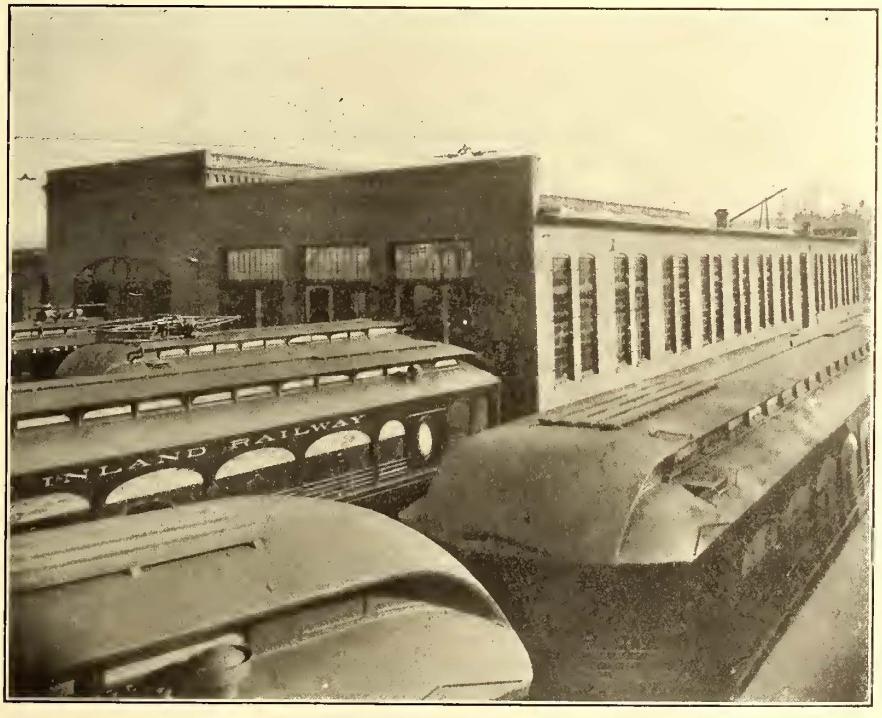
The motor cars collect current through pantagraph collectors on the interurban divisions, but the usual trolley wheel is employed on the city division. The appearance of cars thus equipped will be noted in one of the acompanying illustrations. Both suburban divisions of the Inland Empire System are equipped for handling freight by electricity. Beside the 400-hp freight cars there is a 50-ton, 600-hp locomotive. An order for eight more locomotives has been placed. These are to weigh 72 tons, and will be of 700-hp capacity.

Car houses and machine shops of the Spokane & Inland are located at Spokane. They are of brick and are 100 ft. broad by 200 ft. wide.

The freight terminal, used by both the Spokane & Inland and the Cœur d'Alene & Spokane, is 40 ft. by 300 ft. The freight yards adjoining the terminal are located directly between those of the Great Northern and the Northern Pacific and are connected by a transfer track. The present yards are 300 ft. by 2000 ft., and will shortly be doubled, besides extensive storage tracks to be located at the Y or junction of the two suburban lines south of the river.



INTERIOR OF FREQUENCY CHANGING STATION ON THE SPOKANE & INLAND DIVISION



CAR HOUSE OF THE SPOKANE & INLAND DIVISION AT SPOKANE

The Spokane electric passenger terminal is located at Main and Lincoln Streets in the block adjoining the site for the new Federal Building. It is 50 ft. x 160 ft, of buff brick and terra cotta and oval in shape. The tracks are so laid that the trains circle the building. The lower floor is finished in golden oak and Washington marble. Waiting rooms, ticket office, baggage and express departments are located on this floor. The second floor contains the executive offices and the third the accounting and drafting departments. The arrangement of the offices is such that all have outside windows and an abundance of light. Steel vaults are located on each floor. The building cost $110,000.

FREIGHT SCHEDULES

With the opening of the train service to Oakesdale and Rosalia, the Spokane & Inland Railroad sent out post cards to all shippers in its territory, announcing that all passenger trains would carry express. It was announced that such shipments would be received up to within 10 minutes of train time at the Spokane terminal on cars leaving at 7 and 9:30 a. m., and 1 and 5:30 p. m. This frequent service will afford prompt delivery of shipments for all points on the Palouse line; the Coeur d' Alene and Hayden Lake divisions, and Lake Coeur d' Alene, St. Joe and St. Maries Rivers via Red Collar steamers. The freight schedule issued shows four trains a day from Spokane to Waverly via Rosalia and Oakesdale. Freight at the Spokane terminal will be received up to 5 p. m.; carload business is accepted to all points on the eastern division to Palouse and the western division to Rosalia.

TRANSPORTATION FACILITIES IN SOUTH AMERICA

Theodore Stebbins, who last fall went to South America in the interest of J. G. White & Company, of New York, to report on some railroad and other projects which that firm has in contemplation there, has just returned to the United States. While Mr. Stebbins was not prepared to make any announcement as to the result of his investigation in as far as it concerned his clients, he did make some interesting statements regarding those countries which it was his fortune to visit. Mr. Stebbins went down the west coast and up the east and then crossed to Europe, where he spent several months traveling through Italy, France, Belgium and England. In South America he traveled in the interior some 3000 miles, and crossed the Andes seven times at elevations of more than 13,000 feet. His highest ascent was 15,500 feet, but he was not seriously inconvenienced by this altitude.

Mr. Stebbins states that there is a marked awakening of activity in South America, that the people are getting tired of revolutions, that the governments are being established on more suitable bases, and better security is being offered for capital investments. The commercial and social relations and sympathies of the peoples are still largely with European countries, but the advantages of American methods are appreciated and desired by the more advanced business men. As an indication of the closeness of the relations with Europe the leading papers will have several columns of cabled matter from all the European centers and no news, or scarcely any, from the United States and that little of a very trifling character. American manufacturers will never get their proper share of South American business until more consistent efforts are made to study and meet the needs of the people and more care is taken in packing and shipping goods for the existing methods of transportation there. South Americans feel that during the last century the center of development in the Western Hemisphere has been in North America, but that during the present century South America will occupy the center of the stage. Undoubtedly enormous developments are possible there.

Better transportation constitutes the great need of the west coast. The steamers run as locals, making stops of from a few hours to a few days at each port, and trips are interminably long. Freight has to be lightered at many ports from steamer to land, and is roughly handled. In the interior few railroads have been built on the west coast, and a great deal of the transport is still conducted on mule-back. The cost from some interior points to European ports is as much as $100 per ton. Contracts have been let for the construction of a railway system of considerable size in Bolivia. This road will afford means of delivering the rich mineral products of the country to the coast and will greatly increase the output of the rich mines and increase mining values.

Transportation is so difficult over the mountains that the coal imported into Bolivia for the railway's own use costs $30 per ton. At La Paz abundant timber grows within fifty miles from the mountains, but transportation is so difficult that trolley poles and lumber for building operations are brought from the State of Oregon, a distance of thousands of miles.

Spanish is the prevailing language in all of the Central and South American countries except Brazil, where Portuguese is spoken. In the principal cities one can find English-speaking people in the larger hotels and other places in contact with the traveling public, but none of the common people on the street, the hack-drivers, policemen or street-car conductors speak English. Each country has its own currency, and that of one country differs from that of every other. The English gold sovereign is the coin most universally accepted. In passing from one country to another it is economical to dispose of all the currency of the country one is leaving, as otherwise it must be sold at a discount at the next country reached. The metric system is in general but not exclusive use, and many old Spanish measures of varying standards are still frequently employed. The passenger rates of fare are quite reasonable, but little weight of baggage is allowed with a ticket, and the rates are high on excess baggage.

In the course of the trip Mr. Stebbins made some interesting observations of electric railways in operation and proposed. Kingston, in the island of Jamaica, has a modern railway giving an excellent service and operated by English interests. Panama is a compactly built city with narrow streets without railway facilities, but a system is projected to be extended a few miles outside of the city to the canal terminus.

Guayaquil, Ecuador, population 76,000, has a mule line operating forty-five cars on ten routes. The fare is ten centavos. Transfers, tickets and registers are not used. The franchise was given for thirty years as a monopoly, and at the end of thirteen years was renewed for twenty years. The company paves with cobble-stones between rails at its own expense and outside of the rails at the city's expense. It pays as dividends 1 per cent monthly plus 8 per cent annually, besides accumulating some sinking fund. The stock sells at 160 per cent. The line is to be electrified.

Lima, Peru, population 100,000, has a network of urban and suburban lines which are being electrified. The electric lines are doing a greatly increased business, and the report of the Lima Tramway for the half-year ending Dec. 31, 1905, before any electric operation has been commenced, shows seven and a half million of passengers carried. During the same period the average receipts were 2 cents (American) per passenger and $1.50 per capita per six months. All the railway and lighting interests have been consolidated, are operating by water power, and are doing so well that the stock has greatly advanced in price.

Arequipa, in the southern part of Peru, has a horse-car line operating light cars over light track, and apparently doing a light business also. Statistics of operation are not obtainable.

La Paz, Bolivia, population 60,000, has a railway line 100 miles long to Lake Titicaca, of which 94 miles are operated by steam locomotives and the last 6 miles by electricity. This last 6 miles connects the city at an elevation of 12,200 ft., located within a gorge, with the steam line 1500 ft. higher on a plateau. The air-line length is about a mile and a half, but loops are put in the line to bring the grade down to a maximum of 6 per cent. The steam passenger and freight cars, which are of light construction, are brought down this grade. No other electric railway exists in Bolivia. The subject of concessions and franchises in Bolivia is an interesting one. These words, when applied to a public service enterprise, are understood as giving an exclusive right to carry on the business specified. The constitution of the country, however, guarantees the freedom of industry, and it is believed by many lawyers in Bolivia that this clause will permit a public service company to continue its business, although not on an exclusive basis, after the expiration of its concession. Oruro, Bo-

livia, has granted a concession to a German firm for a mule line. The concession contains some singular conditions.

Valparaiso, 200,000, and Santiago, 400,000, in Chile, have good transportation facilities. Double-deck cars are used. Women conductors are largely employed, and perform their duties in a serious spirit. They are active in jumping on and off cars in motion, climbing to the upper deck, and in their other duties. These women were employed originally when the men were called away to some war, and proved so satisfactory that they have since been retained. They receive as wages about $20 in gold per month. A stranger finds it hard to accustom himself to this field of their usefulness. The company in Santiago has been charging 1½ cents, United States gold, for first-class tickets and three quarter cent for second-class tickets, and has lost money from these fares, so that they have recently been doubled with the consent of the municipality pending negotiations for a final basis. In Valparaiso the fares are the same as now charged in Santiago. As a general thing the street railway companies in South America operate both first and second-class cars and the fares are quite low, but no transfers are given. Transfers are employed, however, in Lima. Upon paying fare in Lima one receives a ticket with a serial number; the transfers also have serial numbers, and these tickets participate in a lottery drawing at the end of each month, This is the means taken to encourage traveling and to insure issuance of a ticket for every fare paid. This is the only remaining authorized lottery drawing in Lima.

There are twelve tramway companies in Chile and eleven different gages of track. This condition offers an inviting field for some of our standardization committees.

Buenos-Aires, Argentine, with a population of nearly 1,000,000, has an extensive tramway system operated by a number of different companies. Many of these roads are now electrified. J. G. White & Company are now completing the electrification of one of the largest lines and are building several hundred miles of steam line out into the country in connection with this line. The horse-car drivers in Buenos-Aires carry cornets to warn other street traffic of the approach of the cars in place of the whistles, gongs and other means of alarm used in this country. These cornets hang from the canopy by a cord at the proper level for convenient use. Many drivers become very expert in the use of these cornets and formerly would blow tunes as the cars traversed the streets. This practice, however, became so objectionable that the city authorities finally had to suppress the unnecessary use of these horns. They give a musical note and are an interesting feature of street traffic in Buenos-Aires.

Rio Janeiro, in Brazil, seems to have good tramway facilities. The principal business street is a wide boulevard which has been cut through the heart of the city for a mile or more within three years. It is lined with beautiful new buildings on either side and connects with a long marine boulevard, also newly constructed. This work has been completed with marvelous expedition and thoroughness.

Las Palmas, in the Canary Islands, has a dummy line using steam locomotives in the business street, and seems much behind the times in this respect.

The San Diego Electric Railway Company, of San Diego, Cal., has decided to make the experiment of using steel ties on sections of its car line in this city, and to that end has placed an order with the Carnegie steel works for 250 ties.

HANDLING TRANSFERS AT OKLAHOMA CITY

All transfers are carefully accounted for by the Oklahoma City Railway. Conductors are supplied with separate envelopes for returning used transfers, void transfers and unused transfers. The used and the void transfers are placed in the envelopes each half trip and are turned in at the office at the end of each trip. The unused transfers are of course, returned in the proper envelope at the termination of the run. Each conductor is required to keep

OKLAHOMA CITY RAILWAY CO.

Conductor's Daily Report _____ 190__

Sheet No._____ Badge No._____ Car No._____

Route _____

Register Ending - - - - -
Register Starting - - - -
Fares Registered - - - - -
Condr's Punch
Cut

Brought Forward									TRANSFER SERIAL NO BEGINNING EACH ½ TRIP
TRIP	Direction	TIME HR.	TIME MIN	NO. CASH FARES	TRANSFERS	TICKETS	TOTAL FARES	REGISTER READING	
1	OUT		M						
	IN		M						

REPORT FOR TEN-TRIP MAXIMUM. SPACE IS LEFT AT BOTTOM FOR NAMES OF CAR CREW

Route _____

Conductor _____

TRANSFERS ISSUED

TIME STARTED HOURS	TIME STARTED MINUTES	SERIAL No. STARTING	SERIAL No ENDING	No USED
TOTAL NUMBER USED.....				
PUNCHED AND NOT USED.....				

DELAYS

DELAYED FROM	TO	CAUSE	PLACE	TOTAL TIME DELAYED
M	M			
M	M			
M	M			
M	M			
M	M			

OTHER REPORTS

BACK OF CONDUCTOR'S DAILY REPORT

record on a special form of the serial numbers of the transfers issued and of the number returned unused and void for each half trip. Record of the serial starting number, the ending number and total number of the transfers used for each run is kept on the conductor's car report shown. The Globe Ticket Company's transfers are used.

LUBRICATION IN THE POWER PLANT

BY AN OIL EXPERT

In considering the best manner of getting the oil into an engine cylinder to secure results which will be both satisfactory and economical, the question arises, does the gravity lubricator meet the requirements, and especially of modern engines? Aside from cylinder oils and their quality entering the question, the application of any lubricant used externally or internally will figure in the answer. All admit that proper distribution on the rubbing surfaces is an essential, yet it is found in practice that the faces of cylinders and valves are cut and scored in streaks, and other parts of the surface show that the lubricant has performed its function in an unsatisfactory manner.

There has been more or less doubt as to the reliability of the existing arrangements for lubricating the valves and cylinders of modern engines, particularly those operating with the higher pressures and steam temperatures of latter day practice. It often happens that the best lubricating oils will fail to distribute properly on the rubbing surfaces, even when introduced or injected in two or more locations in the pipe, steam chest or the valve bonnets of engines.

Leaving aside questions as to the quality of the oils or the amount used, does not the evidence in the majority of cases point to the fact that a proper distribution cuts the larger figure in the sum of the satisfactory results obtained in cylinder lubrication?

Take a piece of tubing with a smooth interior, swab its inner surface with good cylinder oil, allow steam to pass rapidly through the tube for a few moments, and it will be noted that the interior of the tube has been cleaned from all oil by the process. Such evidence proves that the steam itself is a good medium for oil distribution, provided, however, its velocity rate is sufficient to pick up the oil, atomize and combine with it during its passage. If this be true, does it not prove that the velocity of steam at the valve pot edges contributes materially to the diffusion of the oil in the cylinders, although the valve surfaces lacked lubrication in their bearing ends, the latter being practically dead ends so far as the steam flow is concerned? From this line of reasoning, it follows that a proper distribution would require that the steam be combined with the oil prior to its reaching the rubbing surfaces. General experience shows, however, that a reliable means to accomplish this is lacking, or in other words, any good result is more or less accidental.

The problem seems a complex one, as it will be admitted that some of the best results in lubrication, or properly speaking, distribution, has been obtained by ordinary means; yet a close inquiry into conditions will show that some overlooked feature exists to promote satisfactory results. For instance, take an engine or pump, throttled at its steam supply and the lubricant entering above the throttle valve; then, we have the steam wire-drawing at the throttled opening. The oil for lubrication in this case combines with the increased steam velocity at the contracted openings, resulting in a better distribution than where the oil entered below the throttle. As this condition, however, does not exist in the modern units where the low velocity at the throttle entry is demanded and provided for by large openings, it is very probable that the oil has little chance to be atomized until it reaches the valve faces; at that location it is then swept by the steam, and in a more or less atomized condition into the cylinder.

Such varying results in oil distribution invite a better means for accomplishing the desired end, and the positive oil feed is a step in that direction. It seems to offer a means to saturate the flowing steam with the lubricant, delivering the lubricant at every stroke of the engine, so that the entire rubbing surfaces of valves and cylinder walls are positively lubricated by the oiled steam.

It is possible also that the best lubricant may not give satisfaction, owing to its not being properly distributed on such surfaces, and that the lower grades of oil often give better results, some of the latter possessing the quality of better diffusion (if such a term may be used) by the temperature of the entering steam, the better oil lubricating in streaks due perhaps to viscosity or some other quality which, in a measure, prevents it from being effectively atomized by the steam at the point of oil entry.

The most interesting experience that the writer has had in regard to this subject occurred in a power station containing six 36-in. x 62-in. x 60-in. E. P. Allis Corliss cross-compound engines of 2000 hp each. The cost of cylinder oil used averaged from 20 to 24 cents per 1000 kw-hours, which proved that enough oil was used to get the best results. Having perfect confidence in the cylinder oil, it was very difficult to locate the reason for this high cost.

Tests were made for moisture in the steam, which only showed about 2 per cent on full load. The amount of boiler compound was reduced, and in fact discontinued for a time. The points of delivery were changed, and other new ideas given a fair trial, yet with the same results.

The engines were stopped and the heads taken off at once, but no trace of oil could be found. The valves and cylinder walls were perfectly dry. After several months of this trouble the chief engineer concluded to replace the gravity lubricator on one engine with a sight feed oil pump. The result was beyond the expectation of every one concerned, and proved so satisfactory that all the old gravity sight feed lubricators were discarded and replaced with this type of pump. The change not only stopped all the cylinder and valve troubles, but reduced the cost per 1000 kw-hours, so that the total cost for all oils has been reduced to 14 cents per 1000 kw-hours.

A review of this whole situation proves that it was not the oil, but the method of application. The gravity lubricator did not deliver the oil into the cylinders as was supposed. While a drop was passing through the gravity lubricator for every four revolutions of the engine, it undoubtedly accumulated in the pipe until there was a quantity of it, leaving the engine to make from 12 to 14 revolutions before receiving any oil; or if the oil did pass into the cylinders, it went in in such large drops that it did not get a chance to vaporize and evenly distribute itself throughout the cylinder.

With the sight feed pump the oil is delivered into the steam at every stroke or revolution of the engine, feeding the oil into the steam in minute quantities, thus giving it a better chance to atomize and thoroughly saturate the steam. It can be readily understood how great a saving can be accomplished by this method. The pump starts and stops automatically with the engine, giving the valves and cylinders lubrication on the first revolution. The sight feeds are easily adjusted to any number of drops per minute, and the drops are all uniform in size, thereby giving the most perfect conditions for cylinder lubrication.

This type of pump was preferable to the ratchet type of oil pump, as the ratchet type does not feed oil into the steam with each stroke, but is set for the number of revolutions desired for each drop of oil. It is only an improvement over the gravity lubricator inasmuch that when it does feed it is positive.

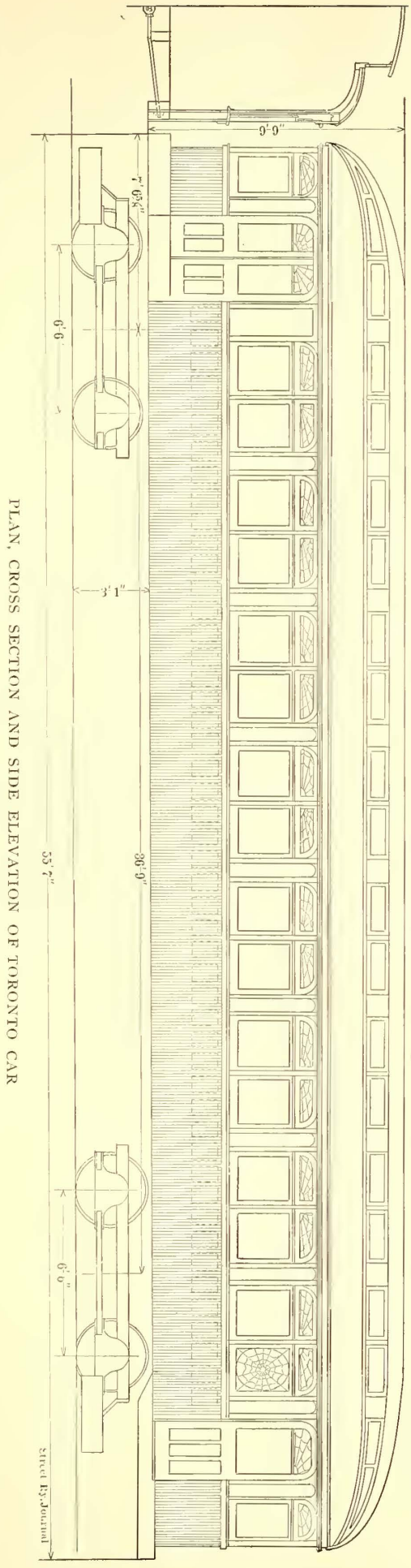
After studying the subject of cylinder lubrication for two years the writer has come to the following conclusions: The power-house valve oil will do the work under all conditions; the gravity-feed lubricator is a failure, as it is not reliable; a ratchet pump is only better than the gravity lubricator as to its positive feed; and that the best results can be obtained by feeding a minute quantity of oil with each stroke of the engine, thereby being sure of the oil atomizing and reaching all the working parts in the cylinder.

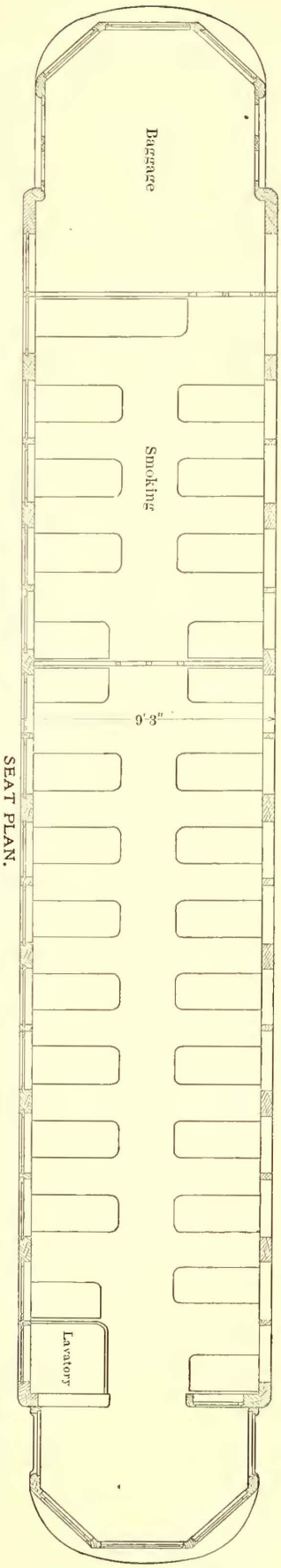
NEW CARS IN TORONTO

The Toronto & York Radial Railway is building in its own shops a number of very handsome interurban cars. They will be used for the long through run between Jackson's Point, the Lake Simcoe terminus of the metropolitan division, and Toronto, a distance of some 55 miles, and are constructed for speed, comfort and safety.

The sill construction is principally steel, and double floors, with several thicknesses of felt between, deaden the sound from beneath and add warmth to the car. The seats are high, roll-back, rattan-covered "Walk-Overs," and were supplied partly by the Heywood Bros. & Wakefield Company and partly by Hale & Kilburn. The heating is by hot-water pipes from a small furnace in the baggage vestibule. The heater was supplied by the Gurney Foundry Company, of Toronto. Pantasote curtains are used. A glance at the plan shows the arrangement of the car. The front vestibule, in which the motorman stands, is large enough to carry the heating apparatus, and allows plenty of space for baggage, etc. The smoking room comes next and seats twenty-four persons, and lastly, there is the main passenger compartment, which seats comfortably about thirty-eight people, and contains lavatory, drinking-fountain, hat-racks, coat-hooks, etc. The interior finish is in antique quarter-cut oak, and all color work, such as the leaded glass transoms, deck lights, etc., are in subdued tones of brown and green, giving to the cars a very restful sensation—in fact, they are probably the finest cars of their kind that have yet been put in commission in Canada.

The motor equipment is composed of four of the new GE No. 73 motors of 75 hp each, giving 300 hp per car. The type M control is used, the first instance, it is said, of its employment in Canada. The side elevation herewith gives some idea of the general appearance of these new cars. The total weight of the car equipped with No. 27 G Curtis trucks and motors, as described, is about twenty-eight tons. The length over all is 55 ft. 7 ins., and the width is 9 ft. 3 ins.





GASOLINE MOTOR CARS FOR RAILWAY SERVICE

The meeting of the New York Railroad Club held on Friday evening, April 19, was devoted to the reading of and discussion on a paper on Gasoline Motor Cars for Railway Service, by W. R. McKeen, Jr., who, as superintendent of motive power and machinery at Omaha, is in charge of the gasoline motor-car development of the Union Pacific Railroad.

Mr. McKeen opened his paper by a brief reference to the success his company had had in operating gasoline engines for work in pumping and co ng stations. It appears that these are delivering power at per hp-hour, compared with $1.92 per hp-hour by steam engines.

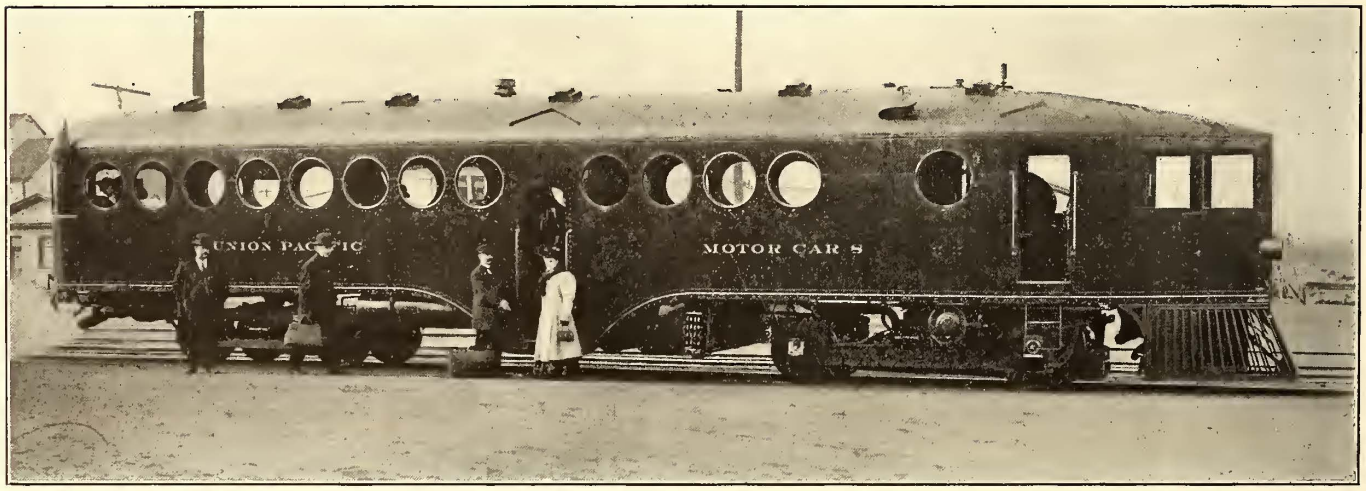
Operating without locomotives had proven popular, as in the case of electric railways, because it enabled the carriage of passengers and freight by small power units at frequent intervals. Since electrification requires a heavy line investment, the car for sparsely settled districts must be of the self-propelled type. Some steam-railroad men still look favorably upon the steam car, but he did not believe there had been sufficient improvement in the steam motor since the dummy days to justify their view.

The modern locomotive and steam-motor car, with high steam pressure and the attendant flue and firebox troubles, are much more complicated than the gasoline motor car, in which, technically speaking, there is nothing present but the vehicle, engine and transmission. As a mechanical man it seemed to him that a gasoline motor car, built with the same skill as a locomotive, is a much less vulnerable machine than a locomotive, and should give more continuous service without failures.

To meet the demand for a low-cost-of-operation, self-propelled passenger car it seemed necessary that gasoline motor vehicles be designed for the special conditions of steam railroad work. Branch lines collect freight and feed the main line, and the limited passenger business can be handled economically when turned over to the main line. Hence the steam train could be replaced by a motor car, a great saving could be made in the operating expenses and passenger traffic would be encouraged by the greater frequency of service. The number of trips, cost of operation, etc., is entirely dependent upon the density of traffic and the length of the branch line. On steam railroads in competition with the frequent service of electric lines, a motor car of high power is necessary to obtain the rapid acceleration and high speed required for this class of service. These cars should be constructed, not along the conventional lines of an electric car, a steam passenger coach or railroad locomotive, but on entirely new lines; in other words, on lines particularly adapted for this class of service.

In designing the car body of the motor car three points must be considered, viz., weight, cost, and strength. For years in steam-car construction the tendency has been toward a more elaborate interior finish, additional conveniences and numerous other improvements, all of which have added materially to the weight; the length of the cars, large windows, improved couplers, improved draft rigging, trucks, air brakes, etc., has also increased the dead-weight of the car, each ton of added weight making the cost of hauling passengers more expensive. As a result of this trains and locomotives have become so heavy without being correspondingly strengthened that in case of a collision the cars are subjected to such severe shocks that they telescope or go to pieces.

Now that an innovation is being made it seems logical that advantage should be taken of the vast experience in building steam passenger cars by including in the new design all the recent demands for improvements that will insure the safety of passengers should the car get into a wreck or turn over. Hence the Union Pacific car is of steel only. The ocean liners are so designed that a collision results only in a hole being punched in the side of the vessel, but, as a rule, the other parts of the frame are not damaged; the same idea might be applied to car design. Instead of having an underframing of excessively heavy sills with a light cracker-box framing above, his company had endeavored to make the whole car body a unit structure. The underframing comprises but one moderately heavy center sill; the side sill is a light-weight continuous channel extending around the body of the car. From this outer channel bar continuous steel ribs run up the side through the roof and down the other side of the car, secured to each other by suitable cross-braces. The sides of the car form a truss, the plate of the car being the top chord and the sill the bottom chord. This framing is well tied together at all points, and is further re-enforced and strengthened by the sheet-steel covering. The ends of the car are strengthened by the round shape at the rear and the pointed lines in front. In a collision this car could be punctured or bent, but it could not be telescoped. One of these cars in an accident struck a switch locomotive while running at about 30 miles an hour. The car was struck in



EXTERIOR OF UNION PACIFIC GASOLINE CAR

the rear and but slightly damaged; the steel plates were bent up, the ribs of the car were broken loose and badly bent, but the frame of the car was not in any way damaged except at the point of contact with the locomotive. Beyond where the car was struck the paint was not even cracked, showing that even under this severe shock there had been no unequal movement of the members of this steel frame.

The latest design, with metal-frame round windows, enables the diagonal braces of the steel frame to be brought very close to the top of the car, and by lowering the roof and bringing the plate of the car closer to the side still a great increase is secured in the strength of the car side which approaches the girder form.

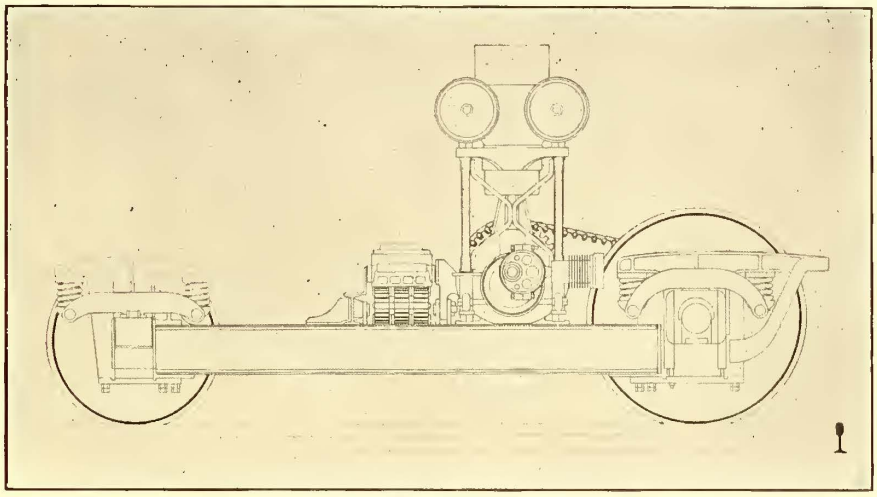
Mr. McKeen then quoted some data from the Berlin-Zossen and Electric Railway Test Commissioners' reports on air resistance in explanation of the parabolic design of car front adopted by his company.

The power transmission system after the car is once in motion consists simply of an engine and a sprocket mounted on a crank-shaft, the power being transmitted therefrom through a chain and into a second sprocket keyed on the driving axle. There are no noisy gears or complicated mechanism for absorption of the power.

Speaking of the engines, Mr. McKeen said that it is generally conceded that a gasoline engine is a constant-speed machine; that used as a power generator any variation in speed must be secured by mechanical methods. The gasoline engines used for stationary purposes are all regulated by a governor and maintained at a constant speed. In the automobile business it is particularly noticeable that foreigners figure on controlling the speed of the automobile by a multiplicity of gear speeds, often as high as four or five, thus admitting the gasoline engine should run at a certain fixed speed. American builders of automobiles frequently control their machines with only two gear speeds, although many of them use more.

For a motor car to operate on a steam railroad where a single machine is almost imperative [illegible] all conditions such that an operator with a reasonable amount of experience may direct his mind to guiding the car from station to station, the gasoline engine and machinery for propelling the car must be flexible of control and of itself require very little attention; in other words, it must be analogous to a steam locomotive—able to stand hard service, hard work and abuse, and yet at the same time so reliable in its performance that there will be no stoppages between stations to complicate the operation of the regular train service.

The Union Pacific motor cars were originally designed and developed on the basis of controlling the speed of the car by varying the speed of the engine; accelerating the speed by opening the throttle, thus giving the engine more gasoline, this being analogous to opening the throttle on a locomotive, and advancing or retarding the spark being analogous to varying, by the reverse lever, the valve motion and the lead of the valve on the locomotive. Motor car No. 8 was equipped with a 200-hp gasoline engine, designed and built at the Union Pacific shops at Omaha. The hope for a flexible-control engine has been fully realized, the engine being able to start and accelerate the car from zero to 60 miles an hour simply by varying the speed of the engine. If the car attains 50 miles an hour and it is desired to run more slowly this can be accomplished by closing off the throttle, reducing the consumption of gasoline and therefore saving fuel. Thus one controls the horse-power developed in the engine by means of the gasoline supply, and the cost of fuel consequently is in proportion to the power demanded from the engine. In his opinion this saving in a gasoline engine is proportionately greater than in a steam locomotive. This flexible control of the gasoline engine is obtained through the following: (1) Utilization of 6 cylinders, giving a power impulse to the shaft three times each revolution; (2) by balancing the crank-shaft and reciprocating parts the uniformity of speed is improved; (3) the gasoline vapor pipes from the carburetor to the cylinders are all equally divided, so the distance the vapor travels is the same in every case and thus no one cylinder takes its charge of gasoline at the expense of another; (4) the dimensions of the cylinders, the opening and closing of the inlet and exhaust valves and the relative timing of these valves to each other, as well as to the piston, have all been of particular importance; (5) as before mentioned, the valve motion of a six-cylinder gasoline engine is analogous in many ways to the valve motion of a steam locomotive. The idea in the valve motion of the motor-car gasoline engine is to operate the valves to produce as nearly as possible uniform horse-power by these cylinders at various speeds.



ARRANGEMENT OF GEARING

The throwing on or off of the friction-clutch is the only move necessary to vary the speed of the car. Even though the car reduces to a speed of 2 or 3 miles an hour simply by throwing in the clutch, the load will be assumed and cared for by the engine without the bucking often experienced with automobiles and other constant-speed engines. The throwing on or off of the clutch is actuated by air, controlled by an operating valve, the lever of which is small and in the hands of the operator. Hence it is easy for him to keep his head out of the window, watch the brakeman, the movements of the car and handle the gasoline-engine mechanism.

The expense for fuel, repairs, cleaning, etc., runs very uniformly, but as the cost per mile is so largely dependent upon the number of miles run per day, as well as on the wages paid the car crew, comparisons are very unsatisfactory. In actual service cars run some months as low as 10 and 11 cents a mile; whereas cars in other localities will run as high as 16 and 18 cents a mile, and in one case, where a 100-hp motor car and trailer has replaced a steam loco-

motive and train, the cost of operation runs as high as 20 cents a mile. On branch lines the motor car should make not less than 100 miles a day. To man the gasoline car with a steam crew is exceedingly expensive and does not produce proper results; to man the gasoline motor car crew would be equally unsatisfactory. A well-paid mechanical man to have entire charge and run the motor car, with an assistant to collect tickets, seems the best and most economical arrangement.

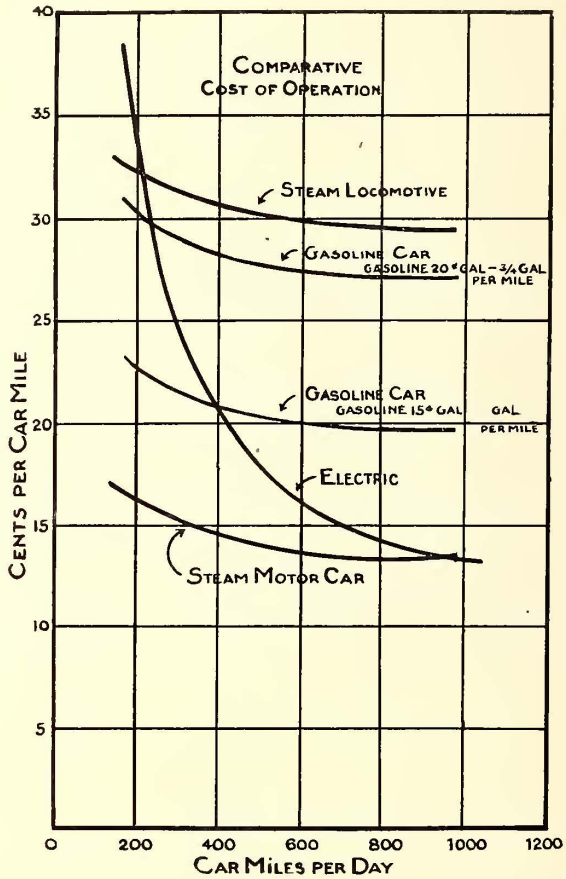
DISCUSSION

H. G. Chatain, of the railway engineering department of the General Electric Company, said he agreed with the structural features of the car developed by Mr. McKeen, because its shape certainly affected a decrease in wind resistance. He was not willing to agree with him, however, on the method of transmission. It appeared to be a common opinion that because gasoline-electric drive involved extra machinery it did not deserve much consideration. It was true that the car developed by his company weighs 30 tons as against the 26 tons of the Union Pacific car, but this difference could not be ascribed entirely to the extra equipment. With electric transmission it would not be necessary to use a truck of more than 6 ft. 3 ins. wheel base, while the like power with mechanical transmission would require a truck of, say, 9 ft. wheel base. This point brings out one weight compensation in favor of electric drive to make up for the additional weight of the generator and motor. Aside from the question of better speed control, gasoline-electric drive meant that the machinery could be placed to better advantage for operating convenience and inspection. As to net efficiency of drive, he was willing to admit an efficiency of about 92 per cent for mechanical drive and only 81 per cent for electric drive. Real efficiency, however, is the gasoline consumption. In the long run this should be less with gasoline-electric transmission because the latter permits the engine to run at its most efficient point all the time.

B. D. Gray, of the American Locomotive Company, gave some statistics about the gasoline consumption per mile of automobiles. The point of his argument was that the larger the engine the greater the period when it would be running at an uneconomical speed. Referring to Mr. McKeen's statement that the car is run on high gear all the time, he admitted that it was certainly desirable to keep down the number of gears to a minimum, but he did not see how it was possible to start from zero on the high gear, especially to reach speeds up to 60 miles per hour. He thought there must be a great slip on the clutch at starting, and wanted to know of what those clutches were made, what became of the heat lost in friction, at what point does it slip, what is the principle of construction, and what are the r. p. m. of the engine at that time. It seemed to him that the horse-power then must be much less than 200. Mr. Chatain had mentioned that the efficiency of the gasoline electric transmission developed by this company was 81 per cent. When he was in Europe the engineers of one building company claimed only 65 per cent, but perhaps this difference may be due to the fact that they used smaller motors, about 30-hp to 35-hp.

He also gave the following figures on the cost of operation of motor cars on the Hungarian State railways, which has thirty-seven for passenger and light-goods service. Of these, 32 are of the gasoline-electric type. Ten cars are of 70-hp capacity, weigh 20 tons, run 2.9 miles per gallon at an average speed of 35 miles an hour; the 35-hp cars weigh 40 tons, including two trailers, and run 3.75 miles per gallon at an average speed of 20 miles per hour.

Among the other figures which he had secured abroad of motor-car operation he presented the following: Great Western Railway, England, steam car, 250 hp, weight of train with one trailer 55 tons, operating cost per train mile 13 cents, including fuel, oil, repairs and driver's wages, cost of fuel practically $3 a ton delivered, driver's wages $1.75 per day, 20 lbs. of coal per train mile, average speed 35 miles per hour; Northeastern Railway, England, gasoline-electric car, 85 hp, claimed gasoline consumption equal to 3½ miles per gallon, average speed 30 miles, cost of gasoline about 25 to 30 cents per gallon, operating cost estimated 15 to 16 cents per train mile; Paris-Orleans Railway, steam car with 260-hp boiler, weight of train 50 tons including one trailer, operating cost 8 cents per train mile; coke $6 per ton; driver's wages $1.04 a day; fuel consumption 21 lbs. per mile; average speed 35 miles per hour. On the Hungarian State railways a Ganz steam car weighed



CAR-MILE COST CURVES OF STEAM LOCOMOTIVES, GASOLINE, ELECTRIC AND STEAM MOTOR CARS

35 to 40 tons, including two trailers; operating cost 7½ cents per mile, coke $5 per ton, driver $1.20 per day, fuel consumption 9.6 lbs. per car mile, average speed 25 miles per hour. Another car was of the gasoline-electric type, rated at 70 hp, weighed 20 tons, operating cost 7.3 cents per mile, cost of gasoline 10 to 11 cents per gallon, ran 2.9 miles per gallon, and had an average speed of 35 miles. A second car of the gasoline-electric type, of 35-hp capacity, weighed with two trailers about 40 tons, cost 5.7 cents per mile, ran 3.75 miles per gallon, and had an average speed of 25 miles per hour. A steam car on the Austrian State railways of 100-hp capacity weighed 50 tons including two trailers, cost of fuel $3.25 per ton, operating cost 5 cents per train mile, wages $1.25 a day, fuel 15 lbs. per mile, and the average speed was 25 miles per hour.

Charles Ducas, of New York, spoke in favor of the Ganz

steam car, of which over 200 are in regular operation. Mr. Ducas submitted the accompanying curve-sheet giving the total cost on a line assumed to be 30 miles long with stops every 5 miles, and a maximum speed of 35 miles, making 3, 6 or 9 trips a day. The highest curve was that of the steam locomotive corresponding to a cost of 30 to 32 cents per mile. The next curve was that of the gasoline car corresponding to 25 cents per mile, this figure being a compromise between two assumptions, one that one gallon would be needed per mile at 20 cents per gallon, and the other on the basis of half a gallon per mile at 15 cents per gallon. The lowest curve was that of the Ganz steam car used on the Hungarian State Railways: this showed a coal consumption of 12 lbs. per mile, working out to a cost of 15 cents per car mile. The curve for electric-car operation

Mr. McKeen resumed the floor to take up some of the points hinted at in his paper or mentioned by the preceding speakers. As to double-end and single-end cars, he was inclined to follow interurban electric railway practice, which seemed to be tending toward the single-end car and for the reasons usually advocated for this practice, namely, saving in apparatus and increase in seating capacity. He did not want it understood that he had said the horse-power was uniform throughout. The losses due to the uneconomical running points of a gasoline engine were like those found in any steam locomotive, which, at times, is very extravagant of power. A similar criticism could be made with regard to electrical machinery, for everyone knows that the method of control involves resistance losses. With regard to the friction-clutch used, this was of cast-

TABLE I.—COMPARATIVE COST OF OPERATION.
(Cents Per Train-Mile.)

	Steam Motor Cars.			Gasoline Cars.			Electric Cars.			Steam Locomotives.		
Car-miles per day	180.	540.	960.	180.	540.	960.	180.	540.	960.	180.	540.	960.
Repairs to motor equipment	2.0	2.0	2.0	2.2	2.2	2.2	0.7	0.7	0.7	....	....	....
Repairs to cars	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Repairs to locomotives	....	....	....	....	....	....	....	....	....	7.0	7.0	7.0
Repairs to overhead construction and sub-station	....	....	....	....	....	....	7.0	2.4	1.4	....	....	....
Wages, engineers and assistant	....	....	....	3.2	3.2	3.0	....	....	....	....	....	....
Wages, engineer and fireman	3.2	3.2	3.0	....	....	....	....	....	....	3.2	3.2	3.0
Wages, motormen	....	....	....	....	....	....	1.7	1.7	1.25	....	....	....
Wages, conductors	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.25	1.6	1.6	1.6
Wages, sub-station attendant	....	....	....	....	....	....	1.4	0.5	0.4	....	....	....
Cleaning, light repairs, inspection	1.5	1.5	1.5	2.0	2.0	2.0	§	§	§	3.8	3.8	3.8
Fuel	1.8	1.8	1.8	15.0†	15.0	15.0	....	....	....	10.0	10.0	10.0
Fuel and water station, operation, repairs, etc.	0.3	0.3	0.3	....	....	....	....	....	....	0.8	0.8	0.8
Cost of power*	....	....	....	....	....	....	6.8	3.7	3.2	....	....	....
Oil, waste and other supplies	0.4	0.4	0.4	0.6	0.6	0.6	0.1	0.1	0.1	0.8	0.8	0.8
Interest, insurance and depreciation	5.3	2.7	2.5	5.5	2.7	2.5	17.2	6.0	4.7	4.9	2.5	2.1
Total	16.4	13.8	13.4	30.4	27.6	27.2	36.8	17.0	13.3	32.4	30.0	29.4

* Includes fuel, labor, repairs, supplies. † Based on consumption of ¾ gallon per mile, 20 cents per gallon. § Included in items of repairs.

TABLE II.—COMPARATIVE INVESTMENT.
(Dollars.)

	Steam Motor Cars.			Gasoline Cars.			Electric Cars.			Steam Locomotives.		
Car-miles per day	180.	540.	960.	180.	540.	960.	180.	540.	960.	180.	540.	960.
Motor cars	(2) $35,000	(3) $52,500	(5) $87,500	(2) $35,000	(3) $52,500	(5) $87,500	(2) $16,000	(3) $24,000	(5) $40,000	.....	.....	.....
Steam locomotives	.....	.....	.....	.....	.....	.....	.....	.....	.....	(2) $20,000	(3) $30,000	(5) $50,000
Cars	.....	.....	.....	.....	.....	.....	.....	.....	.....	(2) 12,000	(3) 18,000	(4) 24,000
Overhead construction and bonding	.....	.....	.....	.....	.....	.....	68,250	68,250	68,250	.....	.....	.....
Sub-station	.....	.....	.....	.....	.....	.....	3,500	3,500	7,000	.....	.....	.....
Gasoline storage	.....	.....	.....	1,000	1,000	1,000	.....	.....	.....	.....	.....	.....
Power station	.....	.....	.....	.....	.....	.....	25,000	25,000	50,000	.....	.....	.....
Total	$35,000	$52,500	$87,500	36,000	$53,500	$88,500	$112,750	$120,750	$165,250	$32,000	$48,000	$74,000

demonstrated that for low traffic densities its cost may be even more than that of a steam locomotive, but that it rapidly decreases with the number of car miles per day, dropping below the gasoline car at about 300 car miles per day, and below the steam-motor car at about 900 car miles per day.

A. W. Wikeford, of the Lehigh Valley Railroad, said that he had been associated with Mr. McKeen in the early work on the Union Pacific gasoline cars. Looking at it from the standpoint of the mechanical man, he did not see why it should be necessary to add electrical complications to gasoline machines when straight drive was sufficient to answer the purpose. As to objections against the gasoline engines, no form of power devised for railway motor cars was free from the likelihood of trouble, as, for instance, the boiler and engine of a steam car.

G. R. Henderson said that he would like to know the cost of the car and also the cost per hp-hour.

iron on cast-iron, being nothing more than a disc with wood inserts capable of absorbing almost any amount of power. It is true that it heats, but not so much as to affect the operation. The driver can let the clutch slip for 10 ft. to 40 ft., as he prefers, in easing the load on the engine. He did not believe that the engine would work as effectively with boiling water as when the temperature of the water is at, say, 180 degs., but he did know that it made no great difference in service. It was amusing to hear statements that mechanically driven gasoline cars were not a success. If any had doubts on that score they were welcome to come to the Missouri River, where they "would be shown" at 2 cents per mile. As to Mr. Ducas' gasoline-car estimate based on 1 mile per gallon, he had succeeded in geting 3.5 miles per gallon on the Union Pacific. He could not comply with Mr. Henderson's request for the cost per hp-hour and the cost per car, as the first had been figured on the mileage basis and the second was still indefinite.

THE FORT WAYNE & SPRINGFIELD SINGLE-PHASE RAILWAY

The Fort Wayne & Springfield Railway, which is the third single-phase railway to be completed in Indiana, was recently put in operation between Fort Wayne and Decatur, Ind., a distance of 21.6 miles. This road has the distinction of being one of the few 6600-volt, single-phase systems in the country. The power generating and distributing system is of particular interest because of its simplicity. The

INSULATED SECTION OF TROLLEY AT DECATUR

high voltage used permits the road to be operated from the station at one end of the line without substations, and without feeders parallel to the trolley. Only two circuits leave the power house. One, a single 6600-volt line, continues to the 6600-volt trolley only, while the other supplies a low-voltage section of the trolley in Decatur. Current is generated at 6600 volts so that no step-up transformers are employed in connection with the system. Except for the a. c. feature, the road corresponds in construction with the best of practice in interurban work. The line passes through comparatively level country and very little grading was required to obtain a maximum grade of 1.08 per cent; in fact the deepest cut is only 10 ft. deep. There are two 5-deg. and two 3-deg. curves on the line, but other than these all curves are of long radius. The only steel structure of any consequence is a 155-ft. truss span across the St. Mary's River at Decatur. There are, however, nine short steel spans across waterways, all resting on concrete abutments. For the smaller waterways sewer pipe up to 24 ins. in diameter and concrete arches were employed.

The line was constructed on private right of way alongside a highway for practically its entire length. The right of way varies from 30 ft. to 150 ft. in width and the greater portion of it was purchased. The road is partially ballasted with gravel. The remainder is being ballasted as fast as weather conditions will permit. To obtain a 5-acre gravel bed near to the line a 210-acre farm was purchased outright. The ties are of chestnut and oak, placed 2 ft. center to center. The rails are 70 lbs. in weight and are in 30-ft. lengths. They are bonded with Ohio Brass Company No. 0000 bonds and are connected with six-bolt angle-bars. The standard poles are 30 ft., but poles of varying length up to 60 ft. were employed. The standard distance between poles is 120 ft. The distance, however, was in many instances shortened to 100 or 80 ft. to avoid road crossings or farmers' gates. On curves the poles are placed 60 ft. apart. The fact that the road was built alongside the highway made it advisable to put the poles all on that side of the track opposite the highway in order to reduce the liability of people coming in contact with them. The higher poles were used to carry the high-tension lines through the towns.

The overhead construction is that of the Ohio Brass Company. On straight track the T iron brackets are 10 ft. long, but on curves with poles on the inside they are 1 ft. 3 ins. longer in order to align the trolley properly. The messenger is supported on a triple petticoat, Locke No. 3 insulator bolted above the bracket and the No. 0000 trolley wire is supported from the messenger by hangers placed 10 ft. apart. At the center of the span the hangers are 7 ins. long, while those nearest the brackets are 18 ins. in length. At intervals of ¼ mile and at each end of curves the trolley is braced by "bridles." At these points the messenger passes under the cross-arm and is supported by a short span wire between

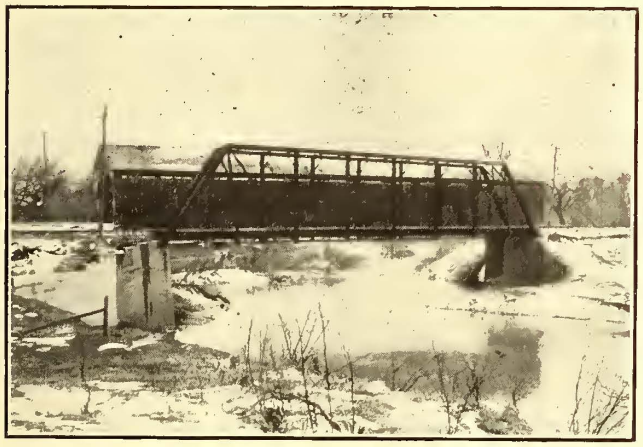
TROLLEY CONSTRUCTION ON CURVES, SHOWING "BRIDLE" IN THE FOREGROUND

two insulators placed underneath the arm. The trolley is also secured direct to the insulators. On curves where the poles are on the inside the trolley is pulled away from the poles by a short guy attached to an insulator placed underneath the end of the bracket. Where the poles are on the outside of the curve the same construction is employed, except that the insulator is placed between the pole and the messenger. Through Decatur a potential of 500 volts a. c. is employed on the trolley, and in Fort Wayne the potential is 550 volts d. c. At each end of the line where the charg-

from 6600 volts is made in the trolley potential there is an insulated section of trolley about 200 ft. long. By means of switches placed in boxes on poles near each end, the insulated section at Fort Wayne may be connected to either the high-tension a. c. or to the d. c. circuits and the section at Decatur may be connected to the high-potential or low-potential a. c. circuit. The cars are operated by running them under the insulated sections, and then by means of the switches connecting the insulated section with the trolley in advance of the car. The line is protected by lightning arresters placed at ¼-mile intervals.

POWER HOUSE

The power house and shops are located on a 14-acre tract of land in Decatur donated to the system by the city. The generating station is located in a structure measuring 86 ft. x 68 ft., built of concrete blocks and with steel roof-trusses. The station contains two generating units, each consisting of a Buckeye cross-compound condensing engine with cylinders 18 ins. x 36 ins. x 36 ins., direct-connected to a 400-kw, single-phase, 6600-volt, 25-cycle Westinghouse generator. The generators are excited from an exciter driven by a belt from the fly-wheel of the engine. The boiler equipment consists of three Stirling 228-hp hand-fired boilers. Feed water and condenser water are obtained from the St. Mary's River adjacent to the power station. The water flows through a 15-in. sewer pipe to a well 25 ft. deep and 10 ft. in diameter, from which it is drawn by the pumps. The condensers are of the jet type, and, together with the condenser pumps, are located in a pit in the rear of the boilers. Immediately above them is a tank used in securing a vacuum in starting the engines. The boiler feed pumps built by the Platt Iron Works, with cylinders 7 ins. x 4½ ins., are employed. The piping is such that either pump may be used for low duty or as a boiler feed pump.



STEEL SPAN ACROSS ST. MARY'S RIVER AT DECATUR

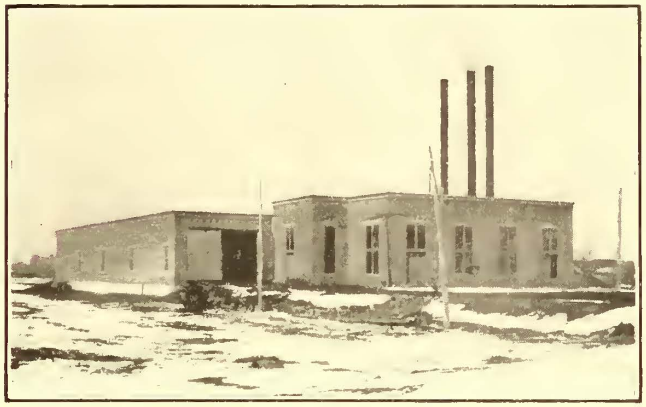
These pumps, as well as the other auxiliary apparatus, discharge into a Cookson feed-water heater. For the 550-volt trolley in Decatur the voltage is lowered from that of the machine potential by an oil-cooled transformer located in the generating station.

CAR SHOP AND CAR HOUSES

Adjacent to the power house is a car house constructed with concrete blocks.. The building is 33 ft. wide, 151 ft. deep, 22 ft. high, and contains two tracks. Each track is provided with a concrete pit 60 ft. long and 4 ft. deep. The machine shop and general repair shop is located in the rear of the building, the machine shop being supplied with a lathe, a shaper, drill-press and an emery wheel. Heavy work, such as turning wheels and pressing them on and off axles, is done at the brass foundry in Fort Wayne. The machinery in the shop is driven by a direct-current motor. Current for this is obtained from a generating set installed in the power station, consisting of a Westinghouse generator, direct-connected to a Westinghouse engine. The shops are steam heated from the boilers in the power house, the coils being placed in the pits.

CARS

The rolling stock consists of three passenger cars, a baggage car and fifteen flat cars used in construction work. The passenger cars, which contain three compartments, are



SHOPS AND POWER HOUSE AT DECATUR

53 ft. long over bumpers and 8 ft. 4 ins. wide. The width was limited because of the narrow devil strip in Fort Wayne. The cars are finished in mahogany and have plush seats in the main passenger compartment and rattan seats in the smoker. The baggage car is 44 ft. in length. The cars are heated with Peter Smith improved hot-water heaters.

The standard truck is of the Baldwin type with a 6-ft. 10-in. wheel base. Steel-tire wheels, 34 ins. in diameter, with 3-in. treads and ⅞-in. flanges are employed. All of the cars are equipped with four 106-A Westinghouse motors, each motor being 75 hp. The control equipment is of the Westinghouse electro-pneumatic a. c. and d. c. type.

Other than the terminal cities there are no large towns on the line. The country, however, is rather thickly populated and averages 652 people per square mile, taken 2½ miles on each side of the line. Decatur has a population of about 5000, while the population of Fort Wayne is approximately 60,000. This is the fifth interurban road and the second single-phase road to be built into Fort Wayne.

The road was constructed entirely by the railway company, under the direction of W. H. Fledderjohann, president and general manager. T. W. Shelton, superintendent and electrical engineer of the road, was in immediate charge of the construction work.

REPORTS OF THE COLUMBUS CONVENTION

The reports of the Columbus Conventions of the Engineering Association, the Accountants' Association, and the Claim Agents' Association have just been published. They are bound in the distinguishing colors of the three organizations and contain the official reports of the proceedings of the 1906 conventions. The typographical work on each is excellent, and speaks well for the plan of issuing the transactions of the affiliated associations from one office. These pamphlets will well bear re-reading and are valuable contributions to the art.

ANNUAL CONVENTION OF THE IOWA STREET AND INTERURBAN RAILWAY ASSOCIATION

The fourth annual convention of the Iowa Street and Interurban Railway Association was held at the La Fayette Inn, Clinton, Iowa, Friday and Saturday, April 19 and 20. The meeting was well attended, the papers presented were carefully prepared, and much interest was taken in their discussion.

The first session was called to order Friday morning at 10 o'clock. Mayor H. U. Crockett, of Clinton, in a few appropriate remarks welcomed the convention to Clinton, adding that he would turn the keys of the city over to Vice-President P. P Crafts, of Clinton. C. D. Cass, of Waterloo, responded to Mayor Crockett's address in a timely manner, after which President F. J. Hanlon addressed the convention.

In his address President Hanlon said the association's most important work of the year was that concerning legislation. Owing to the effective organization many harmful bills were sidetracked. Among the most important were those prohibiting running-boards, Sunday closing, wire regulation bill, and the securing of a 10 per cent minimum on the two-cent-fare bill.

Before presenting his report Secretary and Treasurer L. D. Mathes announced that the offices of the Clinton Gas Light & Coke Company, of the Iowa & Illinois Railway and of the Clinton Street Railway were open to the use of delegates. Likewise the Elks' Clubs extended to delegates the use of the club-rooms. Mr. Mathes also announced that membership badges served as passes on the Iowa & Illinois Railway, the Clinton Street Railway and the Tri-City Railway at Davenport, Rock Island and Moline.

In his report as secretary and treasurer Mr. Mathes said that the heartiest support had been given him by all of the members. The only criticism was that some were tardy in answering correspondence. He requested in his report that all members becoming involved in Supreme Court proceedings forward to him 20 copies of the briefs for distribution among the members. The report showed a balance of $230.92 in the treasury.

On a motion by George B. Hippee, of Des Moines, the reports of the secretary and treasurer were accepted as read and published.

The first paper to be presented was that by H. W. Garner, general manager of the Oskaloosa Traction & Light Company, entitled, "Amusements—How Should this Feature be Handled by Operating Companies?" This paper was printed on page 696 of the Street Railway Journal of April 20.

DISCUSSION ON AMUSEMENTS

In the discussion following, Mr. Hippee said he thought the character of the amusement features to be put into parks was governed by local conditions. He agreed with Mr. Garner that railways should go slowly in developing amusement parks and not too heavily at first. In Des Moines, he said, they started with nothing but a park. There were no buildings nor attractions. A moving-picture outfit was the first amusement feature. Now there are numerous amusements, and vaudeville entertainments are given in a theater every evening during June, July and August. These features usually are operated by amusement companies on a percentage basis. He had heard managers say they depended altogether on bands to attract people. In Des Moines it had been proven that the people would not patronize bands; it was necessary to have a good vaudeville show, and the people insisted on a good show, too. The park in itself had never paid expenses. However, traffic on the park line had been increased 50 per cent. The theater performances were advertised as being free, but occupants of seats near the stage were charged 10, 15 and 25 cents. The coming season will see a slight increase in charges, making them 10, 15, 25 and 35 cents.

P. P. Crafts, general manager of the Iowa & Illinois Railway, extending 36 miles between Clinton and Davenport, said he would like to give the association the benefit of the experience of his road with a rather peculiar park proposition. Owing to attractions at each end of the line and the great amount of equipment necessary to care for short-haul traffic, he had concluded not to develop a general amusement park. Instead, he had established a picnic park at a midway point. This had a large wooded area, with conveniences for picnic parties, including a dancing pavilion. Band concerts were given two and three times a week.

The fare was usually 50 cents round-trip from terminals, but for special excursions it was made 40 cents and sometimes for Sunday-school picnics it was reduced to 25 cents. The receipts from the refreshment stand paid for all park expenses, exclusive of music. Although he had gone into the proposition with misgivings he felt the enterprise had been fairly successful, and he believed an interurban line could conduct a park of this character successfully.

R. M. Howard, general manager of the Clinton Street Railway, wanted an expression of opinion regarding charges for park admission. He had found that all money for attractions came out of the fares and had almost concluded to make a charge of 10 cents for admission to the park.

Mr. Crafts said that a few years ago at Saginaw, Mich., a charge of 15 cents round-trip to the park was made and 5 cents credited as admission to the park.

Mr. Hippee said that three or four years before starting their present park at Des Moines they had tried to charge admission to another park. The proposition ended in a flat failure. He thought it depended a good deal on the way the people were educated. In general, however, parks should be operated free, as people will spend their money after they get in.

Secretary Mathes said that he believed railway companies educated the people wrongly at times. At Dubuque their park showed earnings of $7,500 per month for a season of three months. Attractions cost about $4,000 per month. He would like to put on a gate fee, as they had about 25,000 people per week for 12 weeks. At present everything is free and he was a little afraid to put on a charge. With regard to the moral atmosphere of their park it was regarded locally as a great moral uplift because it drew people away from worse places. The educational authorities and ministers felt that the company was doing much good for the town by operating the park.

Mr. Hippee told of a scheme used two or three days a season in Des Moines to increase attendance at matinée vaudeville performances. Twenty-five dollars was distributed in envelopes—$10 in one, $5 in two, and $1 in five envelopes. It was then advertised that with every ticket purchased an envelope would be given and among these would be those containing the money. This scheme always resulted in crowded houses.

Mr. Mathes asked Mr. Hippee if there was any objection by patrons to paying for seats in the theater. Mr. Hippee said they seemed to want to pay for them. The 10-

cent seats had the least sale of any on every night except Sunday, when the theater was patronized by a different class of people who took their families with them. Seats could be reserved at a down-town office before going out to the park, and frequently over half of the high-priced seats were sold before night. On the park lines there was an increase of over 500,000 passengers during June, July and August.

J. G. Huntoon, general superintendent of the Tri-City Railway, thought it a good plan to add special features or novelties to the regular entertainment features at times throughout the season. To explain what was meant by a novelty he related an incident at their park. An unkempt, vagrant-like individual presented himself at the railway office and offered to make an engagement to walk across Rock River at the park on a tight rope. The performance was well advertised and drew a large crowd. The performer, however, overestimated his ability, for he fell into the water after taking only a few steps. The performance was, in truth, a novelty to the spectators. Mr. Hippee said he had gotten Hagenbeck to drive his elephants into the river, and this drew a crowd.

C. D. Cass, general manager of the Waterloo, Cedar Falls & Northern Railway, brought up the subject of Chautauquas. The Chautauqua held at their park had been growing larger every year for 10 years. Its meetings continued from 1 to 4 weeks. Last year the Chautauqua put up a $20,000 building seating 6000 people. The association cost the railway company practically nothing. Last season the Chautauqua engaged Thomas's Orchestra to give afternoon and evening concerts for a week at a cost of about $10,000, and although it lost about $1,500 the orchestra has been engaged the coming season.

R. A. Leussler, assistant manager of the Omaha & Council Bluffs Street Railway, said with his company the park experiment had always been carried on at a loss, but the receipts from increased travel were far greater than the loss on the park. He thought the greater the variety of the attraction the greater the attendance. At their park was a lake 4 miles long and 2½ miles wide. The row-boats and electric launches proved great attractions. He found the roller coaster the greatest moneymaker. A coaster costing $9,000 or $10,000 would pretty nearly pay for itself the first year. In other places it had been shown that this amusement device drew pretty nearly as many people the second, third and fourth as the first. With them the "merry-go-round" was second as a moneymaker, and the row-boats third.

STORAGE BATTERIES

After the close of the discussion on amusement features J. M. S. Waring, of the Electric Storage Battery Company, gave a well-prepared talk on storage batteries.

Up to three or four years ago, Mr. Waring said, there were two general classes of batteries in railway work: One type — the power-house battery — was installed in direct-current power houses with regulating apparatus of such a nature that the battery ordinarily discharged under heavy load and was charged when the load was light. The other type of battery was a line battery, either without booster or with a booster at the power house or at the battery. Recently, however, the field has broadened greatly, principally due to the use of alternating current in railway work; and now, besides the two classes of batteries mentioned, several types had been developed to work in connection with alternating current. Mr. Waring divided these batteries into four classes. Batteries of the first class are installed in cases where the entire a. c. power-house load is to be regulated and turned out partly as alternating current and partly as direct current. The battery discharges not only at times of heavy load on the direct-current side, but also with heavy loads on the alternating-current side; a battery of this type is installed on the Oneonta & Mohawk Valley Railroad, New York. Batteries of the second class are installed where the entire load on the power house is alternating current; a battery of this type has been installed by the Spokane & Inland Railroad in connection with a motor generator set, consisting of a three-phase induction motor, a 550-volt direct-current machine and a 25-cycle alternator. The battery is connected across the direct-current machine. Under heavy loads the battery discharges through a motor and supplies the line; and conversely, when the load is light, the direct-current machine gives out power to the battery and charges it. Batteries of the third class are installed where there is both a fluctuating a. c. load and a fluctuating d. c. load, as there will be in the new Indiana Steel Company mills now being built at Gary, Ind. The a. c. load will vary from 2000 to 14,000 hp in from 5 to 10 seconds. The direct-current fluctuations will be caused by the motors driving the unloaders on the batteries; in this case the battery is across the a. c. bus-bar and connects the d. c. and the a. c. systems. The heavy a. c. load is thrown partly on the d. c. buses and the battery takes the heavy loads thrown on the a. c. buses. The fourth case is where there is an a. c. supply and an a. c. demand, and the battery is connected to the system through proper transforming apparatus. Mr. Waring also mentioned three methods of installing line batteries. The first was where the battery was installed at the end of a line without a booster. Assuming an average voltage of 500, a minimum voltage of 200, and a maximum voltage of 650, without the battery, the battery would be installed to operate at 500 volts, and with such a battery the voltage would fluctuate between 450 and 500 volts. The second case was where the battery was installed at the end of a trolley line with a booster at the power house. In addition to increasing the average voltage, the booster furnished a means of controlling the battery. The third case was where line batteries were installed, as on the elevated roads in Chicago. Boosters are installed at the batteries and an attendant is required. A battery of this type installed at Robey Street on the Metropolitan West Side Elevated road, he said, cost less money than the copper that would have been required to maintain the proper voltage, and it had the added advantage of regulating the load on the power house.

In enumerating the functions of a battery he said they improve the efficiency of the generating apparatus, and that they reduce the number of generators required and thereby eliminate construction expenses. On the Metropolitan West Side Elevated System, Chicago, on a certain day in January before the batteries were installed a trial was made and a similar test the same month a year after the battery was installed. Although the load had increased 25 per cent on peaks in the meantime, the total load factor on the station had been improved and the actual boiler hours during the test were 10 per cent less than when no battery was installed. The decreased boiler hours resulted from the fact that without the batteries the boilers were maintained banked, ready for emergency; while after the batteries were installed this practice was abandoned, as the battery would carry the load until the boilers were fired up. He also spoke of the reserve features of batteries

or their ability to take care of the load for a short time in case of a breakdown.

At the conclusion of Mr. Waring's talk Secretary Mathes wanted to now what the depreciation on storage batteries was as compared with that on engines, boilers and other equipment. Mr. Waring said the depreciation varied according to the nature of the service. It was very severe on the elevated roads in Chicago, where there were two peaks to be taken care of per day. In this class of service the depreciation was about 5 per cent per annum. Everything else being equal, he said the depreciation on the positive plate was proportioned to the ampere hours discharged. An installation for railway work in Wisconsin had, after 12 years, shown a maintenance cost of less than 3 per cent per annum, and part of this was for attendance. The depreciation in batteries was not exactly the same as with engines and generators. After fifteen years these were usually obsolete, and this was kept in view in determining the rate of depreciation to be charged. With a storage battery, however, a charge of 5 per cent not only maintained the battery but also kept it up-to-date.

H. B. Noyes, chief engineer of the Omaha & Council Bluffs Railway, said, with regard to depreciation on other railway apparatus, that it varied from 5 per cent on a pole line to 8 per cent on generating apparatus.

TRAIN DISPATCHING

At the afternoon session H. H. Polk read a paper, entitled "Modern Train Dispatching Methods on Electric Railways." This paper was printed in the Street Railway Journal of April 20 on page 695. Mr. Crafts started the discussion on dispatching by giving a few of his ideas. Under general conditions he said he thought we depend too much on steam-railway methods. Where train movements were absolutely regular and cars were on time he did not think it necessary to get train orders and clearance cards. It should be an unusual condition that called for a clearance card. On his line he had a standing stop order. A train 33 minutes late must report to the dispatcher. A train crew arriving at a meeting-point and not finding a car there must report for an order. Right of way was not given to cars going in one direction. If a train was late it was pulled through as quickly as possible. He believed that making the unusual occurrence call for a train order rather than the usual one tended to eliminate accidents.

Mr. Polk said Mr. Craft's idea of running on a time-card was very good, but he thought running on a time-card and on train orders, too, doubled the precaution. On the Des Moines interurban lines all inbound trains had the right of way over outbound trains, as it had been found that it was easier for outbound trains to make up time. Regarding surprise tests, he frequently went out on the line and took off switch-lights or reversed them from green to red. On such tests his men never ran against a red light, but he had trouble in getting them to report dead-lights.

Mr. Crafts said he had frequently turned switch-lights and always found his men on their guard. He could not give cars in one direction right of way over the others, because there was a city at each end of the line.

Regarding switch-lights Mr. Hippee said it cost the Des Moines interurban roads over $75 per month to take care of oil switch-lamps. Mr. Crafts said oil switch-lamps cost him about $655 per year.

Mr. Cass said conditions on his road were different because it was operated partly by steam. Steam-road practice was used entirely. He suggested that to avoid switches being left open stub-end switches should be employed.

Mr. Crafts objected to the time required to head-in and back-out when these switches were employed. At the two regular meeting-points on his line there were spring switches, and cars were slowed down for them.

FREIGHT HANDLING

An animated discussion followed the reading of a paper by Mr. Crafts on "Freight Handling by Electric Lines," published on page 699 of the Street Railway Journal for April 20.

In reply to Mr. Polk's question as to whether he had any stockyards along his line, Mr. Crafts said he had not, and added that his road had no joint-rate agreement with steam roads, and that the farm products handled consisted of only corn, oats and feed. Mr. Polk said his line got about 30 per cent of its gross receipts from freight. He said that Eastern men who say it costs $1.50 to handle $1.00 worth of freight evidently don't know how to handle it.

Mr. Hippee said a few years ago, when promoting their first interurban line, the financial men inquired about the passenger earnings only and said nothing about the freight earnings.

Against the claims of some who said interurban roads were not built to stand freight traffic Mr. Crafts said he failed to see why an electric railway operating 30 to 50-ton cars at a maximum speed of 50 miles per hour could not stand freight traffic. When his line went into the express business a car with standard motors and trucks was purchased so that in the event of failure the express body could be sold and the trucks and motors put under a passenger car. He believed that when the passenger business warranted the construction of from 30 to 50 miles of road there were chances for good freight business. He said the earnings from freight on his road were from $15,000 to $16,000 per year, while the expenses of handling freight were about $8,000. But the business had reached a point where the increase in gross earnings was not followed by a corresponding increase in expenses.

A. Parks, who is promoting the Des Moines, Winterset & Creston Railroad, wanted to know if there was anything in the operation of cars by electricity which would prevent handling carload-lot freight.

Mr. Polk said there could be nothing except the question of power. He had never made any tests between steam and electric haulage. However, when trains of over 10 or 12 cars were to be handled he thought steam operation the cheaper. One advantage of the use of electricity was that when trains were sidetracked no power was being used.

President Hanlon said with 60-lb. rails he could not see where there could be difficulty in the handling of 40,000-lb. cars with loads of 100,000 lbs. He did not believe in delivering to store doors. He had tried it and thought it a useless expense. It consumed too much time. He thought interurban terminals should be close to the business portion of cities. He did not believe in cutting steam-road rates; it destroyed standing with them. As to billing forms, he thought the steam-road methods the best that could be gotten.

STEAM MOTOR CARS

The paper prepared by W. G. Wagenhals, of St. Louis, entitled "Steam Motor—Its Value for Interurban Service," in the absence of Mr. Wagenhals was read by Secretary Mathes. Before reading it Mr. Mathes said the paper had been put on the program as a counterpart to a paper presented by Mr. Hild on the self-propelled motor car at the

session last year. Accompanying the paper which was published on page 698 in the Street Railway Journal of April 20, were photographs showing some of the features of Mr. Wagenhals' steam-motor car.

At the conclusion of the reading of the paper Mr. Hippee wanted to know the number of men required to run the car described.

Mr. Polk said he did not see why the car should require any more help than a steam automobile. He said a good many lines could be built in Iowa if it was not necessary to electrify them. He believed a self-propelled car would enable such roads to be built. As a possible location for such a line he spoke of two towns 24 miles apart where a connecting line would serve only about 10,000 people. Only three or four trips of passenger cars would be required per day. Freight could be handled by a steam locomotive. Mr. Hippee thought a steam car for interurban service should have a non-explosive boiler. There was an element of danger in a high-pressure steam boiler.

J. E. Osmer, master mechanic of the Northwestern Elevated Railroad, Chicago, endorsed Mr. Hippee's remarks. He thought, from the standpoint of safety, a flash boiler should be used. He objected to the truck design of the Wagenhals car, saying he preferred inside to outside-hung brakes because of the tipping in stopping if the brakes were not released before the car came to a stop.

Mr. Crafts said the cars of the Union Pacific Railroad were the simplest self-propelled cars he had seen. Mr. Hippee replied that he understood the cars were not very reliable. He suggested that in case of a head-end collision of the Wagenhals car the fuel oil would be scattered and a big fire would be started.

JOINT TRACK OPERATION

The paper by Isaac B. Smith, traffic manager of the Cedar Rapids & Iowa City Railway & Light Company, on "Joint Operation of City and Interurban Cars Over City Tracks," consisted mainly in a discussion of the laws recently passed by the Iowa Legislature regarding this subject. The reading of the paper was followed by a very interesting discussion.

Mr. Hippee said an interurban company should use as few miles of city track as possible. It was not necessary that interurban cars get to a terminal loop in the heart of the city. In Des Moines he said they expected to make a separate loop for interurban cars and keep them off the city loop. The interurban cars would be brought to the business district of the city, but to one side of the central portion. He thought it of the utmost importance that the city schedule should not be disarranged by the interurban cars, as the city people must be given the service they demand. At least 5 minutes were required to unload and load an interurban car, and where city and interurbans were operated on the same terminal loop the city service suffered. He favored a separate interurban terminal such as that at Indianapolis, where baggage as well as passengers could be taken care of.

President Hanlon wanted to know which should be given preference in joint operation—interurban or city cars?

Mr. Crafts said he had been able, with the co-operation of the city roads, to have the interurban cars given the preference. But if they are late they drop behind the city cars. He had spent several thousand dollars to cut off a mile of city track. He thought that under all conditions the interurban should use as few miles of city track as possible. To catch the traveling man he thought interurban cars should take them direct to the hotels and the business district. He thought the interurban depôt should be on the outgoing end of the loop, when a loop was used, and the loop should be a short one. To show the delays possible when interurban cars follow city cars, he said on one occasion a city car got ahead of an interurban car and delayed it on the city tracks 4 minutes. This killed the interurban meeting-points and caused the interurban car to reach the end of the run 15 minutes late.

In reply to Mr. Craft's statement that interurban cars should be given preference over city cars in order to compete with steam roads on through-business, F. L. Diserens, superintendent of the Cedar Rapids & Marion City Railway, said that although their time between Cedar Rapids and Marion was about twice that of the steam road and that the fare was higher on the electric line, passengers deserted the steam road to take the electric line.

With regard to reduction in running time, Mr. Crafts said the running time between Clinton and Davenport was, first, two hours and fifteen minutes; later it was reduced to one hour and forty minutes, and later to one hour and eighteen minutes.

GENERAL MATTERS

At the close of the discussion concerning the operation of interurban cars in city streets, Secretary Mathes asked for expressions regarding whether or not the new anti-pass bill applied to city cars.

Mr. Hippee said it not only included street cars but that it applied to hacks, cabs and all public conveyances and common carriers. It applied to everybody except those who gave all of their time to the railway. However, a clause provided that where the terms of a franchise included the hauling of certain officials the terms of the franchise were to hold.

E. L. Kirk, manager of the Sioux City Traction Company, wanted to know how people having park concessions would be treated under the anti-pass law.

Mr. Hippee said they would have to pay fares as they did on his line now. The company paid them and he saw no reason why they should not pay their fares.

Secretary Mathes announced that inasmuch as the question of depreciation was a very broad one and was before the national convention, it would be dropped from the program.

On a motion by Mr. Cass the secretary was instructed to convey to the officials of the Iowa & Illinois Railway the Clinton Street Railway, and the Clinton Gas Light & Coke Company the thanks and appreciation of the association for the excellent manner in which the association had been entertained.

On behalf of the entertaining companies Mr. Crafts said that if the officers had been able to make the stay pleasant for the members they were happy.

The nominating committee, composed of R. A. Leussler, G. B. Hippee and E. L. Kirk, reported that in view of the efficient and satisfactory service rendered by the present officials that it recommended President F. J. Hanlon, of Mason City; Vice-President P. P. Crafts, of Clinton; and Secretary and Treasurer L. D. Mathes, of Dubuque, be re-elected for another year. The secretary was instructed to cast a unanimous vote for these officials. The invitation of Mr. Hippee to hold the next convention at Des Moines was accepted.

Mr. Garton, on behalf of the supply men, said that the supply men were most grateful for the treatment accorded them. The arrangements provided for exhibits were most satisfactory.

Mr. Hippee suggested at the next meeting instead of giving all the time to the reading of papers that subjects relating to operation be selected and several members be appointed beforehand to lead in the discussion.

Before adjournment considerable time was spent in considering the question of handling rush-hour or peak traffic on city lines.

Mr. Kirk said that at Sioux City they had gone to the extreme in the use of trailers. They were not able to trace a single accident to the use of trailers in the last five years. He believed where extra equipment was not required more than forty or fifty days a year that trailers should be used. The trailers were operated by one man. Hand-brakes had been used in the past, but recently straight air-brake equipments had been purchased. The cost of trailers was about $1,000, as against a cost of $2,000 for a motor car. The maintenance was almost nothing. They were pulled around a loop down-town, but at the terminal of the park line a "drag-out car" was employed. This car, which was passed by the train on a siding, backed in, was coupled to the trailer and pulled the latter on the return trip. This plan required the use of one extra motor car.

Mr. Huntoon said that at Davenport they used trailers on some lines and raw trippers on others. He could not agree with Mr. Kirk that no accidents were due to trailers; most of those occurring were running-board accidents. Mr. Kirk explained that he regarded these accidents as due to open cars and not to trailers.

G. E. Miller, superintendent of the Union Electric Company at Dubuque, said they ran trailers last summer and had only one trailer accident. They could not maintain a fixed schedule during the rush hours — cars were closed up regardless of all schedules. Men were put out along the line to keep the cars moving. These men were put at central points where traffic was heaviest. They did not let all the cars go from one end of the line to the other. On one line there were four turning-points and certain cars were assigned to short hauls. Mr. Miller believed it paid to use trailers on big days. The avoidance of trailer accidents was all in the training of men. It was necessary to get the men together frequently and drill into them the importance of observing the rules. Men were required to signal by whistles; no hand signaling was allowed.

John A. Higbee, superintendent of the People's Gas & Electric Company, said that at Burlington they used trailers quite extensively. They were employed on a park line on which there was a 4½ per cent grade three-quarters of a mile long. One trailer and a motor car were used up the hill, and frequently the trailers were stored on top of the hill and two trailers were carried down behind a motor car. A conductor was put on each trailer. Motormen were signaled by a bell.

At the end of the discussion the convention adjourned.

EXHIBITS AT THE IOWA CONVENTION

At the annual convention of the Iowa Street and Interurban Railway Association and the Iowa Electrical Association, held at Clinton, Iowa, April 19 and 20, a departure was made from the usual practice of having the exhibits arranged in the rooms of the hotel, the basement being given over to the exhibits. The basement was wired for both alternating and direct current, furnished gratis by the local companies, and was filled with well-decorated booths built on either side of a central passageway. Among the companies exhibiting apparatus and which were represented at the convention, were the following: Allis-Chalmers Company; American Steel & Wire Company; Atlas Railway Supply Company; Benjamin Electric Manufacturing Company; Buckeye Electric Company; Electric Service Supplies Company; Electric Storage Battery Company; W. R. Garton Company; General Electric Company; Gould Storage Battery Company; H. W. Johns-Manville Company; Kalamazoo Railway Supply Company; National Carbon Company; National Conduit & Cable Company; National Brake & Electric Company; Ohio Brass Company; Ohmer Fare Register Company; St. Louis Car Wheel Company; Standard Underground Cable Company; W. T. Van Dorn Company; Wagner Electric Manufacturing Company; Westinghouse Electric & Manufacturing Company, and the Western Electric Company.

ENTERTAINMENT AT THE IOWA CONVENTION

Delegates at the Iowa Street and Interurban Railway Convention, held at Clinton the 19th and 20th, were well entertained by a series of events arranged by the entertainment committee, consisting of P. P. Crafts, general manager of the Iowa & Illinois Railway; R. M. Howard, general manager of the Clinton Street Railway; and Thomas S. Crawford, general manager of the Clinton Gas Light & Coke Company. Membership badges served as passes over the Clinton Street Railway, the interurban railway between Clinton and Davenport and the lines of the Tri-City Railway in Davenport, Moline and Rock Island. Friday afternoon a party of about forty accepted the invitation of G. E. Lamb, president of the Iowa & Illinois Railway, to accompany him on an excursion on the Mississippi River in his houseboat. Friday evening a smoker and Dutch lunch was held in the dining-room of the Lafayette Inn, at which the entertainment features consisted of music and of story-telling by members and trade representatives. Saturday afternoon two carloads of members and trade representatives made a trip in special cars over the Iowa & Illinois Railroad to Davenport. Here special cars of the Tri-City Railway conveyed the party to the United States Arsenal on Rock Island. The party, after inspecting the Government and Tri-City Railway water-power plants and the Tri-City Railway steam-generating station, were met in Rock Island by special cars, and after a trip through the residence portion of Davenport were conveyed to the Davenport Commercial Club, where dinner was served. Hon. Joseph R. Lane, of Davenport, acted as toastmaster at the dinner and introduced the speakers, including George B. Hippee, L. D. Mathes, and Mayor Crockett, of Clinton.

FIELD GLASSES FOR LINE INSPECTION

The inspection of overhead lines, if done with care, is a matter of considerable physical difficulty. It involves much walking, sometimes a large amount of pole climbing, and generally uses up a great deal of nervous energy if the inspector is conscientious. The labor may be considerably decreased by the use of a light field glass, and in climates where the percentage of sunshiny days is liberal the glass can be made much more effective by the use of a small hand mirror in connection with it. By taking the proper position on the ground beneath the line and reflecting the rays of the sun upon the insulator, tin, wire or crossarm under observation through the field glass serious defects can be located almost as well as though the inspector were at the top of the pole.

DEPRECIATION IN CLEVELAND

The following description of the policy of the Cleveland Electric Railway Company in charging for depreciation was made public last week. It is from the 1906 report of the secretary and treasurer of the company, H. J. Davies, to President Andrews:

Track Depreciation—Following the suggestion made in my last annual report, a charge has been made each month to expense, and a corresponding credit to a number of reserve accounts, which we have called "Depreciation Reserves," for wear and tear of track, equipment, etc., in addition to the ordinary repair charges. The rule of the Street Railway Accountants' Association, as expressed in the Standard Classification of Operating Expense Accounts, provides that all expenditures for repairs and renewals shall be charged to maintenance (expense) accounts. This rule, if not incorrectly expressed, is likely to be misinterpreted and misapplied. The rule should provide that there be charged to expense all expenditures for repairs as distinguished from renewals, and, in addition, each month, by way of reserve, a sum large enough to take care of or provide for the wear of the month, this sum to be such a proportion or percentage of the cost of renewal as the month bears to the probable life of the property; so that when a piece of track or equipment is entirely worn out and replacement must be made, a reserve sufficient to pay for the replacement will appear on the books. The reserve and the value of the property ought to equal at any time the cost of replacement. It would be still more accurate and scientific to charge to maintenance expense a certain sum per car-mile run in each month, large enough to cover both ordinary maintenance charges and the month's proportion of the probable cost of renewals, crediting this sum to a "Renewal Reserve" account.

To follow strictly the rule of the association would require that the cost of renewals be charged to expense in the year or month in which the renewals are made, throwing an abnormal burden on the summer months, when track-laying is done, whereas the wear on the track is as great per car-mile run in the winter months as in summer. If, instead of charging the cost of renewal to expense at the time the expenditures are made, the cost be spread over several future months or years, as was our custom until recently, the subsequent periods will show a much larger maintenance expense than the period immediately following construction. The first few years after construction, if no charge is made for renewal, will show very low maintenance cost; the first few years after renewal, if the cost of renewals is made and spread over a term of years, will show very high cost of maintenance. This method of accounting has deceived stockholders and the public as to the earnings of street railway companies, and as to the cost of carrying passengers. No provision having been made in the early years of operation for renewal reserves or funds, the owners of street railway properties have had to provide additional capital for renewals; and this had led in many cases to over-capitalization. And this process of renewing from new capital has been repeated by some companies several times.

Provisions should be made from the current earnings of the company for depreciation of its property by reason of wear, for depreciation by reason of progress and improvements in the arts of manufacture and in methods of operation, and for decrease in the value of franchise due to lapse of time. There is less excuse for neglecting this provision on the part of companies possessing short-time franchises than on the part of those, like the New York and Pennsylvania companies, that have franchises running for ninety-nine or 999 years. But I know of no railway company in the country that is making adequate provisions for this deterioration and depreciation.

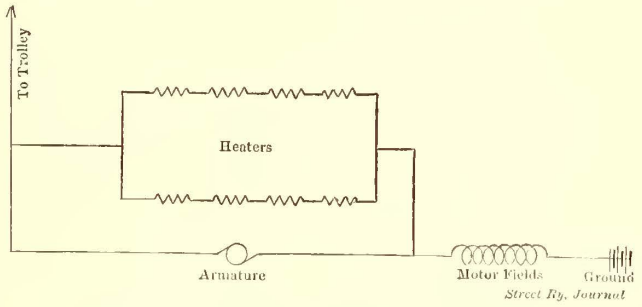
Depreciation of Cars—We own 876 passenger cars. If they were all of our new convertible type, we might be able to do the present business with 800. Eight hundred convertible cars, with trucks, motors, air brakes and other accessories, would cost us now, new, nearly $4,000,000. Their life would probably not exceed ten years. To provide funds for 800 new cars when these wear out, we should, therefore, charge to expense, in addition to expenditures for ordinary maintenance, or, at least, should deduct from income in some way and put in a renewal reserve for cars and motors, nearly $400,000 per year. As before stated, we charged off $20,000 for this purpose last year.

Our total depreciation charges amounted to 1.24 per cent of our capitalization of $31,426,000; to 2.6 per cent of $15,000,000, Mayor Johnson's estimate of the cost of reproducing the entire property.

METHOD OF FINDING THE EFFECT OF STRONGER FIELDS

The method employed in a Western interurban railway repair shop of finding out what would be the effect of putting more turns in the fields of a motor may be of interest to some who suspect that the faulty action of a motor is due to weak fields. This test was employed after the failure to locate in the armature or in the setting of the brushes the cause for excessive sparking at the brushes of a motor. The proposition of winding a set of fields with square wire and a greater number of turns to test the effect of stronger fields was being considered, but this would have been rather an expensive procedure.

The accompanying diagram illustrates the manner in which the effects of additional field turns were obtained



HEATERS IN SHUNT AROUND ARMATURE

with very little trouble and with practically no expense. The diagram shows the heaters of the car placed as a shunt around the armature of No. 1 motor. When the motors were thrown in multiple the effect of the connections illustrated was simply to increase the current through the fields while the armature current remained practically the same as without the shunt, because the drop in voltage in the fields of a railway motor is very small, as compared with the drop in the armature. In the test cited the heaters were connected to permit of three gradations of current, and with both of the heater circuits connected in, the current through the field, by actual measurement, was about twice that through the armature, that is, the fields were as strong as they would have been with double the number of turns on them.

Between St. Louis and Springfield, Ill., a distance of about 96 miles, the McKinley system of interurban lines charges 2 cents per mile on its limited trains. The fare for the round-trip averages less than 2 cents per mile. The average fare in one direction is, approximately, 2 1/10 cents per mile; the average fare on a round-trip is, approximately, 1 3/5 cents per mile. This is the basis of the schedule on practically all the company's roads. The system runs eight trains from St. Louis to Springfield and eight from Springfield to St. Louis every twenty-four hours. The trains are known as the Corn Belt Limited and the Capitol City Limited. The trip of 96 miles is made in about four hours. The fare from East St. Louis to Springfield is $2. The fare for the round-trip is $3.15. Seven trains passing through Springfield are operated each way between St. Louis and Bloomington.

SPECIFICATIONS FOR CREOSOTED WOODEN BLOCKS AND SUB-STRUCTURE

The use of treated wooden blocks for paving would seem especially attractive to the street railway company because a pavement of this character can be so easily taken up whenever track inspection is required.. It would be wrong, however, to deny that this advantage is nullified by improperly shaped blocks whose interstices permit water percolation or if the wood is of such character that it will swell and thereby throw the rails out of gage. Hence it is essential that the blocks as well as sub-structure for this class of pavement should comply with the most rigid specifications. The nature of these requirements is well illustrated by the methods followed by the Wyckoff Pipe & Creosoting Company, of Stamford, Conn.

The blocks are cut from sound yellow pine or gumwood, free from knots, shakes, worm holes, rot, or other defects. The blocks are rectangular, and dressed on all sides except the top and bottom. None is allowed to vary more than 1/32 in. in length or width and 1/16 in. in depth.

The standard size is 8 ins. long, 3 ins. wide and 3, 3½ or 4 ins. deep; but all the blocks used in any one contract have the same depth. The grain of the wood stands vertical, the ends of the grain forming the top and bottom.

The completed blocks are thoroughly waterproofed and otherwise freed from decay by treatment with live steam between 220 degs. F. and 275 degs. F. at 30 to 40 lbs. per square inch, in a closed cylinder, from 3 to 6 hours, according to the condition of the wood and the season. At intervals during this process a valve is opened at the bottom of the cylinder to drain the condensed steam and sap. When the steaming has been completed the sap and condensed steam are blown out of the cylinder through an opening at the bottom and the remaining steam is allowed to escape through the top of the cylinder. After this the exhaust valves are closed and a vacuum pump is immediately applied to maintain a 24-in. vacuum until all moisture has been exhausted. During the entire process the wood is kept hot by steam coils within the cylinder.

The preservative treatment begins by at once filling the cylinder with creosote at a temperature of at least 175 degs. F. This is pumped in until the wood has absorbed the specified amount—between from 12 to 20 lbs. per cubic foot. The oil is required to have a specific gravity at 38 degs. C. of at least 1.06 and not more than 1.2; be liquid at 15 degs. C.; leave no more than a trace of residue on a filter paper at 15 degs. C.; not contain more than 3 per cent water; upon heating to 235 degs. C. to retain at least 80 per cent of the original volume; and to contain no acetic acid nor acetates.

Before these blocks are laid the earth foundation or sub-grade should be brought to an even surface, parallel with the grade proposed for the pavement, by making the necessary excavation or embankment. Soft or spongy earth or other material not affording a firm foundation should be removed and the space filled with sound stone, broken as specified for concrete, which shall be solidified by ramming or rolling. The sub-grade surface should be compacted by a steam roller which will give a pressure of not less than 250 lbs. per lineal inch of roller. Any portion not accessible to the roller should be thoroughly compacted by ramming. When the rolling and ramming are completed the surface should be true and smooth, 6½ ins. plus the depth of the blocks below the proposed finished surface of the pavement. On this sub-grade there should be laid a bed of Portland cement concrete 6 ins. thick, made of 1 part Portland cement and 4 parts of clean, sharp sand thoroughly mixed dry and then made into mortar by adding clear water and again mixing; 7 parts of crushed limestone, other approved stone or screened gravel, free from dust or dirt, drenched with water, but containing no loose water in the heap, should then be incorporated immediately with the mortar. Each batch of concrete shall be thoroughly mixed, the mixing to be continued until each piece of stone is completely coated with mortar; it should then be spread and at once be thoroughly compacted by ramming until free mortar appears on the surface. The broken stone should not measure more than 2 ins. on the longest diameters, and not less than ¼ in. on the smallest diameters.

The upper surface of the concrete should be made smooth and exactly parallel with the proposed surface of the pavement and lower than the proposed surface of the pavement the depth of the blocks, plus ½ in.

After the concrete foundation has set it should be covered by a ½-in. bed of cement mortar, composed of Portland cement and clean, sharp sand, mixed in the proportions of 1 part cement to 2 parts of sand. This mortar should be rammed into place with concrete rammers until all the unevenness in the concrete is taken up, and then "struck" to a true surface exactly parallel to the top of the finished pavement. The wooden blocks should be immediately laid upon the unhardened cement mortar and driven together as closely as possible.

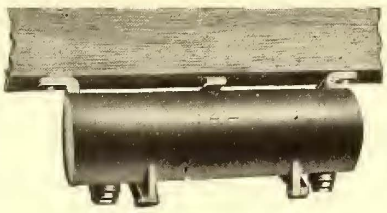
Expansion joints of bituminous cement should be placed at the outer edge of the gutter and across the street at intervals of 50 ft. The gutter joints should be 1 in. wide and the cross joints ½ in. wide. To make these a plank the proper thickness should be inserted and the blocks laid snugly against it. The blocks being laid the plank is removed and the crack thus left filled with bituminous cement of at least 300 degs. F. The pavement is then rolled with a hand roller until the tops of the blocks are even.

The bituminous cement used throughout should not flow at 120 degs. F., nor become brittle at 0 deg. F. It should be absolutely proof against water and street liquids, and pliable rather than rigid; thus providing for any possible expansion and contraction. After the pavement has been rolled, bituminous cement heated to at least 300 degs. F. should be poured along, and completely filling the crack between each block. The bituminous cement should be poured on the cracks only when the blocks are perfectly dry. This cement should be perfectly hardened, and the cement mortar beneath the blocks set before the street is open to travel.

The report has just been announced of the judges of the prize trolley-trip story contest, which was conducted by the passenger department of the Boston & Northern and Old Colony Street Railway companies during the winter months, and closed March 1. The department offered a prize of $25 in cash for the best story of the best trolley trip taken on the lines of either of these two companies, $15 for the second best, and $10 for the third best. By the decision of a board of newspaper men the first prize has been awarded to Katherine Keife, of Danvers; the second to Mary I. Coggeshall, of Melrose; and the third to Ellen M. Dole, of Salem. The winning story is printed in this month's issue of the Tri-State Tourist, the monthly publication of the passenger department.

A MALLEABLE IRON RAILWAY CUT-OUT BOX

A railway cut-out box, made from malleable iron, to eliminate breakage due to the rough usage occurring in railway work, is offered by the Chase-Shawmut Company, of Newburyport, Mass. These boxes are japanned for protection from the weather, and contain a slate base with terminals for clamping and soldering the leads. The bases are made to take the National Electric Code Standard enclosed fuses, which are especially convenient on cars. When the box is closed the fuse is held firmly in place by a fiber stop, which is attached to the cover. On opening the box the fuse is very readily removed. The cover is held closely by a spring clasp. These cut-outs are made in three sizes to take fuses of, respectively, 61-100 amp., 101-200 amp., 201-400 amp. capacity.

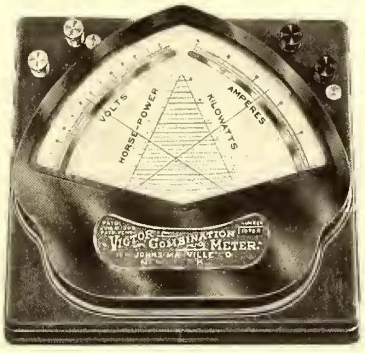


MALLEABLE IRON CUT-OUT BOX

A NEW PORTABLE COMBINATION METER

The demand for the Victor combination voltmeter, ammeter, wattmeter and horse-power meter, designed for switchboard use and placed on the market about a year ago by the H. W. Johns-Manville Company, of New York, has led to the production by the company of a type of this instrument in a portable form suitable for testing.

This meter consists of two separate and complete instruments in a single case, the one giving readings in volts and the other in amperes. The third and fourth readings are obtained on a scale plotted at the center of the dial, giving the product, or power consumption, in watts or kilowatts and horse-power. These readings are taken at the points of intersection of the two indicators. The power scale is calibrated in "watts" or "kilowatts" on one side and "horse-power" on the other.

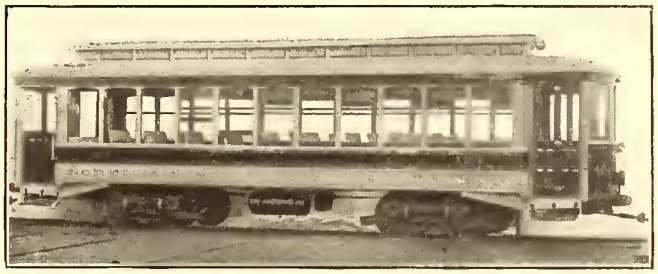


PORTABLE COMBINATION METER

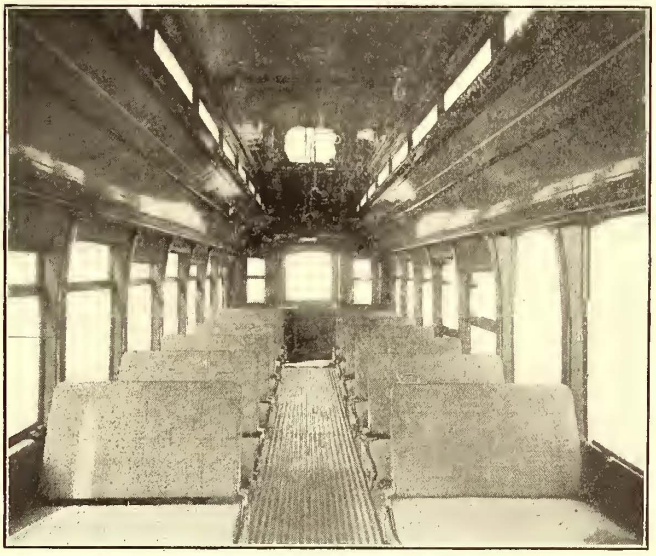
The convenience of having in one instrument a portable meter giving readings in volts, amperes, watts and horse-power is readily appreciated at a glance, as this meter is adapted for rapid testing in the laboratory, while for field work it is almost indispensable. It has been found especially suitable for taking readings on electric cars, electric elevators, etc. If desired, multiple shunts and extra multipliers are furnished in connection with the volt and ampere scales for additional readings, and a table containing the multiplying factor to be used with these various combinations when reading the central scale. The calibrations are carefully and accurately made, and the instrument is reliable and permanent.

NEW ROLLING STOCK FOR USE AT JAMESTOWN

Twenty grooveless post semi-convertible cars, built by the J. G. Brill Company, are now running on the Norfolk Division of the Norfolk, Portsmouth & Newport News Company; and 20 cars, similar in every respect, are being delivered as fast as possible by the same builders to relieve the traffic on the Norfolk & Atlantic Terminal line. New open trail-cars will also be distributed over these two divisions in about the same proportions. A detailed description of these two routes to the exposition grounds was given in the Street Railway Journal of April 6, 1907, and the article also set forth the very adequate transportation facilities provided by the railway company, going on to say that it will be possible to run a motor car and trailer over each of the lines mentioned every 2½ minutes, and during the rush hours every three-quarters of a minute. Besides the rolling stock mentioned, there has been ordered from the Brill Company one combination semi-convertible passenger and baggage car and a baggage and express car, and the American Car Company has already



EXTERIOR OF EXPOSITION CAR



INTERIOR OF EXPOSITION CAR

delivered six large interurbans for exposition service; these cars, which also contain the grooveless-post semi-convertible feature, measure 42 ft. over the end panels and are divided into three compartments—passenger, baggage and smoking—located in the order named. The car illustrated is 30 ft. 8 ins. over the end panels and 40 ft. 7 ins. over the vestibules; width over sills, including sheathing, 7 ft. 10½ ins.; height from rail over trolley board 12 ft. The seats in all the semi-convertibles built by the Brill Company are of that builder's make, as are also the numerous patented specialties with which the cars are equipped. The type of truck used on both lots of cars is the No. 27-G1.

FINANCIAL INTELLIGENCE

Wall Street, April 24, 1907.

The Money Market

The past week has witnessed a further decided improvement in monetary conditions both at home and abroad. In the local market the banks and individual lenders have managed to hold rates for practically all classes of accommodations at last week's level, but they have experienced considerable difficulty in making new contracts on that basis. Stock commission houses continued to draw their supplies from the call loan dpeartment rather than to commit themselves for fixed periods. The inquiry from railroads and other corporations has been extremely light, and apart from the placing of some small amounts of bonds, the demand for fresh capital has been unimportant. During the week announcement was made of the successful flotation of a block of 4 per cent debenture bonds in the European markets by the New York, New Haven & Hartford Railroad Company. Railroads as a general thing are disposed to go slow in making expenditures for improvements, etc., and it is said that one of the large Western roads has decided to expend $2,000,000, which is considerably below the original amount thought to be necessary for such work. Money at all the principal interior points is reported in active demand, but conditions West and South are strong. Increasing strength developed in the foreign exchange market, rates advancing sharply, as the result of a general disposition on the part of bankers and merchants to liquidate their obligations abroad. Money and discounts at all of the European financial centers have displayed increasing ease. The Bank of the Netherlands, at Amsterdam, Holland, reduced its discount rate one-half of 1 per cent to 5 per cent, and similar action was taken by the Imperial Bank of Germany, which institution reduced the rate from 6 to 5½ per cent. In London, open market discounts rule somewhat lower than the official rate, and it is expected that the Bank of England will order a reduction in the minimum rate in the near future. Paris continues to draw gold from London, and in well informed quarters the belief prevails that the Bank of France also will find it convenient to reduce the rate of discount. At the close of the week the general monetary situation was encouraging, and there appears to be nothing in the situation calculated to disturb existing conditions. The bank statement published on Saturday was disappointing. Lons increased $25,347,800, and was attributed to the shifting of loans from other institutions to the clearing house banks. Cash increased $2,477,300, but as deposits increased $26,501,600, the reserve required was $6,625,400 larger than in the preceding week, thus cutting down the surplus by $4,148,100. The surplus now stands at $11,704,825, as against $16,366,725 in the corresponding week of last year, $11,448,050 in 1905, $34,203,704 in 1904, $10,985,475 in 1903, $9,461,050 in 1902, $14,922,100 in 1901, and $24,894,350 in 1900.

The Stock Market

Speculative opinion developed more confidence during the past week, notwithstanding some rather adverse reports regarding the winter wheat crop outlook, and the price movement, while tending upward, showed considerable irregularity at times as a result of profit-taking sales. The speculation was almost entirely professional, and the volume of commission house business was such as to confirm this statement. At one time the market developed pronounced strength, and prices advanced in a manner which suggested a revival of active operations on the part of large interests, hitherto opposed to any extension of commitments on the long side of the market. The dominant influence in the betterment was the improved position of the money market both here and abroad, as indicated by the decline in the rate for time money here, and by further reductions in open market discount rates at the principal financial centers in Europe. The general ease in the money markets abroad was reflected in a reduction in the official discount rates of ½ per cent each by the Bank of the Netherlands and by the Imperial Bank of Germany, and it is probable that the Bank of England and the Bank of France will also reduce their minimum rates in the near future. The crop situation is now attracting the usual attention at this time of the year. During the week some very unsatisfactory reports were received, but were partially verified later by the Government report, the publication of which was followed by a sharp advance in wheat. The report that a large electric concern had reduced the working force from 25,000 to 20,000 since last July attracted considerable attention, but its influence upon values was slight, as the action is the result of special rather than general conditions. The iron and steel trades continue active, and considerable interest attaches to the quarterly report of the United States Steel Corporation, to be made public at the end of the current month. It is expected that the report will make a very gratifying showing, both in the way of earnings and the volume of unfilled orders on hand, but in well-informed quarters no increase in the common dividend rate is looked for at this time. Aside from the influences referred to the market was influenced by the strength in the Pacific stocks, especially Union Pacific, which is said to be earning considerably more than dividend requirements. The Hill stocks also displayed strength and substantial advances were made in American Smelter, the Southern group of stocks and in some of the specialties.

There has been no material change in the traction situation, and these shares consequently moved in sympathy with the general market.

Philadelphia

Trading in the local traction shares was only moderately active during the past week, and while the general tone was firm the improvements in prices were confined to the small fractions. Exceptions to the general rule were United Companies of New Jersey, which rose 2½ to 250 on light purchases, and Consolidated Traction of New Jersey, which moved up a point to 73½. Philadelphia Rapid Transit was the active feature of the group, and after a reaction to 17 on sales to realize profits, it advanced to 19¼, and held most of the gain. Union Traction was also pressed for sale early in the week, the price yielding to 57, but subsequently there was a rise to 59⅜. American Railways sold at 49¾ and 50, and Philadelphia Traction brought 94⅛ and 93⅞. Philadelphia Company common was dealt in at 44 and the preferred at 45⅞ and 45.

Chicago

The developments in the local traction situation were of an extremely favorable character during the past week. The decision of the Supreme Court of the State of Illinois declaring the Mueller law certificates invalid, not only puts municipal ownership of the traction lines by the city of Chicago out of the question, but it also removes about the only serious obstacle in the carrying out of the plans already formed to give the city of Chicago an up-to-date service. Plans for the reorganization of the various properties are being worked out, and the situation is now clearer than at any time for several years. Trading in the shares of the street railway companies, however, ruled quiet. About the only activity developed in West Chicago, which sold to the extent of about 700 shares at from 32 to 30. North Chicago stock sold at 35, and City Railway brought prices ranging from 180½ to 185, an advance of 5 points. South Side Elevated sold at 80 and 81½. Metropolitan Elevated preferred at 65, and Chicago & Oak Park preferred at 15.

Other Traction Securities

Little interest was manifest in the traction shares at Baltimore. Trading was extremely light and price fluctuations were narrow. United Railway 4s sold at from 86¾ to 87¼. The incomes brought 54 and 54¾, and the funding 5s sold at 84⅞ and 85. Several hundred shares of the deposited stock brought 13. Augusta Railway & Electric 5s sold at 101½ for $5,000. The Boston market was unusually dull. Boston Elevated, after an early decline to 141½, recovered to 142½. Massachusetts Electric sold at 17 and the preferred at 59⅜ and 59. Boston & Worcester advanced to 25¼, and the preferred moved up from 71 to 73.

Owing to the fight that has been waged for some time, Cleveland Electric stock dropped 6¼ points on the Cleveland Stock Exchange Monday. These securities had kept up well until the past week or two, but with no support in the shape of a pool they have been dropping gradually until they are something like 10 points lower than two weeks ago. Only a few hundred shares were sold at the lower figures, and they were apparently thrown upon the market by those who had call loans at banks to take care of and others who are tired of the fight that is being waged. It is also suggested that with perfect unanimity among the stockholders of the company a pool would have been formed to protect the stock. The drop, however, seems to bother the larger stockholders very little. Forest City securities have varied but little from where they stood a week ago. Some small lots of Northern Ohio stock have changed hands within the past week, as well as some others, but the market has not been active. Most of them have held their own, notwithstanding the depressed condition of the money market.

Security Quotations

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

	April 17	April 24
American Railways	50	49½
Boston Elevated	141½	142
Brooklyn Rapid Transit	60⅛	57⅞
Chicago City	180	180
Chicago Union Traction (common)	4¾	4
Chicago Union Traction (preferred)	15¾	14
Cleveland Electric	58¾	51½
Consolidated Traction of New Jersey	72	73
Detroit United	73⅛	73½
Interborough-Metropolitan	25	24⅞
Interborough-Metropolitan (preferred)	60	60½
International Traction (common)	50	50
International Traction (preferred), 4s	72½	72½
Manhattan Railway	138	139¼
Massachusetts Elec. Cos. (common)	16¾	16
Massachusetts Elec. Cos. (preferred)	a59½	59
Metropolitan Elevated, Chicago (common)	24	24
Metropolitan Elevated, Chicago (preferred)	65	64
Metropolitan Street	94	—
North American	73½	72½
North Jersey Street Railway	40	40
Philadelphia Company (common)	44½	44
Philadelphia Rapid Transit	17¾	20¾
Philadelphia Traction	94	94
Public Service Corporation certificates	64	62
Public Service Corporation 5 per cent notes	93	92
South Side Elevated (Chicago)	80	82
Third Avenue	108	110
Twin City, Minneapolis (common)	95½	95½
Union Traction (Philadelphia)	57	59¾

a Asked.

Metals

An increasing demand is reported for Northern and Southern iron for nearby delivery, but the inquiry for shipments for the second half of the year is not large. Steel making and foundry irons are strong. The demand for finished steel products continues large. The bookings for rails for 1908 are below expectations.

Copper metal is strong and unchanged as to price. An active demand for electrolytic is reported at 25 and 25¼c.; Lake is quoted at 25½c.

AGITATION STOPS TROLLEY BUILDING IN CENTRAL NEW YORK

It is stated that because of the agitation against railroads, which has made investors cautious about putting their money in bonds and stock of new corporations likely soon to come under strict regulation, trolley building in Central New York will be curtailed. The Syracuse & Utica line, built by New York Central interests on the West Shore route, is constructed and will be in operation within a month, but the Central syndicate has no other present projects The other suburban lines out of Syracuse will be built by a syndicate headed by Clifford D. Beebe, with whom are associated Hendrick S. Holden, William Nottingham, A. K. Hiscock, Frank C. Soule, H. S. Wilkinson and others, of Syracuse. The syndicate planned this year to extend the Rochester, Syracuse & Rochester from Lyons to Syracuse, making a through trolley line from Syracuse to Rochester; to extend the Lakeside road from Baldwinsville to Oswego, and to rehabilitate the defunct South Bay line, partially constructed from this city to Oneida Lake. But the men in the syndicate do not propose to invest money in an enterprise which may be limited by State regulation to a 5 or 6 per cent return, and they find a similar unwillingness among the money lenders of New York to buy bonds of a railroad which may be thus handicapped. The Rochester road will be constructed to Port Byron, so that cars may be taken by a branch road to Auburn and thence by the Auburn & Syracuse into this city. The Oswego line will not be built and the South Bay road, in which more than $1,000,000 was invested by the former owners, will be left as it is until prospects brighten.

THE CLEVELAND SITUATION

A few days ago the Low Fare Railway Company attempted to connect its tracks with those of the Cleveland Electric at Euclid Avenue and East Fourteenth Street. After the work had proceeded for a few hours an injunction was issued from Judge Ford's court stopping it. The Low Fare officials claim they have a right to make the connection on the ground that free territory covers that district, but they will now have to fight the matter out in the courts. The Cleveland Electric so far has allowed the truce to remain unbroken so far as all other matters are concerned, but the officers felt that they could not stand by and see competing companies making arrangements to use their tracks in their efforts to defeat the old company in its contentions.

President A. B. Du Pont, of the Municipal Traction Company, sent an offer to the Cleveland Electric Railway Company to purchase its tracks and other equipment on Central Avenue and Quincy Street for $149,993.19, at the same time stating that cash would be paid for the property. He also said that his company would purchase the car houses and other property not named in the first offer, including cars, if the right kind of a price was named.

The proposition of the Cleveland Electric in answer to this must have been a surprise. In his letter, President Andrews said his company would be willing to sell the tracks, poles, trolley wires and feeders on the two streets named and on East Ninth Street, between Central Avenue and Quincy Street, and the car yards, houses and special work connected with these lines for $448,473. From all that can be learned, however, the Mayor did not object to the figures as much as he did the fact that the company did not state in its offer that it would bind itself not to interfere with the operation of cars on these lines by the new companies. The officers of the Cleveland Electric said they would not tie their hands in any way. The letter stated as a condition that, if the offer was accepted, the cash should be deposited with the Citizens' Savings & Trust Company before April 23; and, further, that if the offer was not satisfactory, the company would be willing to leave the value to a board of arbitration, consisting of fair minded men, and stand by their award. In case the figure fixed was lower than the price asked, the bank was to refund the difference, and if larger, then the purchaser should pay the difference into the bank.

On their decision to refuse this offer the Mayor, City Solicitor and other officials expressed the belief that the Forest City Railway Company could operate its cars over these lines in spite of the objections of the Cleveland Electric, if that company ceased operations at midnight on April 23, as it had given notice it would do. They based their idea on the fact that public necessity would give the companies a right to furnish service, but the decision of the Supreme Court of the United States, which declared the company's franchise had expired, also stated that the tracks, poles and other property in the streets belonged to the company, and in that event it certainly has the right of protection.

A resolution of the City Council ordered the Cleveland Electric to remove its tracks from the streets, and it at once applied for a permit, but this was not forthcoming until Saturday evening. It is said that the city officials spent several days in studying out a permit that would make the removal of the track difficult

and at the same time force the company to allow the cars of the other companies to operate its tracks until they are removed, the new track being laid as the old track is taken up.

The permit orders that only one track shall be taken up at a time, and work may begin only in certain stated place. Not more than 700 ft. of track shall be up in any one place at a time, and permission must be given to build cross-overs, so that other cars may be run around these places. The poles and wires must be taken down last, and there are restrictions in regard to this that will allow the other companies to make use of them until their own are in position. The tracks on Central Avenue must be taken up first and then work may begin on Quincy Street, and the tracks must be taken up in the same way.

The Forest City Railway Company secured a permit and has built a temporary transmission line from its west side line across to the Cleveland Electric's lines that feed the trolley wires on these two streets. It will probably be ready to furnish current as soon as the cars of the Cleveland Electric cease operation, but it is expected that any attempt to connect the lines will be followed by a legal fight that will leave the people of that section without service for some time to come.

The Cleveland Electric Railway Company has rejected the permit given it to remove its tracks on Central Avenue and Quincy Street. Attorneys, answering the note of the board of public service, informed the members that the conditions of the permit are unreasonable and framed to favor other companies, instead of allowing the Cleveland Electric to remove its property from the street and in a proper and peaceable manner. It is further stated that a general ordinance provides that the company shall remove its property from the street within thirty days after abandonment, and put the pavement in proper condition after the work, to the satisfaction of the street commissioner. This ordinance, they state, is made a part of the contract between the city and the Cleveland Electric, and that if the board does not see fit to grant a permit, the company will proceed to remove its property under this contract.

On Tuesday an extra force of police was placed along these two streets to see that the tracks were not interfered with and an additional force is ready at the central station to enforce the orders of the Mayor, who seems to think that he has been enthroned with authority to carry out his wishes, no matter what happens. His contention is that the new companies may take possession of the tracks and use them as their own, and in this he has been advised by City Solicitor Baker, who is a young man and has had little experience in legal matters of this kind. The rule they have adopted is that the rights of the people to use certain street car lines are paramount to the rights of the owners. But 1500 residents of those two streets sent a petition to the City Council Monday evening, asking that the old company be given a new franchise on the basis of seven tickets for a quarter. The paper may have as well been blank, so far as any attention was paid to it by the Mayor and his Council.

On Wednesday, April 24, cars ceased operation on the Central Quincy lines, and the new company was barred off the streets by injunction. The court decided that the franchise of the Low Fare Company on Euclid Avenue east of the square is invalid, as the consents of property owners are lacking. This prevents the company's cars reaching abandoned lines.

SUPREME COURT DECISION IN CHICAGO CASE—UNION TRACTION REORGANIZATION

The Supreme Court of Illinois handed down its decision in the case in which the legality of $75,000,000 worth of Mueller law certificates, which ex-Mayor Dunne wanted issued, was challenged. The court decided against the certificates. In doing so it practically made the law itself inoperative. The Mueller law still stands intact, but the power of putting it into effect, so far as Chicago is concerned, has been taken away from it. The city can own and operate street car lines if it wants to, but the method of getting money to buy or build them has been taken away from it. The proposed certificates were declared invalid by the court for the reason that they would be an addition to the bonded indebtedness of Chicago, and this city is already fully up to its constitutional limit. The decision also finds fault with the certificates because they are a mortgage, not only on what street car properties the city might acquire under them, but also on the streets of the city as well. The Mueller law provides that in case there is a default in the payment of the principal or interest of these certificates the owners of the properties in foreclosure not only would acquire them, but also a twenty-year franchise to operate them. As the case now stands, the only way in which municipal ownership of street car lines is possible in Chicago reduces itself to these alternatives. The city can buy up all its outstanding bonds so as to leave a clear field for the issuance of bonds with which to buy street car lines. At this time it could not issue more than $30,000,000 of bonds, and a traction system covering the whole city could not be built or bought for this. It can save up the 55 per cent net receipts of the companies it will receive under the recently adopted ordinances until the total amounts to enough to buy a system. It is said that a rehearing will be asked by the city.

Purchases of new material to be used in the rehabilitation of the electric railway properties will be made under specifications issued by B. J. Arnold. Mr. Hamilton, secretary to Mr. Mitten, of the Chicago City Railway Company, has confirmed the purchase of 10,000 tons of steel rails, already noted in the Street Railway Journal, and states that 300 additional cars are being built. This is considered the big end of the purchases for the rehabilitation, as the Chicago City Company is in pretty good shape as regards car houses; the overhead was fixed up last summer. There is no connection between the purchasing department of the Chicago City Railway and the Union Traction Company.

The agreement dated April 22, 1907, between the Chicago Union Traction committee, consisting of J. N. Wallace, John W. Castles, Robert M. Gallaway, H. B. Hollins, James Jourdan and Alfred Skitt, and such holders of preferred and common stock of the Chicago Union Traction Company as may become parties to the agreement by depositing their certificates of stock, has been issued. The agreement says that the Chicago Union Traction Company is the lessee of the railways of North Chicago Street Railroad Company and the West Chicago Street Railway Company. The total debts for which said three companies are directly or indirectly liable exceed in bonded indebtedness $26,000,000 and in floating debts $5,000,000. The agreement reviews the traction situation in Chicago since the properties went into the hands of receivers in 1903 and to the ordinance passed Feb. 11, and approved by vote of the people of Chicago at the election on April 2 for vesting in a new corporation, known as the Chicago Railways Company upon the terms and conditions set forth in the ordinance. The stockholders of the Union Traction Company are asked to deposit their stock with the Central Trust Company, assigning to the committee the stock so deposited so that the committee is vested under the terms of the agreement as trustee with the legal title to all shares of stock which may be deposited. The committee shall have power to prepare a plan for the reorganization of the Chicago Union Traction, alone or in conjunction with any other corporation, or to confer in and accept any plan prepared pursuant to the provisions of an ordinance passed by the city council on Feb. 11, 1907.

ST. LOUIS EARNINGS

The United Railways Company returned a satisfactory percentage in net earnings and net income in the official statement for March. Both these items showed a decrease for January and February this year compared with the corresponding period in 1906. Last month the gross earnings show a substantial gain of $112,000. The increased expense account, however, cut this down to $37,000 gain in net earnings. The report shows as follows:

Month of March—	1907	1906
Gross earnings and other income....	$903,145	$790,838
Expenses, taxes and depreciation....	596,247	521,329
Net earnings	$306,898	$269,509
Charges	230,868	231,475
Net income.....	$76,030	$38,034
Fiscal year, Jan. 1 to March 31—		
Gross earnings and other income....	$2,494,162	$2,286,291
Expenses, taxes and depreciation....	1,722,595	1,475,738
Net earnings	$771,567	$810,553
Charges	693,734	695,521
Net income	$77,833	$115,032

REORGANIZATION OF PHILADELPHIA & WESTERN RAILROAD

In order that the Philadelphia & Western Railroad may be reorganized and its stock and bond issue brought more on a parity, the property will be sold at West Chester on May 20 to the highest bidder. It is explained, however, that this will be a mere legal proceeding, and will in no way affect the running of the new line, which will be opened for traffic next month. The sale will be conducted by the Trust Company of North America, which is the trustee for the $15,000,000 bonds, and the technical reason for offering the property at auction is given as failure to pay interest on a portion of the outstanding bonds for a period of more than sixty days. Henry G. Brengle, second vice-president and treasurer of the Trust Company of North America, is quoted as stating:

"The sale is merely a legal proceeding toward the expansion of the company. There is no financial embarrassment. The original bond issue of $15,000,000 was found to be too small, and the company now intends to float a mortgage of $50,000,000. The default of the interest on the mortgage was a necessary step in order to sell the property."

MR. PIERCE ADVOCATES MEASURES FOR RESTORING CONFIDENCE

Henry P. Pierce, president of the International Railway Company, of Buffalo, advocates an extra session of the Legislatures of the various States to investigate charges against the public service corporations. The occasion of Mr. Pierce's remarks was the banquet given by the Buffalo Chamber of Commerce Thursday evening, April 18, following the dedication of the magnificent new home of the body. Besides reiterating the statement already made in the STREET RAILWAY JOURNAL, that improvements involving $2,000,000 proposed to be made to the International Company's property would be suspended for the present, Mr. Pierce formally said that they would not be made until public confidence in railroads was restored. Mr. Pierce's plan is for the Governor of each State to call a second Legislature, to be composed of the heads of Chambers of Commerce, and to meet at the capitol after the regular Legislature had adjourned. Mr. Pierce is quoted as follows:

"This Legislature should not meet for a day, but for weeks, if necessary." It should discuss every question of interest or at issue in any way affecting the public service of the people. Its members should aid to bring about a thorough understanding of corporation business from the business standpoint. It would result in a better understanding, and during that time, if later the laws needed to be amended, the State's Chief Executive and other officials would ascertain the practical business side, for subsequent use in such amendment as might be found necessary.

"The convening of such an assemblage would mark a new era in our country's development. Certainly no harm could come from hearing all sides of every question. Then we could ascertain just what charges of corruption, if any, in public service corporations were true, and just what accusers and accusations were untrue.

"Here in our own State the people surely would uphold the Governor if he should call in conference representatives of all of the Chambers of Commerce of the State and discuss with them questions pertaining to the regulation of public utilities, and invite the criticisms and suggestions of these practical men.

"I believe the Governor would find that they, knowing the wants and necessities of the corporations which they represent, would be able to give him advice and suggestions that he would be glad to accept, and that, as a result, a measure, if any were deemed necessary, would be drafted whose requirements could be observed without hardship by the corporations, and that would, while safeguarding the interests of the people, meet the approval of business interests, and that the State of New York would have a public utility law that would be so workable, sane, and practicable that it would be a model likely to be adopted by the other States."

Vice-President J. B. Thayer, in an address on railroad problems, made reference to the inability to secure capital in this country to carry on projected improvements. Governor Hughes referred to the importance of public confidence, saying that business and commerce must have stability, which they cannot find unless the public confidence is maintained. The public is entitled to be assured that business conducted by right of franchises is conducted as the public interest requires.

A NEW HAVEN OFFICIAL ON THE SITUATION IN RHODE ISLAND

E. G. Buckland, vice-president of the New York, New Haven & Hartford Railroad, with offices in Providence, who also is largely responsible for the operation of the lines of the Rhode Island Company, made some interesting statements at a meeting last week of the East Providence Business Men's Association. Mr. Buckland outlined the situation to be met by the Rhode Island Company in the operation of its lines in Providence, Pawtucket, Central Falls and other cities, and also discussed in a general way the traffic situation which confronts the New York, New Haven & Hartford in operating into Providence. In connection with the operation of the steam lines into Providence, Mr. Buckland referred briefly to the equipment of the Providence tunnel, to which reference has been made before in these columns. He said that in his opinion Providence should be not only the traffic center of Rhode Island, but the center of traffic of Southeastern Massachusetts, and as such should care for all freight and passenger traffic from Fall River, New Bedford and vicinity which now goes by way of Boston and Middleboro. One obstacle that has stood in the way of making Providence the central point has been the necessity for transferring across the city from Fox Point to the union station. A surface road was at first proposed and a charter granted by the Legislature; later an elevated road from Fox Point was considered. Mr. Mellen, on taking charge of the New Haven property thoroughly considered the matter and finally decided that a tunnel through the hill was the only solution of the problem. The question of motive power for the tunnel, Mr. Buckland said, had not been finally settled, but he expressed the hope that the experiments with electricity about to be begun on the New Haven line between New York and Stamford would prove successful, in which event the tunnel line would be equipped for electric operation. Mr. Buckland then said that the next work of the company, if the experiment with electricity proved successful, would be to extend the line from Stamford to New Haven, and that finally the entire New Haven system would be equipped with electricity. Continuing, Mr. Buckland said: "A few words about the electric cars of the Rhode Island Company. Dec. 20 last, I came to Providence to assume charge of the electric car line known as the Rhode Island Company. I found that there were many things that were being criticised. Some of these have been corrected, some are under consideration, and others will be corrected as fast as I can do so and make both ends meet.

"The transfer matter I considered to be of the most importance and gave it my first attention. I did not think that is was right that the transfers should be of such a limited character, and I gave instructions to have a material broadening of their scope, so that a person could use a transfer upon any line of cars except that upon which the transfer was originally issued. I hope that this system may be in operation by the first of May.

"I have been importuned by many to extend the transfer zone This is a question that must receive careful consideration. If we attempt to grant an extension on one line it becomes a question of similar treatment for all lines. I hope to be able in the near future to extend the transfer zone in several directions. But I must ask for a chance to catch my breath.

"It is of no use for you to tell me that you ought to have transfers to Broadway Six Corners. I know all about it, and I may say that I am ready to concede it. I cannot promise any extension of the transfer zone at this time, but I shall work out the problem and will give you the assurance that when it is possible to do so without entailing too great a loss of revenue to the road you will get an extension. I hope that this may be in the near future.

"It is not the purpose to make any money out of the Rhode Island Company at this time. It is simply a strategical factor in the plans of the New York, New Haven & Hartford Company. When that company develops the numerous plans that it has under consideration and under way we believe that we can liberalize the charges to passengers so as to give them such facilities as will prove the company to be a common carrier indeed.

"The cars of Providence are much over-crowded and it is something that must be cared for. Already we have taken steps to do so, and before snow flies we will have sixty new cars, each 35 feet in length and of the latest improved type, on our lines. I have received from the company the authority to expend nearly $2,500,000 in Providence and vicinity during the coming years in improvements, repairs and extension work."

THE POULSEN PLAN TRIED AT CONEY ISLAND

Plans were recently made for a test at the Culver terminal of the Brooklyn Rapid Transit Company's lines in Coney Island of the plan which Neils Poulsen, of Brooklyn, has insisted for some time would materially relieve congestion at the Manhattan terminal of the Brooklyn Bridge, and accordingly a test of the plan, slightly modified to meet the ideas of Nelson P. Lewis, chief engineer of the Board of Estimate, was made at Coney Island on Sunday morning, April 21, before the rush to the island began, in the presence of city officials, representatives of the Brooklyn Rapid Transit Company, and a number of railroad officials and experts in and about New York.

The layout of the tracks at the Culver yards is somewhat similar to that at the Brooklyn Bridge. There are five platforms for the use of passengers and four pockets into which the trains are run. The latter were numbered 1, 2, 3 and 4, and, according to the Poulsen plan, three trains would always be ready for the unloading and loading of passengers, for which one and a half minutes would be allowed. As train Number 4 enters its pocket and the last car has left the main track, train Number 3 goes out. Another train immediately runs into this vacant pocket; Number 2 then goes out and so on. The trains carried the various signs denoting the route over which they traveled and would seldom return to the same pocket from where they started.

Engineer Lewis objected to any such plan on the ground that unless each train had a specific pocket, the conditions would be made no more tangible than at present. He contended that unless passengers knew exactly from which platform they could board the train the congestion at the bridge would be more complex and the people wishing to go to Bay Ridge would find themselves on an East New York train and vice versa. Mr. Poulsen stated that any such objection could be overcome by the placing of signs at the rear of the platforms, indicating the train to leave next. Mr. Lewis still claimed his plan to be the best and it was decided to try that one first. The proceeding proved to be a slow one and twelve minutes were consumed in running the first eight trains, while the present system at the bridge allows the running of sixty trains an hour. It was then too late to try the plan originally proposed by Mr. Poulsen.

The Brooklyn Rapid Transit Company refused to discuss the test, stating that as a courtesy it had supplied the trains and crews in accordance with its policy to accept suggestions and further projects submitted which give promise of proving of value to the company and its patrons.

SITUATION AT HARRISBURG, PA.

With less than one month in which to complete its labors, and with about 500 bills yet in committee, there is much work ahead of the House of Representatives. The second and third reading calendars are large and the latter include the Reynolds bills, designed to enforce the constitutional provisions on transportation. One prohibits passes absolutely. The remaining four bills forbid the absorption of competing or parallel lines by lease or sale, with a fine of $20,000 for the offending corporation, and as much for each transgressing official; discrimination in freight or passenger rates, with a $20,000 fine for the company and $1,000 for the officers; the manufacture, mining or production by the railroads or transportation company of any commodity which is transported over its line, with $20,000 penalty, and not more than $5,000 for each officer implicated, in addition to not more than three years in jail; rebating or preference in furnishing cars or motive power, with a penalty of $2,000 for the corporation, and from $1,000 to $10,000 for the responsible officers, who may also be sentenced from one to five years. These bills will likely pass both branches.

A resolution was offered in the House last week to take from the Committee on Electric Railways a bill providing that all suburban electric cars be equipped with lavatories. The committee had the bill for some time and refused to act upon it. The resolution was laid over until Monday.

Representative Creasy charged Chairman Riebel, of the House Electric Railways Committee, with neglecting to report promptly the Mayer bill, which the committee had voted to recommend for passage. Speaker McClain, in answer to Creasy's inquiry, decided that delay was not permissible, and later in the day Riebel reported the bill, which enlarges the rights of trolley companies to cross steam lines, either at grade overhead or underground.

Members of the Legislature are receiving many letters commending their action in passing the trolley freight bill, which is expected to be of much benefit to farmers, and even the steam railroads themselves. Among the companies which propose to engage in the transportation of freight are the Shamokin & Edgewood, which will now proceed with the building of its Sunbury extension. Another line will be the proposed Perkiomen Valley Traction Company, which applied to Governor Stuart on April 22 for a charter. This company has completed its preliminary surveys and proposes to build a line 11½ miles in length through a populous rural district in Montgomery County, extending from Collegeville to Green Lane via Schwenksville and Perkiomenville. At Green Lane the line will connect with the proposed Lederachville & Pennsburg branch of the Montgomery County Rapid Transit Company, and at Collegeville with the new line of the Schuylkill Valley Traction Company.

On April 23 the Governor signed the trolley freight bill, which takes effect immediately. The house has passed finally the bill authorizing street railway companies, chartered under act 1889, to issue bonds payable at such time after date thereof as may seem best to directors.

PENNSYLVANIA TUNNEL EXTENSION INTO NEW YORK

A. J. County, assistant to third vice-president of the Pennsylvania Railroad, discussing "The Economic Necessity for the Pennsylvania Railroad Tunnel Extension Into New York City" in the Annals of The American Academy of Political and Social Science for March, says, in part:

The plans of the company, since their first inception, have been materially broadened, as the general recital of the physical features of the extension indicates, and the total cost, including real estate, will probably be not less than $90,000,000.

Summing up, the Pennsylvania Railroad Company's New York tunnel extension is a line of railroad from Newark, N. J., to Port Morris, N. Y., through the Borough of Manhattan and Queens, having for its principal purposes:

The construction of a large passenger terminal centrally located in the city of New York.

Making the Long Island Railroad an integral part of the system.

Affording the Boroughs of Brooklyn, Queens and the balance of Long Island abundant opportunities for development; and,

Binding the New England States with those of the west and south by means of the New York Connecting Railroad.

The reasons for its construction apparently were:

First—To provide for the future by enlarging the present facilities for freight and passenger traffic, because of the continuous growth in passenger and freight traffic, and to accomplish it before the cost becomes almost prohibitive, or the task impossible, because of the construction of other underground transportation lines.

Second—To run its passenger trains into a central location in the city of New York, instead of a station on the west bank of the Hudson River.

Third—To open to the people in the thickly populated borough of Manhattan, the residential sections of Long Island, and to offer to Newark and other populous towns in New Jersey direct and quick access to the resorts on Long Island beaches.

Fourth—To provide a highway for all-rail traffic to New England.

Fifth—To give the boroughs of Brooklyn and Queens, with their population of over 1,500,000, direct railroad connection to and from the New England, Southern and Western States, and to supply freight facilities with similar connections in these boroughs, thereby properly serving the entire area of Greater New York through freight stations suitably located to develop its commercial interests

Sixth—To provide additional freight facilities and shorten the water transportation trip for the New England traffic across New York harbor from about twelve miles to three and four-tenths miles.

Seventh—To make its Long Island investment remunerative within a comparatively short period.

Eighth—To obtain a proper share of the golden future by judicious expenditure in a territory having abundant promise, whether viewed from the growth of traffic in the past or the outlook for the future.

INTERBOROUGH-METROPOLITAN ORDERS CARS

The Interborough-Metropolitan Company has just placed orders for a total of 250 cars. Fifty of the cars will be of all-steel construction, and will be used in the subway. The remaining 200 cars, of which 116 will be trail cars and 84 motor cars, will be used on the elevated. The 50 subway cars are to be built by the American Car & Foundry Company. The contract for the 200 elevated cars has been divided between the St. Louis Car Company and the Wason Company, the trail contract going to the St. Louis Company and the motor car contract to the Wason Company.

It was announced early in the week that President Shonts, of the Interborough Company, would soon contract for forty all-steel cars of new design for use on the lines of the New York & Queens County Railway, one of the Belmont properties. The cars are to be 38 ft. long, and will have cross seats and seating accommodations for forty-four passengers each. The approximated cost of each car is $8,000, a total expenditure of $320,000 for rolling stock for the Belmont lines in Queens County. It was learned that the cars are to be so constructed that they may be operated in the Steinway Tunnel, which is really the primary reason for adding to the present equipment of the Queens County lines. Under the franchise granted several years ago, before August Belmont entered the metropolitan traction field, nothing was said about the operation of fireproof cars exclusively, however. The tunnel under the East River has been constructed under the franchise, the legality of which has been questioned.

NEW YORK LEGISLATURE TO END MAY 16

Plans are being laid for adjourning the New York Legislature on May 16. A number of important matters are still to be disposed of, but it is thought they will all be cared for so as to carry out the plan for adjourning which has been mentioned. The assembly committee on railroads and Speaker Wadsworth spent many hours in the latter part of last week in consideration of the Public Utilities bill, and Chairman Merritt, introducer of it on the Assembly side, expresses the opinion that within a day or two they will be ready to confer on the bill with the subcommittee of the Senate judiciary committee. It is probable that the Assembly committee will make few material changes in the measure. The real battle is expected on the Senate side. It is not impossible that the bill as passed upon the joint committee will be ready for presentation to the two houses the last of this week, but it is more likely that it will not be reported in either house before next week.

It does not seem likely that the Public Utilities bill can come before the two houses of the Legislature from the committees having the measure in charge until after May 1. The Assembly railroads committee took up the bill April 18. It will consider the bill section for section and make any amendments that may be suggested by the briefs both of friends and opponents of that measure. Its work will probably not be completed before the middle of next week. Then, according to the plan which has been adopted, the Assembly railroads committee will go over the bill again in joint session with the judiciary committee of the Senate, to which body it was referred to in the upper House.

CONTRACT LET FOR ELECTRIFICATION OF BALTIMORE & ANNAPOLIS SHORT LINE

A contract has just been closed between J. G. White & Company and the Maryland Electric Railways Company, whereby White & Company will draw plans for the electrification of the Baltimore & Annapolis Short Line and supervise the work of changing the motive power of the road. The plan of the Maryland Company for making this change has been referred to before in these columns, but the letting of the contract to White & Company is the first really significant move that has been made. The details are all to be arranged, and there is nothing of a definite nature available at this time about the plans.

The stretch of road that it is proposed to convert to electric operation is about 25 miles long and extends from Baltimore to Annapolis. The short line was recently merged with the Maryland Electric Company, in accordance with the terms of an agreement with the United Railways & Electric Company. After the consolidation the Maryland Electric Railways Company authorized an issue of $8,000,000 first mortgage 5 per cent twenty-year gold bonds to the Mercantile Trust & Deposit Company, as trustee, the proceeds of which are to be used for the purpose of acquiring by purchase, construction, etc., car houses, rolling stock, etc., in accordance with plans outlined in the Street Railway Journal, in connection with the financing of the improvements of the United Railways & Electric Company.

Early this year the company concluded an arrangement by which it secured the Bay Ridge summer resort property, situated about 4 miles from Annapolis. With this property was included the railway between Annapolis and Bay Ridge, along which traffic will be conducted as soon as the line is electrified. The property consists of about 350 acres, laid out as an up-to-date amusement resort.

It has not yet been decided where entrance will be made to Baltimore. Neither has the question of power been settled. It is stated, however, that the privilege may be taken advantage of which the United Railways Company has of securing power from the McCalls Ferry Electric Power Company.

REPORT OF THE OHIO RIVER ELECTRIC RAILWAY & POWER COMPANY

The report of the Ohio River Electric Railway & Power Company for the year ended Dec. 31, 1906, has just been made public. Compared with the previous year the report shows as follows:

	1907	1906
Motor car miles	290,557	285,633
Freight car miles	12,702	12,956
Gross receipts	$58,981	$53,196
Operating expenses	36,224	30,125
Net earnings	$22,756	$23,071
Fixed charges and taxes	17,808	17,790
Net income	$4,947	$5,280

The decrease in the net is accounted for by extraordinary expenditures extending to all parts of the service. The following figures from the report of the superintendent are given as of special importance:

PASSENGER RECEIPTS

Cash fares	$33,842.25	
Commutation tickets	12,673.75	
		$46,516.00

FREIGHT RECEIPTS

Sale of parcel tags	$1,202.95	
Delivery local H. V. Railway	463.92	
Carload freight to and from H. V. Ry.	4,345.70	
		6,012.57

MISCELLANEOUS RECEIPTS

Carrying United States mail	$148.51	
Sale of advertising privilege	200.00	
Sale of power	5,194.46	
Sale of store-room supplies	427.84	
Sale of scrap material	470.30	
		6,441.11
Total gross receipts		$58,969.68

Passengers carried in 1906	1,008,344	
Passengers carried per car mile	3.47	
Passenger car miles run	290,577	
Freight car miles made	7,737	
Locomotive miles run	4,993	
Current output for year d. c.	467,822 K. W.	
a. c.	238,410 K. W.	
Total	706,232 K. W.	
Cost of producing current at switchboard	.01.09	
Current consumed by passenger cars	397,521	K. W.
Current consumed per passenger mile	394	Watts
Current consumed per passenger car mile	1,368	
Current consumed by locomotive	22,206	K. W.
Current consumed per freight and locomotive mile	1,744	Watts
Current output, commercial lighting	181,985	K. W.
Current output, municipal lighting	56,425	K. W.
Number of hours municipal lights burned	2,638	
Average pounds coal consumed per kw-hour	12	

SUBSCRIPTIONS TO CANADA

Owing to the new postal regulations in Canada, the postage on second-class mail matter has been increased from 1 cent to 4 cents per pound. Partly to meet this increased cost the subscription price of the Street Railway Journal to Canada hereafter will be $4.50 per annum. All prepaid subscripitons will be carried to their expiration at the old rate, but all renewals and new subscriptions will be at the new rate.

TO REPORT ON PUBLIC OWNERSHIP

Chairman Melville E. Ingalls, of the Public Ownership Commission of the National Civic Federation, has called the committee of twenty-one to meet in New York on May 6 to consider the report of a sub-committee, consisting of Edward E. Bemis, Milo R. Maltbie, Walton Clark and Charles L. Edgar. The committee of twenty-one has completed its investigations both in this country and in England, and the work of the engineers, experts and accountants will form the basis of the report of the sub-committee.

RUNS ON THE ELECTRIFIED WEST SHORE

Some practice runs were made last week on the newly electrified West Shore Railway between Utica and Syracuse. The work has practically been finished to Canastota and with that place and Utica as terminals the conductors and motormen who are candidates for positions on the road are operating the cars back and forth. The first car was taken over the line by General Manager Allen, of the Utica & Mohawk Valley Railway Company, on April 9. It was No. 500, one of the fifteen recently received from the J. G. Brill Company for service between Utica and Syracuse, and is equipped with four 75-hp motors. The official opening will occur soon.

QUICKER TROLLEY SERVICE TO REVERE BEACH

The Boston Elevated Railway Company is planning an extension of its East Boston tunnel car service to Gladstone Avenue in Orient Heights. The agreement for this service is now being drawn up with the management of the Boston & Northern Street Railway Company, whose tracks are in part involved in the project. A short section of track will be laid from the Boston Elevated terminus at Orient Heights to connect with the Boston & Northern lines. The result of the arrangement will be to give tunnel passengers a quicker and more direct connection with Revere Beach, which is now one of the most popular and largely patronized beach resorts on the North Atlantic coast.

CONTRACT LET FOR CONNECTING NEW YORK BRIDGES BY SUBWAY

The New York Rapid Transit Commission has awarded the contract for the construction of the first section of the subway loop between the East River bridges to the Degnon Contracting Company. There were only two bids on the work, the other being the Cranford Company, of Brooklyn. The Degnon Company bid $2,952,000 for the tunnel construction and $83,000 extra for building pipe galleries. Six votes were required to pass the resolution awarding the contract, and Morris K. Jesup, though ill, came from his home to make up the necessary number. While he was present the plans for changing the subway and elevated stations at Third Avenue and 149th Street were also put through. George L. Rives of counsel has reported to the board that to make the changes in the subway at Ninety-Sixth Street, suggested by the chief engineer, and calculated to do away with the switches at that point, exactly the same steps would have to be taken as would be necessary in building a new line. Consents of property owners will have to be obtained, and all other formalities will have to be gone through. The matter was referred to the committee on plans.

SOME SUGGESTIONS FOR GETTING PERUVIAN TRADE

In view of the statements made elsewhere in this issue by Mr. Theodore Stebbins regarding the possibilities of South America, the suggestions made by Consul General Samuel M. Taylor, reporting to the Department of Commerce and Labor from Callao, regarding trade in Peru are especially pertinent. Mr. Taylor among other things says:

The prevailing products of the United States in this market are sewing machines, typewriting machines, cash registers, and certain classes of electrical appliances; and closely following these are agricultural implements and machinery, certain lines of children's toys, especially of the "express wagon" class, and chemicals. Other things being equal, naturally these various nationalities favor the country of their birth in their selection of goods and in recommending to customers. Assuming that we have "as good goods" the problem is to give better prices and quicker delivery; and this people needs to get goods at less price. As a people their purchasing power is very limited, yet the cost of living is from 10 to 30 per cent greater than in the United States, and 50 per cent greater than in Europe. Comparatively speaking, nothing is cheap here, except what a favorable climate makes unnecessary. Climatic conditions being so equable, mild, and dry, make certain articles of wearing apparel, as rain coats, heavy topcoats, overshoes and umbrellas unnecessary, except in the mountainous districts; and certain articles of domestic economy, as coal and other fuel, stoves and grates, for heating purposes, are likewise unnecessary. But for the rest there is no escape from the increased cost.

With practically no manufacturing competition at home the people are dependent on foreign-made goods and products of nearly every kind. Except on implements for agricultural and mining purposes, typewriting machines, and a few other favored articles there is an average tariff duty of 45 per cent. The cost of an article, then, to the consumer is the price of it when it left the country or origin plus transportation, plus handling, plus 45 per cent tariff (the consumer in this case, for want of home competition, pays all the duty), plus profit, usually large, plus breakage of 10 per cent, plus commission charges. This foreign trade is handled largely through commission merchants, who, having established their connections, are not particularly interested in exploiting the goods of new aspirants for this market.

Quick sales and small profits is not a maxim that animates the retail trade here to any great extent. On the contrary, one sale and three profits is preferred. The effect of this policy is greatly to retard consumption. Some American manufacturers in established lines are forestalling this practice by fixing the price, usually the United States price, which the retailer must not exceed, and they do their own advertising, where mention is made of the retail price. I think it safe to say that were retail prices more reasonable there would be from one-third to one-half more goods consumed here. The tariff is credited with the high prices, but in many instances the tariff is a subterfuge, as a little figuring shows profits of 100 to 125 per cent over and above all expenses. Again, when prices are not fixed by the manufacturer, there is an asking price and a final selling price, and the price obtained ranges all along between.

Here, so far at least as the native population is concerned, the foreign manufacturer is given a free hand. There are no prejudices against the products of his factories. There is no feeling that the goods he may bring here will supplant home industries and home labor. He is welcomed, first, for what he is and then for what he represents. He may enable the people to obtain goods at less price hence he is a benefactor, a visitor that helps. Again, after distances have been more or less eliminated by superior shipping facilities, two essentials remain to be considered. This trade is not here for the mere asking, and those firms in the United States who think they can build up a demand by simply letting the people here know by letters and pamphlets that they have certain things to sell are about certain to meet with disappointment. On the other hand, those firms in the United States that have had the courage and pluck to send competent salesmen here, with a thorough knowledge of their business and able to explain it in the Spanish language, are getting good returns on their investments.

When the goods have been sold, a most important matter is the packing. If firms are not prepared to pack their goods to stand the roughest kind of treatment, or if they feel they can not assume the additional expense that such packing entails, they had better not attempt to send the goods at all.

MANUAL ON INSULATING VARNISHES AND COMPOUNDS

The Sherwin-Williams Company, of Cleveland, has recently issued a manual on its Ajax insulating varnishes and compounds, which goes considerably further than the catalog usually published by manufacturers. It is, in fact, practically a treatise on insulating compounds, their application and the proper methods of testing for faults. The book, which is bound in board covers, states in the introduction that three years ago the manufacturers decided there was a great opportunity to improve electrical insulation through higher quality and better adapted varnishes and compounds than then existed. For this reason they established a laboratory and placed it in charge of an expert with complete authority to conduct all tests necessary to determine the electrical efficiency of the products of the company. The catalogue then describes in detail the various Sherwin-Williams insulating varnishes and compounds, including the different baking and air-drying varnishes and impregnating compounds which have become well known through the trade name of Ajax. Each is for a different purpose, and for each minute directions are given for securing the best results. The compounds are designed especially for use with the vacuum drying and impregnating process of treating electrical coils, whether used in transformers with a cooling bath of oil or under ordinary conditions. The subject of baking ovens is then considered in detail. The pamphlet describes their proper construction, and illustrations are given of the proper methods of securing heat distribution, good ventilation and conveniences for handling the work. This chapter is followed by some hints on proper baking. Following this section is one on dipping tanks, with hints on dipping coils and armatures and instructions as to the proper method of securing correct specific gravity. An illustration is given of a typical dipping tank and japanning machine with convenient devices for holding the armature, etc.

The latter part of the book is devoted to insulation tests. The reader is instructed as to satisfactory methods of testing insulation, of making aging, moisture proof, oil proof, penetrating and acid tests, and of determining baking, cementing and sticking qualities and the ability of the insulating materials to conduct and radiate heat. The book concludes with a useful description of a single high-potential transformer testing set, and other devices for testing coils. The experience of the Sherwin-Williams Company in the manufacture of paints and varnishes has been so extensive that a brochure issued by the company on this subject cannot but be very instructive.

STREET RAILWAY PATENTS

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

UNITED STATES PATENTS ISSUED APRIL 9, 1907

849,393. Car Replacer; Charles H. Hess, Steamboat Rock, Iowa. App. filed Dec. 21, 1906. An inclined rail provided with a bottom flange tapered at one end, and a shoe adapted to rest on the track-rail, said shoe having depending flanges, flared at one end, and a raised portion at the top, tapered at one end, to abut against one end of the inclined rail, and carry the car-wheel flange diagonally across the track rail.

849,432. Electric Locomotive; Elmer A. Sperry, Cleveland, O. App. filed Nov. 26, 1902. An electric track rail locomotive which may also be used by the ordinary adhesion to the rails. Novel means for mounting the gears.

849,457. Trolley Controller; Willis C. Burdon, Louisville, Ky. App. filed Jan. 27, 1906. A rack is vertically mounted at the rear of the car and a heavy block slidably mounted thereon engages the teeth of the rack when abruptly moved upward. Has connection with the trolley pole to lock the same in case it leaves the wire.

849,503. Trolley Pole; Quinto Saudelli, Fall River, Mass. App. filed Jan. 23, 1906. The trolley wheel is mounted on a support of the toggle lever or lazy tong type, having parallel motion links which give the wheel an absolutely vertical spring impelled movement above the center of the car.

849,460. Safety Signaling Device for Railway Switches; Prosper Cloutier, Three Rivers, Quebec, Canada. Provides a locking device which locks the switch in its closed position, the arrangement being such that the act of raising the semaphore unlocks the switch, and the act of closing the switch unlocks the semaphore.

849,515. Roller Side Bearing for Railway Cars; Frederick B. Townsend, Chicago, Ill. App. filed Dec. 29, 1906. Details.

849,550. Air Brake Mechanism; Charles G. Lundholm, Otis, Cal. App. filed July 16, 1906. Relates to that class of brakes in which the braking power is determined by the load on the car and consists of a brake-cylinder for controlling the brake-lever, a lifting mechanism independent of and disconnected from the brake mechanism and valve mechanism for controlling said lifting mechanism.

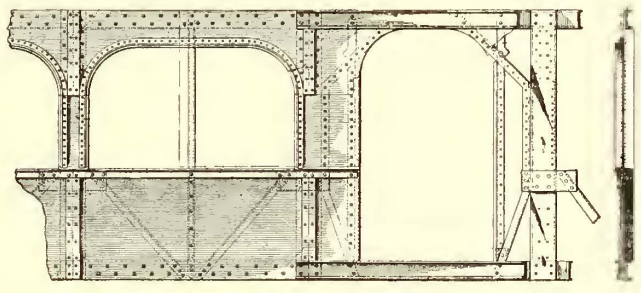
849,596. Seat End; Edward G. Budd, Philadelphia, Pa. App. filed July 18, 1906. Details of construction.

849,657. Rail connection for Car Seats and the Like; Edward G. Budd, Philadelphia, Pa. App. filed April 26, 1905. Means for supporting a sill or rail of angular cross-section at either end thereof.

849,703. Electric Railway; Samuel B. Stewart, Jr., Schenectady, N. Y. App. filed April 29, 1901. A novel construction of contact shoe for protected third rails. Relates to the spring support of the shoe.

849,791. Railway Tie; Louis Blessing, Jackson, Mich. App. filed Dec. 17, 1906. Two reinforced concrete blocks, one for each rail, rigidly connected by metallic bars.

849,722. Brake Shoe; Charles W. Booth, Milwaukee, Wis. App. filed June 19, 1905. Comprises an integral body portion and attaching-lug of cast metal and a tie-plate secured to the



PATENT NO. 849,826

back thereof, comprising a skeleton portion which extends upwardly and is embedded in the attaching-lug, said skeleton comprising lateral webs and a transverse web which connects the lateral webs outside of the keynote in the attaching-lug, forming a hole or opening in alinement with the keyway in the attaching-lug.

849,749. Controller for Electrically Propelled Vehicles; John S. Raworth, Streatham, England. App. filed Jan. 25, 1906. Designed to make changes from motors in series to motors in parallel and vice versa, and answer the standard conditions imposed in dealing with the heavy currents of this class of apparatus.

849,773. Third-Rail Protecting Mechanism for Electric Railroads; Hamlet Corrigan, Pittston, Pa. App. filed May 3, 1906. The third rail is surrounded by a protecting tube, the cover of which is slidably displaced during the passage of the train, so as to expose the rail for contact.

849,798. Composition Railroad Tie; Joseph Le Favour and Robert F. Brammer, Albany, Ind. App. filed Nov. 5, 1906. A composite tie equipped with a plate having a central upstanding portion provided with interiorly screw-threaded end tubular portions, and a screw bolt engaging a tubular portion and effective to engage the rail base or flange.

849,826. Passenger Car Construction; Francis McFarlan Brinckerhoff, New York, N. Y. App. filed Dec. 14, 1906. Details of construction of a trussed side wall.

849,828. Car Construction; Francis McFarlan Brinckerhoff, New York, N. Y. App. filed Dec. 14, 1906. The platform end sill is so constructed that it provides for the support of a radial draw-bar without the usual sector-bar construction.

849,838. Motor Driven Truck; Archibald H. Ehle, Philadelphia, Pa. App. filed Oct. 16, 1906. A trailer truck coupled to the truck frame, has a gas engine mounted thereon, and means for transmitting the power to the main truck wheels.

849,871. Trolley; Richard W. Walker, Topeka, Kan. App.

filed Oct. 15, 1906. A pair of inwardly impelled spring fingers mounted on the trolley harp and which close over the wire in use, but which can be displaced to form guides when the wheel is being positioned on the wire.

849,970. Amusement Device; Paul Boyton, St. Louis, Mo. App. filed Aug. 27, 1904. Details of a "shoot-the-chutes" apparatus, whereby space is economized and the operation facilitated.

849,994. Acute Angle Crossing for Electric Railways; Edward E. Gilmore, Philadelphia, Pa. App. filed Sept. 27, 1905. An overhead crossing for electric trolley systems comprising a body and end runners pivotally secured thereto and adapted to hold the trolley wire on the body.

850,117. Electric Railway; William B. Potter, Schenectady, N. Y. App. filed Sept. 24, 1902. Relates to electric railways of the type having normally de-energized sections which are connected with the feeder successively as the car proceeds. Provides means by which the switches are actuated by a local battery circuit on the car which is also used for the auxiliary motors, the lighting and heating.

PERSONAL MENTION

MR. C. N. JELLIFFE, formerly auditor of the American Light & Traction Company, has been elected secretary of the company to succeed Mr. James Lawrence, who in turn succeeds Mr. Jelliffe as auditor.

MR. ALVA REYNOLDS, formerly roadmaster of the Hoosac Valley Street Railway at North Adams, and Delaware & Hudson Railroad, has taken a similar position with the Pittsfield Street Railway Company.

MR. ROBERT DUNBAR, superintendent of the Haverhill and Salem divisions of the New Hampshire Electric Railway Company, has resigned from the company to develop as a model farm a large tract of land which he has purchased near Salem.

MR. IRVIN J. BROWER, president of the Montgomery & Chester Trolley Company, of Phœnixville, Va., died April 18 from an attack of pneumonia, aged 60 years. He was a native of Phœnixville, and prominently identified with many of the business enterprises of this section.

MR. T. I. PEACOCK, in charge of the new business department of the Sedalia Light & Traction Company, of Sedalia, Mo., has tendered his resignation to assume charge of the new business department of the Menominee & Marionette Light & Traction Company, at Menominee, Mich.

MR. DE WITT C. McMONAGLE has been appointed general manager of the Wallkill Transit Company, of Middletown, N. Y. Mr. McMonagle, who is about sixty-five years old, has been a resident of Middletown practically all his life and has been identified with various local enterprises in that city. For twenty years he was senior member of the wholesale drug firm of McMonagle & Rogers. When he retired from the company he became manager of the Consumer's Light & Power Company and remained with the company until it was sold to the Orange County Lighting Company. Mr. McMonagle is vice-president of the First National Bank, and also is treasurer of the Orange County Telephone Company.

MR. A. R. WHALEY, superintendent of the New York division of the New Haven Railroad, is to enter the employ of the New York Central on May 1. He will become general manager of the New York Central terminal and general superintendent of the electric zone, to succeed Mr. Ira McCormack. Mr. Whaley began his railroad career as freight brakeman of the Providence & Worcester Railroad and worked his way up. For two and a half years he has had charge of the New York division of the New Haven system, with headquarters in the Grand Central Station. For the New York Central he is to be the directing head of one of the most difficult of positions. Every train, whether propelled by steam or electricity, running in and out at the Grand Central Station will be subject to his orders. Mr. Whaley is 45 years old and has been in railroading for twenty-seven years.

MR. R. E. DANFORTH, who was recently appointed general manager of the Public Service Corporation of New Jersey, at the suggestion of President Horace E. Andrews, of Cleveland, and Vice-Presidents William K. Vanderbilt, Jr., and John Stanley, will not formally relinquish his duties at Rochester on May 1, but will continue for a time to divide his time between the Rochester and the New Jersey properties until the details of the operation at Rochester are thoroughly familiar to Mr. Wilcoxen and Mr. Stanley, who eventually will divide between them in a manner still to be decided the responsibility of managing the property. Mr. Andrews will probably spend part of each week in Rochester, just as he now spends a portion of his time in Syracuse.

MR. F. J. DOYLE has been appointed master mechanic of the Schenectady Railway Company, of Schenectady, N. Y., to succeed Mr. L. L. Smith, whose resignation from the company to become master mechanic of the Chicago & Milwaukee Electric Railway was noted in the Street Railway Journal for April 13. Mr. Smith was born in Buffalo, N. Y., in which city he was educated. In 1894 he located in Schenectady and entered the employ of the General Electric Company, with which he served in the armature department, railway motor test laboratory and on the experimental third rail line at the company's works. In 1901, after seven years general experience, covering the branches mentioned, Mr. Doyle became connected with the Schenectady Railway Company. He served here successively as instructor of motormen, barn foreman and general foreman of operating barns and repair shops.

MR. THOMAS A. CROSS, who, as noted in the Street Railway Journal for April 20, was elected general manager of the United Railways & Electric Company, of Baltimore, Md., to succeed Mr. William A. House, is a native of Baltimore and has been connected with the street railway companies in that city since a young man. His first work was with the North Avenue Electric Railway Company, whose service he entered in 1890. Later this company became the Lake Roland Elevated Railway Company and Mr. Cross was advanced until in 1893 he was selected by the Baltimore Traction Company to take charge of its overhead work, motor equipment and power stations. When this company was consolidated with the City & Suburban Company in the name of the Consolidated Electric Railway Company, Mr. Cross' duties were still further increased, and in 1899, when all the lines were merged in the United Railways & Electric Company, Mr. Cross was formally elected to the position of superintendent of overhead work, cables, etc.

MR. E. J. WILCOXEN, superintendent of transportation of the Rochester Railway Company, has been appointed general superintendent of the company, filling the vacancy caused by the resignation of Mr. D. F. Carter, which took effect Jan. 1. Mr. Wilcoxen was born April 27, 1871, at Seneca Falls. On leaving school he entered the car service department of the Buffalo, Rochester & Pittsburg Railroad in 1888, locating at Bradford. He moved to Buffalo to become secretary to the assistant manager of the Wagner Palace Car Company. This place he relinquished to become assistant superintendent of the State reservation at Niagara. After leaving the employ of the State, Mr. Wilcoxen returned to railroading, becoming general passenger agent of the Geneva & Cayuga Lake Railroad. After serving the road for some time Mr. Wilcoxen came to Rochester to superintend the construction of the Rochester & Sodus Bay Railroad, and on completing this work accepted the place of general freight agent. Later he became general superintendent.

COL. ALEXANDER R. PIPER has been appointed general freight agent of the Brooklyn Rapid Transit Company, in addition to his duties as superintendent of the American Railway Traffic Company, which is identified with the B. R. T. interests. Col. Piper was born at Staten Island in 1865, and was graduated from the U. S. Military Academy in 1889. He was appointed second lieutenant in the infantry, and later promoted to first lieutenant. In 1896 he was promoted to be captain and commissary of volunteers and assigned to the first corps. In May, 1898, he was made captain of infantry, from which post he retired July 31, 1899. Col. Piper participated in the Sioux campaign of 1890 and 1891, and in the Spanish War. Upon his retirement from the army, Col. Piper became general manager, secretary and treasurer of the Seamless Metalware Company, of Ossining, N. Y., with which he remained until it was absorbed by the American Can Company. Later he became superintendent of final disposition in the department of street cleaning of New York, under Commissioner Woodbury, and subsequently was appointed by Mayor Low as second deputy police commissioner, in which position he remained during Mr. Low's administration. His appointment as superintendent of the American Railway Traffic Company dated from March 20, 1904.