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RULE-OF-THUMB VS. RATIONAL METHODS

As the electric railway business becomes more highly developed from the technical standpoint the methods used in solving problems naturally tend to become more rational or systematic. This fact has been increasingly evident in the articles published in the Electric Railway Journal from time to time, especially when comparison is made of the practices over an interval of several years. It is illustrated this week particularly in the article by J. R. Brown which appears in the "Equipment and Its Maintenance" section of this paper. The question as to the effect of the welding process on the rail head is answered by appeal to analysis. In the present case this consists in sectioning a rail to which a bond has been welded, and in bringing out the characteristic structure of the steel by etching, from which its properties can be determined with some measure of exactness. Supplementing this, hardness tests are made with simple apparatus. As such methods become more popular progress will be more rapid, for the results of a proposed improvement can be predicted at a nominal cost without waiting for the test of time. With the increasing difficulty of making a fair profit from electric railway operation accurate testing must take the place of "cut and try."

EVIDENCE OF REAL PUBLIC JUSTICE

Waiving its right under the franchise agreement to limit rates to a stipulated figure, the authorities of a certain town voluntarily assented to a 30 per cent increase in order to permit successful operation of a private utility. This sounds Utopian, but it actually happened recently in connection with the gas company in West Seneca, N. Y. Some pessimists may assert that selfishness was the leading motive of the town, for the utility easily showed that the franchise provision in question had been for years inimical to its prosperity and with rising costs would mean its dissolution. We wish, however, that there were more of such selfishness. It has been too little recognized that a utility and its customers have a mutual interest in the business and that good service must be properly compensated if the utility is to prove attractive to investors and beneficial to the public. Some day the public will more fully understand that unreasonable demands in regard to service and rates ultimately mean loss and inconvenience to themselves as well as to the utility. The rights of the utility to income and benefits must be conserved fully as much as the rights of the public to rates and service. The two points of view are not antagonistic; they are mutually dependent, even if not always so recognized by the public.

CAN ELECTRICAL MACHINERY RUN HOTTER?

The discussion on safe working temperatures for electrical apparatus, which occupied the New York meeting of the A. I. E. E. this month, treated of a subject of the most vital character. Some surprising information was given out, but, thanks to the existence of a great store of practical knowledge of insulation matters, the statement that electric generators had been operating for many years at temperatures frequently above 250 deg. C. in the "hot spots" was received calmly. Insulation of Class B in the A. I. E. E. code was the center of interest. Manufacturers believe that this will safely withstand a higher temperature than that now permitted, without special guarantee by the manufacturer, under the A. I. E. E. rules. The users of machines are conservative as they want to be sure of long life of their equipment. The general tendency, however, is toward more liberal temperature rise allowance. The New York discussion suggests a number of significant facts. First is the influence that the A. I. E. E. rules have in guiding electrical practice. Again, temperature rise limitations for machines insulated with refractory materials have in the past been quite conservative. A third point is that the hotter generators and motors can be operated the cheaper they are in first cost. The relation of maintenance and first costs must determine the limits of economical temperature rise. Unfortunately, the resistance of electric conductors increases with the temperature, so that the same current produces heat faster in a hot machine. This may prove to be a controlling factor.

WEIGH L. C. L. FREIGHT AT POINT OF ORIGIN

Although electric interurban railroads have been careful to render their patrons the full measure of service in connection with freight traffic, they have, in some instances, been exceedingly lax in safeguarding their own interests. This applies particularly to checking the weight of all less-than-carload freight shipments. The extent of the losses due to negligence in this particular may vary from a few cents to several dollars on a single shipment. Aside from the possibility of a gain in revenue, the process of checking the weight of a shipment also serves as a check on its condition and the number of packages contained and also frequently reveals illegible marking which would delay or make impossible prompt delivery. In case a claim is filed subsequently, information of this nature is invaluable. Weighing and checking at the point of origin will also eliminate the cause of many claims and increase the number of satisfied patrons. If relief from the former is obtained the

traffic department may devote more of its energies to obtaining new business and less to the most undesirable and unsatisfactory phase of the freight-handling business. As a general proposition the way station agent is not a busy man, so that insistence on weighing and checking at this point does not work a hardship. At terminals or heavy shipping points such a requirement might increase the burden, but the savings effected would warrant employing additional help. As we see it, therefore, insistence upon weighing at the point of origin is a panacea for many freight-department ills.

LOCOMOTIVE MILEAGE AND ELECTRIFICATION

The electrification of 440 miles of the Chicago, Milwaukee & St. Paul Railroad is by no means interesting only because of the immensity of the project, nor is its importance measured alone by the radical nature of the forward step that has been taken by its sponsors. As it stands, the installation will go further than any of its predecessors toward providing a definite answer to one of the most important but mooted questions of the electrical operation of steam railroads, namely, that of the influence on cost of operation of the large mileages of which electric locomotives are capable.

Heretofore everyone of the electrifications that has been undertaken in this country has covered much too short a route mileage to escape the handicap of the terminal detentions which are invited every time an engine arrives at the end of its run, even though it may be perfectly ready to continue in revenue service at the head of a train. On the St. Paul, however, no such condition will obtain, and as pointed out in these columns when the project was first agitated, electrification will permit each locomotive to take its train over the whole 440 miles of route, setting out bad-order or local cars as are required at the various stations and changing crews in accordance with their physical limitations. Obviously this provides an opportunity to increase locomotive mileage to an extent that is unparalleled in previous railroad practice. With the short divisions of, say, 150 miles that are necessary for steam operation, the time lost at the division points and chargeable only to the terminal delay may actually constitute more than half of the time spent between terminals in revenue service, but with the division points eliminated, practically all of the time thus wasted may be utilized by the locomotives in hauling trains. The vastly increased locomotive mileage thus possible may, and probably will, go far to offset the effect of the lesser traffic density which has been cited from time to time as a reason for believing that the St. Paul installation will not equal the record of 20 per cent return on the investment that has been made on the Butte, Anaconda & Pacific electrification in the same territory.

Traffic density is, no doubt, essential in a large degree for the profitable substitution of electricity for steam as a motive power. But the underlying reason for this advantage is, in the end, nothing more than the fact that it is necessary to make frequent and regular use of the costly contact and transmission system in order to earn interest charges and profit upon the investment. Exactly the same reasoning applies to the electric locomotives, which constitute from one-half to one-third of the total investment in the ordinary electrification project. If the locomotives are not utilized to their fullest extent, or, in other words, if they do not make the maximum revenue mileage of which they are capable, they become just as much of a financial handicap as an expensive contact system that is used by only one or two trains daily. For example, the St. Paul locomotives comprise roughly 40 per cent of the entire investment for electrification, and if the annual mileage per locomotive now expected should be cut in half for some unforeseen reason, the installation would have to carry 40 per cent more interest on account of the necessity for double the number of locomotives, to say nothing of the increased cost of maintenance per mile that invariably follows reduced mileage. Such an increase in interest would offset the major part of the net earnings, but, on the other hand, if the annual mileage per locomotive now expected should be doubled, the interest on the installation would be reduced 20 per cent as soon as a place could be made for the surplus locomotives, and this would be the equivalent of a corresponding increase in profit.

Pending the results of actual operation it is, of course, impossible to say what the St. Paul locomotives will accomplish in the way of yearly revenue-miles, although as outlined above there is every reason to believe that it will be very high. The main point is that this electrification will at last give an opportunity to show what can be done along these lines by electric units, and when the results are known it is quite possible that the ensuing economies will be sufficient to make hesitation in trunk-line electrification seem like criminal negligence.

EFFICIENCY IN EXPORT

For a country which has made such rapid progress in technical matters it is sometimes surprising that the United States has not done more in a scientific development of its export trade. We have the goods, the men to make them, and the money to exploit them, but our export methods have always been characterized by a *laissez faire* policy which has left our manufacturers far behind in the competitive race with the manufacturers of other countries. This policy has affected the small manufacturing companies much more than the large ones. The latter could afford to have their own representatives abroad to develop the field, arrange for bills of exchange, and, if necessary, help to finance the purchase of their products. The result has been, for example, that representatives from the fleet of the Standard Oil Company are seen in practically every important harbor in the world. But with the small manufacturer it has been an entirely different matter. He could not conduct the complicated business of export trade from his home office, which might be perhaps far from the seaboard. As one small manufacturer testified recently before the Federal Trade

Commission: "We have had an exasperating experience with port duties, consular fees, fines for improper wording of bills of lading, improper boxing, and improper net and gross weights, cubic contents and dimensions. For a small concern, business in South America as well as the Orient is an utter impossibility."

The present war in Europe and the change which it has effected in world business conditions, however, have forced a change in our policies in the matter of our business relations with foreign countries. A large part of the world outside of the belligerent countries is looking to us for assistance in the development of its enterprises. The usual channels for the receipt of manufactured and raw materials which these countries absolutely need have been interrupted, and they need money or credit for the development of enterprises already begun. This demand seems bound to continue even after the war is over, because during the reconstruction period in Europe, the manufacturers there will have all that they can do for a long time to come to repair the waste of war. Hence, the general inquiry now being conducted into foreign trade conditions by the Federal Trade Commission and the recent announcement of the formation under the auspices of the National City Bank of a large company to develop the foreign trade of the United States, possesses the greatest significance. It is hoped that through the agency of these two movements a large part of the handicap under which the American manufacturer has labored in seeking foreign business through his lack of training, knowledge and experience in this class of business will be overcome.

It is an especially interesting and significant fact that the board of directors of the American International Corporation, whose organization with a capital stock of $50,000,000 was announced on Nov. 23, contains the names of a number of men who have been prominent in electrical development in this country. This makes the organization of this company of peculiar interest to manufacturers of electrical apparatus as well as to those who have been interested financially in electrical undertakings in this country and are ready to invest in sound enterprises abroad of a similar character. Tramway undertakings in South America and the Orient have been a favorite form of investment for many years by Belgian, British and German capitalists, but practically no money has gone from this country into enterprises of this kind. This has been due to several causes, one of which has been a lack of knowledge on the part of investors in this country as to the character of these investments and another has been a lack of means by which investments could easily be made in them. Nevertheless, the conditions under which these companies operate are in many respects much more favorable than those governing similar enterprises in this country. With the attention which is now being given to the development of foreign trade and foreign enterprises, it is not too much to expect that the various manufacturers and investors who have built up successful electrical undertakings here will be able to extend their enterprise to countries which need undertakings of this kind much more at present than our own country.

AVOIDING INACCURACIES IN STEEL CAR BUILDING

Errors in small details of construction occasionally produce more serious consequences with steel than with wooden cars. In building wooden cars a mistake in measurement can often be rectified without disfigurement or without incurring practical objections by the insertion of a small wooden filler. With steel construction, however, this picture-puzzle method is impossible. Exact dimensions are particularly essential in the construction of parts of steel cars exposed to the weather. For example, special ventilators may be easily and snugly attached to the roofs of wooden cars by the use of screws, whereas in steel cars where riveted or bolted construction is used, if the ventilator fit is imperfect serious leakage of rain water or melting snow may occur. In a recent case, the builders of a number of new steel cars for a well-known railway neglected to furnish the necessary insulating gasket between steel sheets where the ventilators were attached. In addition, they carelessly sheared off too large a portion of the inner ventilating duct and thus caused such a poor ventilator fit that after the car was placed in operation rain leaked in at that point and ruined the interior paneling.

One railway company which discovered that a certain shipment of cars delivered to it did not conform strictly to specifications insured satisfactory results on the following car delivery by warning the car builder in advance that it would dismantle one of the cars when delivered; that if the railway company then should discover any hidden errors in measurements of design, method of assembly or quality of material used, it would immediately refuse acceptance of all the other cars. Although the above admonition was quite successful in that case in bringing the car builder to terms, to dismantle a car would, of course, involve much unnecessary labor and expense. Cannot such trouble be forestalled in a milder way by the exertion of a little more circumspection all around? The car builder for the sake of his own reputation should study close adherence not only to the specifications furnished by the railway and specialty manufacturer, but also to requirements of good car-building practice not expressly "written in the bond," and should endeavor to avoid inaccuracies of workmanship. The manufacturer of special apparatus should be sure to give explicit directions on his blueprints for installing his equipment so as to render absolutely intelligible such details which may not be self-evident from the appearance of the drawing alone. The railway company, in its turn, would be more likely to reap fuller satisfaction from its rolling-stock by sending a competent inspector to the car-builder's plant during the period of car construction, providing the company can financially afford such inspector and the number of cars ordered is sufficiently large to warrant his employment. Observance of the above suggestions should result greatly to the advantage of all three parties concerned.

Electrical and Mechanical Details of the Bay State Car

Outside-Hung, Nose-Suspension Motors and a New Form of Control Are Used, and a Description of These Features Is Published Together with Details of the Body Construction— A Detailed Table of Weights Is Appended

In the Electric Railway Journal of Oct. 23, 1915, was published a general description of the new convertible car of the Bay State Street Railway, which is characterized by many features of striking originality. The motors, control and air-brake equipment of the car also embody numerous points of interest and these are outlined in the following paragraphs together with a description of the semi-steel body construction.

Motors

Four General Electric motors of the design known as GE-247-C are provided. These are similar in general internal design to those used on the low-wheeled cars in New York City and Pittsburgh, having internal ventilation to reduce the weight for a given capacity. They are the first in the country, however, to be designed for outside-hung nose suspension. Each motor has a rating of 35 hp. on 600 volts and 30 hp. on 500 volts, according to the manufacturer's standard of 75 deg. C. rise by thermometer on any part of the windings after one hour's run on the stand with all the covers off.

The frame is of the box type, and the weight of the motor without gear and pinion is 1685 lb. or with gear and pinion, 1941 lb. The motor design includes commutating field coils and the usual modern features that are found in standard practice of the General Electric Company.

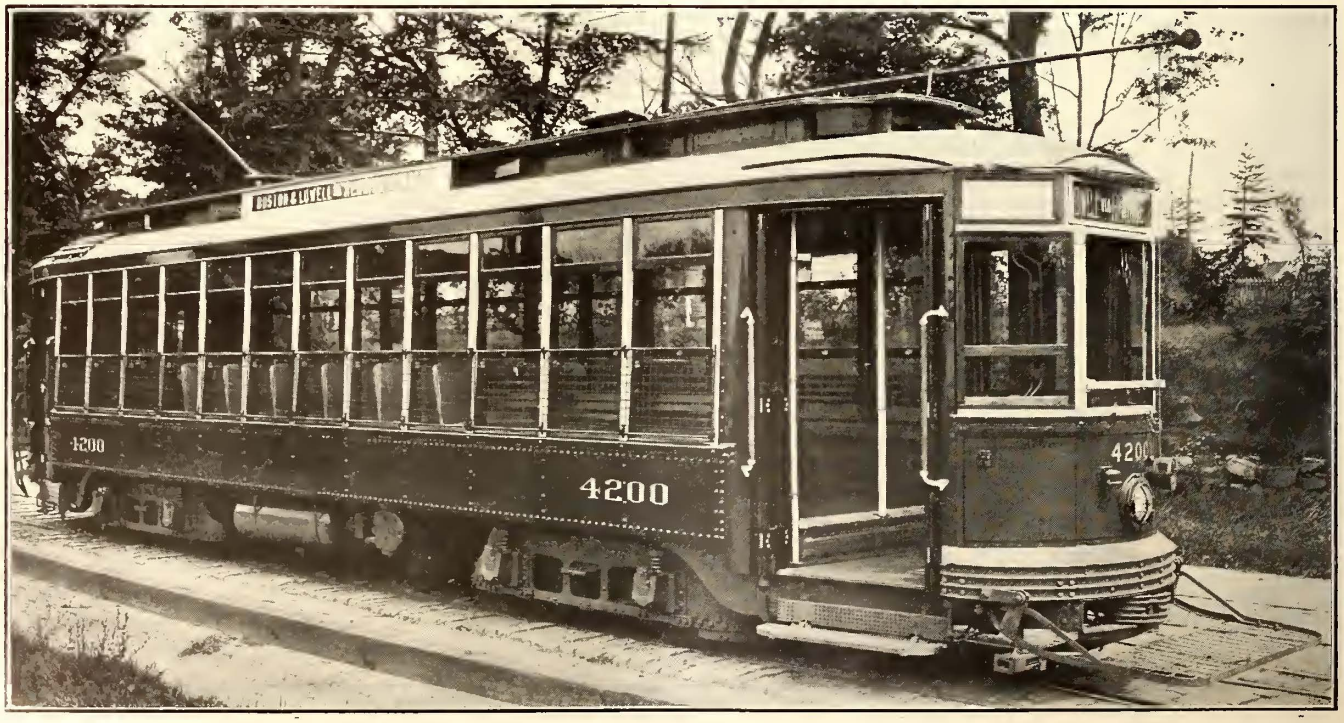
The nose, which is designed for spring suspension of the motor, is cast integral with the magnet frame, but instead of being located in the center of length it is at the center of weight of the motor. The motor is mounted so that the nose comes on the center line of the truck, giving a larger clearance than usual between the gear case and the wheel and adding space for the brake hanger. The gear ratio used on the new car is 20:58, at which a maximum speed of 35 m.p.h. is attained on a level track at 600 volts. The length of the motor over all along the shaft is 41⅜ in., and the depth from the center line of axle to the bottom of the gear case is 11 3/16 in., giving 3 13/16-in. clearance above the rail on a 30-in. wheel. The motor is also adapted to a gear ratio of 15:63 for purely city service. The use of the nose suspension for outside hanging instead of the ordinary bar and bracket suspension cuts 100 lb. per truck from the weight of the complete car, and there is a minimum of strain on the axle bearings, as in ordinary practice with three-point suspension. Under the motor shell the clearance above the rail is 4 9/16 in.

Trucks

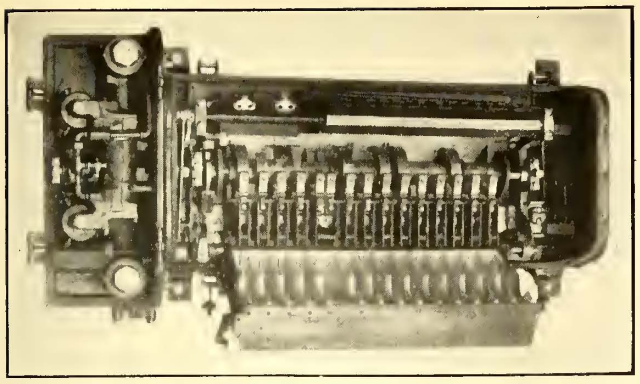
The trucks are the Bay State Street Railway 12-B type, and except in minor details they are similar to the company's 12-A truck, which was designed by the equipment department of the railway and fully described in the Electric Railway Journal of Oct. 5, 1912. In front of each truck is a pilot board consisting of ¼-in. x 4-in. steel, bent to shape as shown in the accompanying illustration and bolted to lugs attached to the truck frame.

Brakes

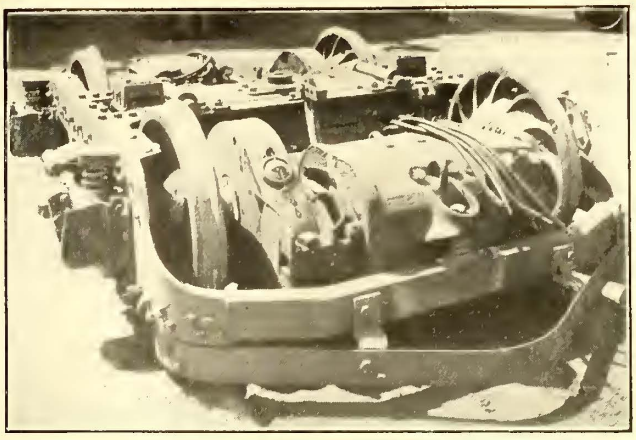
Both hand and air brakes are provided, the former being of the Peacock type, with a specially designed hand wheel for vestibule service which fits closely into the vestibule but allows ample space for manipulation. The hand-brake lever is divided into two independent



BAY STATE CAR EQUIPMENT— GENERAL VIEW OF CAR



BAY STATE CAR EQUIPMENT—ELECTRO-PNEUMATIC CONTROLLER



BAY STATE CAR EQUIPMENT—TRUCK FULLY ASSEMBLED

sections which work on each side of the fulcrum. This arrangement keeps the chain taut on the side connected with the end away from the point of application, and facilitates free movement of trucks, motors and other rigging which might otherwise be hampered by slack chain. Pulleys are used beneath the car floor to facilitate free movement of chains.

Straight air-brake equipment with an emergency feature has been installed on the car. This equipment was recently developed by the General Electric Company to meet the requirements. Under these conditions the straight air brake with emergency feature possesses the advantage of securing the maximum brake-cylinder pressure in the minimum time in emergency, thereby shortening the distance required to bring the car to a stop, and adding materially to the safety features of the equipment.

The emergency feature consists of a valve which on maximum application opens a passage directly from the main reservoir to the brake cylinder. A CP-27-B compressor, with a Spencer air purifier is used, this being suspended directly by lugs bolted to the framing, thus eliminating the usual cradle. The main reservoir is 16 in. x 60 in., and there is also a control reservoir 10 in. x 30 in. which provides the air supply for the operation of the doors, and control mechanism. By adding the necessary hose and couplings two-car trains can be operated with all the protection of the automatic air brake and without in any way dispensing with the simplicity, reliability and ease of manipulation of standard straight air-brake equipment.

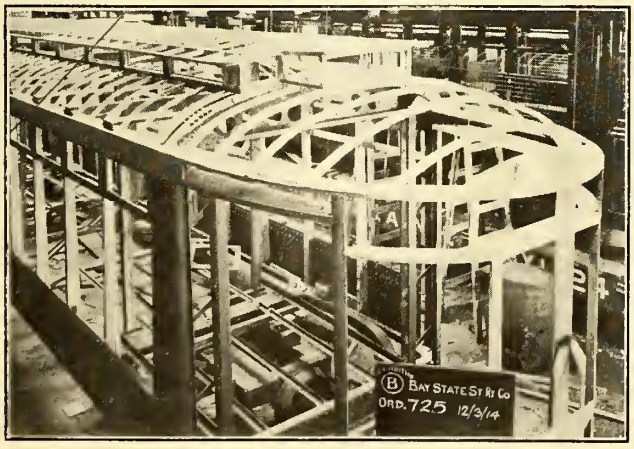
CONTROL EQUIPMENT

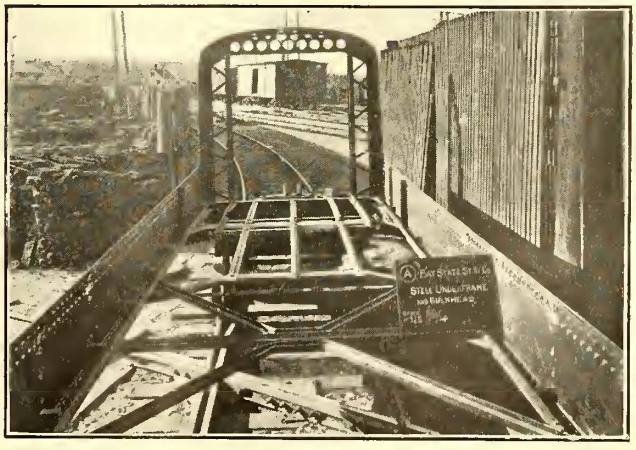
The control apparatus is virtually a General Electric K-35 control cylinder development with balanced air-operated head, pneumatically operated reverser and electromagnetic line breaker. The apparatus provides the features of permitting the use of a small controller on the platform; the installation of all motor current-breaking equipment under the car where any arcing is invisible to the passenger; the use of contactors instead of the controller, to break the main current; the elimination of one piece of main current-carrying apparatus on a double-ended equipment, with resulting simplicity of wiring; the protection obtained by the use of apparatus having a definite time limit for notching up to full parallel position and multiple-unit operation.

The contactors, with an overload relay, are inclosed in a sheet metal box. The overload relay functions to interrupt the control circuit of the equipment if the line current of the car exceeds the value for which the relay is set. Having once tripped and dropped out the line breaker, the relay locks itself open and must be reset before the line breaker can be reclosed. This relay is reset electrically by the control switch in the motorman's cab.

BODY FRAMING

Owing to the low steps and large side window opening to be provided for, a side girder construction of unusual design was used. With the height of floor from top of rail but 34 in. to 36 in. and the height from floor to top of window stool 16¾ in., the side girders had to be extended below the floor 6 in. to provide a pocket deep enough to take the interchangeable window sashes. This gave a 22¾-in. side girder, consisting of a 22-in. x 3/16-in. steel plate to which a pressed member at the top and bottom was riveted. The latter member forms a pocket with a bent up flange for floor support; the top member forms the window stool. Inside the hollow

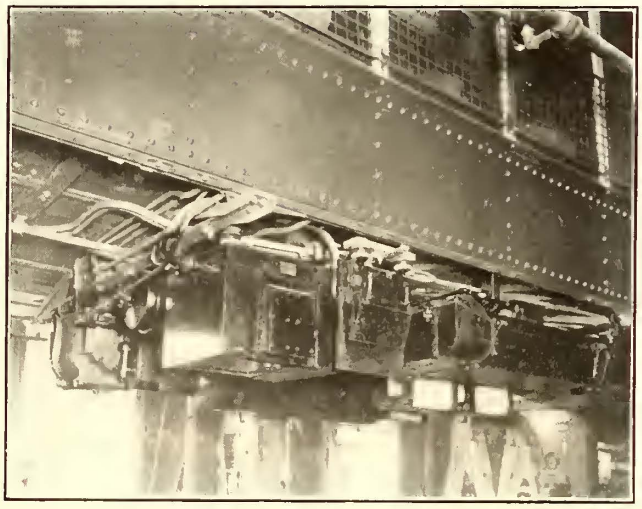




BAY STATE CAR EQUIPMENT—CONSTRUCTION VIEWS SHOWING ROOF AND FLOOR FRAMING

stool an extra stiffener in shape of a 2-in. tire channel is riveted to the plate. The intermediate posts are fastened to the side girders with 4½-in. bolts spaced equal distances apart from center of window stool and down, and fitted into special castings, riveted to the girder at the lower edge of the window stool and in the pocket. At the bolsters this casting runs the whole height of the girder, and the bolster posts are braced with an angle iron bracket from the top flange of the bolster. In place of the usual truss planks, light steel pressings in the form of square pans are placed between the posts, the side flanges of the pans being tied together through the posts forming a continuous truss. The bottom flange is tied in with the inner flange on the girder pocket, and the top flange, finished off, is used as a seat support. These pans are lined with insulating material and hold the heaters and, in addition to the castings at the window stool, they insure proper spacing of the intermediate posts.

The bolsters are of cast steel; the top and bottom flanges are widened to 12 in. at the ends, and fastened with turned machine bolts between two extra wide gussets riveted to the bottom and the inner flange of the girder pocket. These gussets follow the girder to



BAY STATE CAR EQUIPMENT—VIEW OF UNDERSIDE OF CAR

about 20 in. in front of the bolster, where it receives the extended platform supports which again are tied in at the body corner with the end sill, side girder and corner post with a bracket-shaped steel pressing and a gusset plate extended downwards lapping the side of the platform support. The latter is also suspended from the end sill with a U-shaped angle-iron stirrup, whose ends are flattened and bolted horizontally against the end sill, bent over and bolted vertically to the corner gusset to insure proper clamping of the supports. The end sills consist of a 10-in. x 3/16-in. steel plate and two angle-iron stiffeners riveted to the inner edge of the sill at the top, where it receives the body floor supports and the extended threshold plate, and on the outer edge at the bottom where it is tied to the platform supports and receives the platform floor furrings.

The platform supports are channel-shaped ¼-in. steel pressings, 10½ in. deep at the end sill and tapered off to 6 in. at the ends, where they are tied together on top and bottom with steel plates edged with angle iron. In the center between these plates the draft rigging, a combination drawhead and spring-cushioned bumper of special design, are carried. The crown piece and the floor are also bolted to the top flange of the platform supports and diagonal cross-braces run from the body corners to the platform support, where they are tied in through the web of the latter with pressed-steel brackets supporting the vestibule corner posts and the upward extended anti-climber bumper, which had to be kept a certain height from the rail to insure interlocking in case of colliding with other cars with higher platforms. The bumper is also braced between the platform supports with triangular-shaped steel pressings, tied to the top gusset plate.

The center construction of the bottom framing is made up of two needle beams and diagonal braces tied together at the side members with pressed steel gussets, and in the center of the car the braces are tied in with a channel-iron center beam by a liberal-sized gusset in such a manner as to give the maximum of clearance for brake rigging, pipes and wire conduits carried above the equipment between the needle beams. The latter are constructed as queen-post trusses, reinforced at the top with a floor furring tied to the side member gussets. This lends stability to the side members and is especially adapted for floor support and to resist the load of the equipment which is suspended between the two needle beams.

Floor support over the motors and wheels is made up of three light T-shaped steel pressings, strung from needle beam to end sill and tied to the top flange of the bolster and bridged across with angle irons, backed with floor furrings. On each side of the bolster an additional T-bar extends from the end sill back beyond the bolster the full length of the longitudinal seat framing, the latter being integral with the floor supports. This construction gives practically a flush floor over the motors and wheels, the floor being laid in between and parallel to the web of the T-shaped pressings. The matting consists of strips of ⅞-in. maple, carried above the floor instead of flush with it, facilitating cleanliness and solidity of floor construction.

Bulkheads were constructed with unusually large openings and disappearing bulkhead doors, the doors being designed to operate in pairs, with one leaf sliding at double the speed of the other. The door pocket is narrower than the longitudinal seat alongside, thus offering no hindrance whatever to the movement of the passengers, whether in ingress or egress. The skeleton construction of the bulkheads consists of a ⅛-in. pressed-steel cornerpost reinforced with a 3/16-in. pressed angle riveted to the side girder and laced up with the door post, a light steel pressing, with 1½-in. x ⅛-in. bars and tied across overhead with a pressed-steel pan shaped to suit the curvature of the roof. This pan with the skeleton frame on the outer edge of the corner posts, consisting of pressed-steel flanged angles, forms the usual pocket for the door hanger, the latter being a ball-bearing hanger of special design.

The side posts are 1½-in. x 4-in. ash, with separate sash runs and facing cap glued and screwed on. The upper sash, which is stationary, is built and runs continuous from corner post to corner post, the rails being halved in with the intermediate posts under the facing. This stiffens the construction as much as would a letterboard 19 in. wide while the actual letterboard is only 6½ in. wide.

There are eleven steel carlines 1½ in. x ¼ in. extending from side to side in one piece tied to the monitor and body roof rafters and bolted down to the side of the body plates.

Agasote headlinings are used and the finish is natural cherry.

The trolley base support is constructed as a short bridge, bolted securely to the rafters and steel carlines, instead of the usual trolley planks.

Appendix—Detail Weights of Bay State Passenger Car, 1915 Type

	Number Per Car	Weight Per Car, Lbs.
ELECTRICAL EQUIPMENT		
Galvanized-iron conduit	..	250.8
Fittings and straps	..	75
B.J.343 junction box and brackets	4	92
B.J.348 control connection box	1	26.5
B.J.348 control hanger and bolts	..	6
Main trolley Motor cable Resistance cable Light wire Air wire Heater wire Buzzer wire Arc-light wire Control wire	..	252.5
Wire furrings	..	40
Wire moldings	..	48
M.S. 8 switch	2	36
M.S. 14 switch	2	9
M.S. 12 switch	..	5
M.S. 46 switch	4	20
Roof fuse complete	2	23
Line breaker	1	188
Line-breaker hangers	..	9
Resistance box	3	239
Resistance-box hangers	..	41
Porcelain insulators	18	54
Lightning arrester	1	35
Kicking-coil core	1	8.5
M.A. 13 fuse box	1	13.5
M.S. 13 fuse-box suspension	..	5
P. C. motor controller	1	510
P.C. motor-controller brackets	..	55
Master controller	2	180
Master-controller brackets	..	7
Incandescent headlight	2	21
Incandescent-headlight switch	2	3
Arc headlight	1	12
Arc-headlight resistance	1	10
Arc-headlight dasher plugs	2	6
Arc-headlight switch and condulets	2	10
Arc-headlight brackets	2	10
Lamps	..	2
Lamp sockets and shade holders	..	29
Spare lamps and sockets	..	1
Trolley stand support	2	27
Trolley stand	2	260
Trolley pole with harp and wheel	2	60
Trolley-pole hook and anchor	2	5
Trolley-rope guard	2	10
Trolley catchers	2	25
Trolley catchers safety hook	2	2
Cloth and rubber tape	..	5.5
Circular loom	..	15
Brass cleats	..	2
Solder	..	5
Sign-light sockets	2	1
		2,740.3
Trucks	2	12,060
Motors	4	6,746
Gear, pinion and axle collar (4 of each)	..	1,236
AIR-BRAKE EQUIPMENT		
Galvanized-iron pipes	..	148
Galvanized-iron pipe fittings	..	50
Galvanized-iron pipe hangers	..	12
Air compressor	..	618.5
Air-compressor hangers	..	8
Air reservoir	1	109
Air-reservoir hangers	..	10
Air-reservoir auxiliary	1	34
Air-reservoir auxiliary hangers	..	7
Brake cylinder	1	160
Brake-cylinder hangers and bolts	..	27
Brake-cylinder levers	2	52
Brake-cylinder tie-rod	1	23
Brake-cylinder lever steel pins	12	13
Brake-cylinder lever carrier	..	34
Brake-cylinder lever wearing strips	..	10
Truck-brake rod	2	77
Air governor	1	34
Air-governor bracket	..	5
Emergency valve	1	19
Emergency valve suspension	..	10
Reducing valve and strainer	1	2.5
Motorman's valve with one handle	2	25.5
Motorman's-valve bracket	..	5
Safety valve	1	5
Oil strainer	1	11.5
Drain cocks	2	2
Shut-off cocks	3	3
Whistle	2	10
Whistle valve	2	4
Muffler	2	10
Pressure gages	2	6
Strainer	1	4
		1,549
Buzzer system	..	18.5
HEATERS		
Heaters complete	24	356.5
Heater furrings	52	41
Heater switch	1	16
Heater switch, magnetic	1	38.5
		452

	Number Per Car	Weight Per Car, Lbs.
HAND BRAKE		
Hand-brake staff with pawl, ratchet, bushing and plate	2	34
Hand-brake gear box (complete)	2	53
Hand-brake wheel	2	18
Gear-box brackct	4	15
Geared hand brake	2	77
Hand-brake rods	2	48
Sway bar with chains, hangers, bolts and pins	..	154
Sway-bar guides with bolts	2	13
Hand-brake chain guides	2	40
		452
SANDERS		
Sand-box hoppers	2	20
Sand storage	2	30
Sand-box fixtures and spouts	2	60.3
		110.3
FENDERS		
Fenders	2	113
Fender hinges	4	36
Fender springs	8	6
Fender-spring holders and plates	4	8
Fender bolts	20	5
Fender hooks	2	1
		169
DRAFT RIGGING		
Drawbars and shackles (emergency)	2	148
Drawbar hangers and bolts	..	30
Draw bumper, complete	2	261
		439
FARE BOXES		
Fare box	2	68
Fare-box stanchions	2	48
Fare-box balance spring-case and brackets	2	50
Fare-box brackets	2	32
		198
FARE REGISTERS		
Registers (cash and transfer)	2	34
Register-cord hangers	7	13.5
Register-cord sheaves and brackets	2	8
Register cords	..	2
		57.5
SIGNAL BELLS		
Signal bell	2	5
Signal-bell bushings	4	5
Signal-bell cords	..	2.5
Signal-bell hooks and anchors	5	5.5
		18
SIGNS		
Illuminated side sign—destination (complete with compartment)	2	77
Illuminated end sign—destination (complete with compartment)	2	106
Illuminated end sign—special (complete with compartment)	4	35
Advertising signs	2	2
Smoking sign	1	1
Board of health sign	1	1
Regulation sign frame	1	1.3
Flyer hooks	2	.2
Door signs	4	2
Dasher sign bracket	4	12
		237.5
MISCELLANEOUS EQUIPMENT		
Flag racks	2	1.5
Spare lamp and fuse box	2	1
Register-card case	2	.5
Vestibule equipment channel	2	21
Motorman's seat with brackets	1	20
Motorman's gong	2	18.5
Motorman's step	6	4.5
Roof grab handle	2	5
Roof matting	2	14
King pin	2	37.3
King pin covers	2	2
		125.3
SEATS		
Cross-seats, complete	12	831
Longitudinal seat:		
Cushions	4	180
Cushion holders	4	3.8
Cushion guides	1	1.8
Cushion hinges	3	1.7
Cushion butts	9	2.7
Furring	..	10
Panels	4	104
Frame filler	4	60
Frame cover strip	4	9
Front angle	4	33
Legs	12	25
Leg battens	12	15
Leg shims	12	2
Frame clips	12	12
Frame clips	12	5
Back slats	16	18.5
Back slats furrings	16	4
		487.5

	Number Per Car	Weight Per Car, Lbs.
Vestibule side door:		
Seats	4	28
Brace	4	9.5
Adjuster	4	13
Keepers	4	.8
Hooks	4	7
		58.3
CURTAINS		
Body curtains	24	115.3
Body-curtain brackets	..	3
Body-curtain guides	48	6
Vestibule curtains	6	25.5
Vestibule-curtain fixtures	16	4
		153.8
DOOR OPERATING DEVICES		
Pneumatic door engine for vestibule doors	4	859
Air strainers	2	1.8
Vestibule door operating shaft	4	100
Vestibule door operating coupling	8	3
Vestibule door operating collars	16	1
Vestibule door operating handles	20	4.2
Vestibule door operating handles	8	4
Bulkhead-door track and hangers	2	125
		1,098
DOOR TRIMMINGS		
B.H. door threshold extension	4	30
B.H. door threshold	2	155
B.H. door threshold—center bracket	2	10
B.H. door guides	16	10
B.H. door chafe	4	3
B.H. door striker	4	20
B.H. door flush grab	4	3.8
B.H. door plates	4	.5
B.H. door hooks	4	4.5
B.H. door flush lock	2	6.5
B.H. door catch	2	.3
B.H. door weather strips	4	6
B.H. door stops	2	2
Vestibule door chafe	16	16
Vestibule door rubber retaining strips	4	9
Vestibule door rubber holders	4	4
Vestibule door track filler	20	4.8
		285.4
WINDOW TRIMMINGS		
Vestibule sash lifts	8	.2
Vestibule sash springs	12	.4
Vestibule sash strikes	12	1
Vestibule sash adjusters	4	2.5
Deck sash pivots	8	.1
Deck sash openers	6	5
Deck sash butts	16	1
Body sash chafes	96	4.2
Body sash stops in sash	96	5
Body sash stops on posts	48	2
Body sash gravity catch	24	5
Body sash lifts	48	2
Body sash eccentric catch	96	9
		37.4
FRAMING STEEL		
Body underframe		
Side plates	2	812
Side sills	2	524
Side stools	2	218
Side stools reinforcement	2	131
Body bolsters	2	900
Body-bolster gussets (top)	4	76
Body-bolster gussets (bottom)	4	66
End sill plate	2	108
End sill angle (top)	2	43
Gussets (side and end sills)	4	34
End sill angle (bottom)	2	32
Gussets, tee and end sills	14	47
Fillers, tee and end sills	..	12
Floor tee	16	218
Trap angle	4	58
Needle beam (top member)	2	97
Needle beam (bottom member)	2	60
Spool	4	12
Center beam	1	44
Center diagonal braces	2	84
Brace	2	11
Clips	4	5
		3592
VESTIBULE PLATFORM FRAME		
Platform knee	4	532
Platform-knee hangers	4	96
Platform-knee hangers clip	4	12
Platform-knee stiffener	4	12
Platform-knee filler	4	20
Bumper and platform-knee brace	4	76
Bumper and platform-knee angle	8	14
Bumper stiffener	8	16
Bumper top plate	2	50
Bumper bottom plate	2	50
Bumper bottom-plate stiffener	2	22
Bumper anti-climber	2	176
Platform cross-ties	4	66
Platform cross-tie clips	4	5
		1147
BODY AND ROOF FRAME		
Corner-post finish	4	164
Corner-post angle	4	76
Bulkhead angle	4	50
Bulkhead angle	4	38
Bulkhead angle	4	48
Bulkhead lattice	28	21
Bulkhead gusset	4	20
Bulkhead gusset	4	6
End belt	2	60
End-belt angle	2	15
End-belt angle	2	11
End-belt clips	10	8
Carlines	11	93.5
Truss plank	8	75
Truss plank	16	100
Side finish (interior)	16	28
Sash pocket cover	24	48
Sash guides	40	24
Bolster-post brace	4	20
Bolster-post stiffener	4	30
Side-post pocket casting	22	40
Side-post clips	18	4.5
Side-stool space	20	13
Truss spacer	4	10
Body plate and corner post connection	12	5
Inside door post clip	4	1.5
Monitor extension tie-rod	4	1.5
Body-plate anchor bolts	4	4.5
Body-plate anchor clips	4	2
Gusset at bulkhead door post	4	5
		1022.5
VESTIBULE FRAME AND HOOD		
Dashers	2	96
Bumper shield	2	24
Vestibule corner post cover	4	53
Vestibule front post batten	4	42
Vestibule side sash top angle	4	3
Vestibule stool clips	6	5
Vestibule sash clips	6	6
Vestibule panel guides	4	8
Vestibule bead at letterboard	4	24
Vestibule post to window header clip	4	4
Vestibule side sash, upper window stool	4	7
Hood carlines	2	15
Hood carlines	2	21
		308
FRAMING WOOD—BODY		
Body plate	2	155
Monitor frame	2	177
Eaves rails	10	14
Letterboard	2	56
Side post	22	209
Side post	4	36
Body-sill furring	12	55
End-sill furring	2	23
Floor furring	..	125
Floor matting	..	100
Floor-sweeping strips	..	2.5
Body floor	..	693
Body roof	..	253
Upper deck rafters	37	65
Lower deck rafters	70	52
Truss plank	16	15
Trapdoor	4	120
Post covers	26	39
Letterboard sash frame	2	66
Letterboard sash beads	..	1.5
Body sash	48	117
Body-sash guides	48	34
Body-sash beads	..	6
Monitor sash	32	17
Monitor-sash beads	..	.5
Sign-box header	2	40
Card molding	12	10
Curtain molding	2	20
Monitor-sill molding	..	27
Monitor-plate molding	..	21
End carlines	4	20
Monitor extension	..	53
Letterboard batten	..	39
Lamp furrings	..	20
Parting beads	..	4
Bulkhead board (outside)	..	11
Bulkhead door stiles, rails and panels	..	72
Bulkhead finish and molding	..	60
End belt	2	10
Monitor ventilator frames	..	4
Monitor sill casings	2	17
		2859.5
VESTIBULE		
Hood rafters	..	34
Hood roofing	..	30
Hood furrings	..	33.5
Hood sills	4	50
Vestibule corner post	4	55
Vestibule front post	8	17
Vestibule center stool	2	5
Vestibule center gurt	2	2
Vestibule center frame	4	10
Vestibule side stool	4	9
Vestibule side gurt	4	4
Vestibule side frame	8	10
Vestibule door header	4	40
Vestibule door header	4	8
Vestibule door-header furrings	4	8
Vestibule sash	6	19
Vestibule sash stops	4	6
Vestibule panels	4	22
Vestibule panel Agasote	4	36
Vestibule bands	..	30
Vestibule door stiles, rails and panels	..	147.5
Vestibule sign box sill (center)	2	2
Vestibule sign box sill (side)	4	3
Vestibule upper side sash	4	6.3
Water sheds	6	8
		595.3

	Number Per Car	Weight Per Car, Lbs.
Platform timber	2	110
Platform braces	4	27
Platform floor	..	115
Platform steps	4	46
Platform bumper furring	..	22
Platform furrings	..	4
		324
GLASS		
Side-sash glass	48	126
Letterboard sash glass	24	63.5
Side-monitor sash glass	20	20
End-monitor sash glass	6	4.5
Extension monitor sash glass	6	6
Vestibule sash glass	16	77
Vestibule door glass	24	50
Bulkhead door glass	16	44
		391
MISCELLANEOUS BODY DETAILS		
Upper deck ceiling	4	125
Lower deck ceiling	6	140
Roof canvas	..	66
Roof canvas molding	..	21
Carline covers	22	4.5
Monitor corners	4	1.3
Upper deck roof corners	12	8
Step risers	4	16
Step-riser clips	4	1
Ends for vestibule heaters	4	3
Bulkhead panels (Agasote)	12	25
Vestibule door butts and pins	..	6
Side-pocket cover, pivot sockets	48	2
Strap poles	4	64
Straps	36	17.5
Pole and door operating shaft bracket	24	12
Safety tread	8	40
Vestibule grab handles	8	16
Vestibule grab handle brackets	16	7.5
Agasote for vestibule heater	4	12
Asbestos for vestibule heater	4	3.5
Enameled pipe stanchions in vestibule	4	61
Pipe-stanchion sockets	4	1.7
Pipe-stanchion bracket	4	.5
Pipe-stanchion bracket	4	4.5
Switch panels	6	40
Switch-panel braces	..	3
Motorman's inclosure (complete)	2	87.5
Motorman and conductor's box under longitudinal seat	2	16
Trap lifts	4	2
Bands for jack box	..	6
Bolster side-bearing plate	4	40
Side window screens (outside)	8	116
Side window screens chafe, bracket, and holder	..	6.5
		976

SUMMARY OF WEIGHTS—BAY STATE CAR NO. 4200

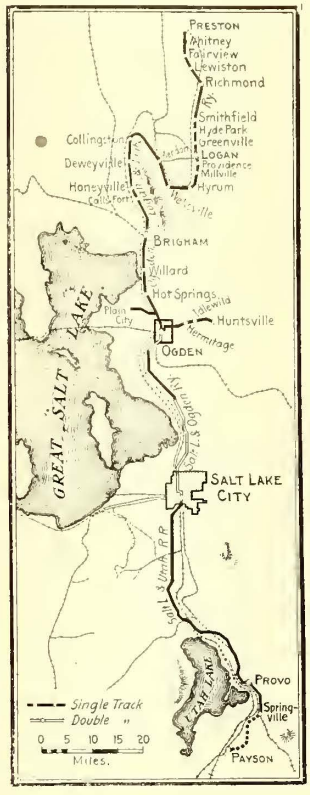
	Lb.
Electrical equipment	2,740.3
Trucks (2)	12,060
Motors (4)	6,746
Gear, pinion, axle collars (4 each)	1,236
Air-brake equipment	1,549
Buzzer system	18.5
Heaters	452
Hand brake	452
Sanders	110.3
Fenders	169
Draft rigging	439
Fare registers	57.5
Fare boxes	198
Signal bells	18
Signs	237.5
Miscellaneous equipment	125.3
Seats	1,376.8
Curtains	153.8
Door-operating devices	1,098
Door trimmings	285.4
Window trimmings	37.4
Body, bare: Framing—steel 6,069.5; Framing—wood 3,778.8; Miscellaneous body details 976; Bolts, nuts, rivets, screws, etc. 441; Paint stock 90; Glass 391	11,746.3
	41,304
Motorman's seat and two emergency drawbars	165
	41,138.8
Car (as weighed)	41,120
Deduct sand weighed with car	150
	40,960

Safety zones have been marked off for three blocks on both the near and far sides of crossings on Main Street in Joplin, Mo. The zones are 60 ft. long, and 7½ ft. wide from the outside rail, and are painted on the pavement in white. Traffic will be allowed to pass these zones at all times, while the previous rule requiring traffic to stop 10 ft. behind a standing street car will be observed elsewhere.

A 1500-Volt Interstate Interurban Railway

Opening of the Brigham-Wellsville Section of the Ogden, Logan & Idaho Railway Marks Completion of Important Interurban Project

The completion of the last link in the system of the Ogden, Logan & Idaho Railway between Brigham and Wellsville, and the inauguration of through service between Ogden, Utah, and Preston, Idaho, was celebrated on Oct. 27, as noted previously in the ELECTRIC RAILWAY JOURNAL. The closing of this gap makes it possible for a passenger to travel by electric railway from Springville, Utah, to Preston, a distance of 186 miles. The trip is over three independent systems, but it is expected that in time through trains will be run.



O., L. & I. RAILWAY AND CONNECTING LINES

The interurban lines pass through the center of the richest portions of Utah and serve 80 per cent of its population. They parallel for the greater part of their route the steam railway lines serving the same territory. On the north the Ogden, Logan & Idaho Railway runs between Ogden, Utah and Preston, Idaho, a distance of 96 miles. It passes through the northern end of Salt Lake valley, noted for its apples and peaches, and through the southern end of Cache valley, known as the granary of Utah. Its tracks are on private right-of-way throughout most of the route.

The Salt Lake & Ogden Railway operates between the two cities from which it takes its name, the largest two cities of the State, a distance of 36 miles. It serves the fertile territory lying between the Great Salt Lake and the Wasatch range of mountains, the richest and most intensively developed farming section of the State. This line has been completed since 1908, and has been operated by electricity since 1910. Considerably more than half of the line is now double tracked and work is progressing on the remainder.

The company operates out of Salt Lake City from a temporary joint depot with the Salt Lake & Utah Railroad. The two companies now have under way negotiations for a site for a joint terminal depot, and as soon as these can be settled and the necessary rights-of-way secured work will be started on an adequate terminal station.

The Salt Lake & Utah Railroad, the southern end of the interurban chain through Utah, operates between Springville and Salt Lake City, a distance of 54 miles. A 6-mile extension to Payson, which is to be the southern terminus of the line, is under construction. This line was first opened under electric operation on July 24, 1914, between Salt Lake and Provo, a distance of 48.5 miles. The line traverses a rich agricultural section in Salt Lake County lying west of the Jordan River which has not hitherto had convenient transportation facilities.

The new line has been designed for high-speed, heavy

service. The track is on private right-of-way, this right-of-way averaging 65 ft. in width. Seventy-pound rails and catenary overhead construction have been used throughout. New passenger, freight and express depots have been constructed in practically every town along the line.

The company secures its power from the Utah Power & Light Company's system, consisting of hydro-electric plants with an aggregate capacity of 75,000 kva. and a 20,000-kva. steam auxiliary. This power is transmitted at 44,000 volts to one portable and three permanent substations. Each permanent substation contains one Westinghouse 500-kw. three-bearing motor-generator set, each set consisting of a 1500-volt, compound-wound commutating-pole d.c. generator and a 2300-volt, three-phase, 60-cycle synchronous motor, with exciter. Each of the three transformers of a set has a capacity of 235 kva., and in the bank both primary and secondary windings are connected in delta with taps provided for obtaining reduced voltage at starting. The particular capacity and arrangement of the transformers were selected with a view to operation in open delta in case of damage to one of the three units.

Several new all-steel triple-compartment interurban cars were placed in service on the Logan division of the line before the Brigham-Wellsville line was completed. The new cars, which were built by the

50-TON LOCOMOTIVE IN SERVICE ON O., L. & I. RAILWAY

American Car Company, are 62 ft. in length over all, and have a seating capacity of seventy-five passengers. The electrical equipment on the cars consists of four Westinghouse 334-E-6, 750-1500-volt motors, each with a nominal rating of 85 kw. On the higher voltage the motors are operated in series so that there is a potential of but 750 volts across each motor. They are geared for a free running speed of from 47 to 50 m.p.h. on the level, with an average of 1350 volts on the trolley.

The unit switch control apparatus is of the HL type, differing from the standard outfit in the provision of unusually great creepage distances, exceptionally powerful blow-out coils and additional switches connected in series to break the arc.

The air-brake equipment consists of Westinghouse AMM combination straight and automatic air-brake apparatus with M-24-A brake valve. A continuously-running dynamotor furnishes 750 volts for the control and lighting circuits and the air compressor. This compressor is connected mechanically to the dynamotor by means of a multiple-disk clutch, which is normally held by a spring in a closed position. Whenever the air pressure reaches a predetermined value, the governor admits air to a small cylinder, disconnecting the clutch and stopping the compressor, but allowing the dynamotor to continue running.

The lighting equipment for the cars consists of two circuits of seven 56-watt tungsten lamps with Alba shades. Headlights and heaters operate direct on the 1500-volt circuit.

To accommodate the local traffic in the city of Logan, the present four-motor, double-truck, forty-passenger cars have been changed over to operate with straight 1500-volt equipment. Each car is equipped with two Westinghouse 543-A-6, 750-1500-volt motors, connected permanently in series and controlled by R-200 double-end equipment.

Three 50-ton Baldwin-Westinghouse locomotives are used for hauling freight. In these the equalized pedestal construction was employed, permitting the use of simply-designed trucks, with half-elliptic springs and rigid bolsters.

The four motors on this locomotive are type 562-A-6, rated at 75 kw. They are built for forced ventilation, but also have fans on the armature shafts of capacity sufficient for operation at three-quarters load with the blower out of commission.

The present electric interurban system has been accomplished by such men as Simon Bamberger, for many years president of the Salt Lake & Ogden Railroad; the late David Eccles, former president of the Ogden, Logan & Idaho Railway, and his successor, M. S. Browning, and W. C. Orem, president of the Salt Lake & Utah Railroad. P. D. Kline of Ogden, Utah, general manager of the Ogden, Logan & Idaho Railway, formerly had charge of the building of the Salt Lake & Ogden interurban lines from Ogden to Salt Lake, and since that time he has had entire charge of the construction of the new interurban lines of the Logan division of the Ogden, Logan & Idaho Railway and has been responsible for the operation of all the lines of the latter company.

Miami to Open Storage-Battery Line

The Miami (Fla.) Traction Company will begin street railway service with four storage-battery cars early in December, adding trailers as the increase of business may demand. An article describing some features of the road, particularly the rolling stock, was printed in the Oct. 30, 1915, issue of the Electric Railway Journal, page 920. The following additional facts have since been received from the company. With the exception of an unsuccessful attempt to furnish such service, made about eight years ago with one car, this is Miami's first electric railway. Up to the present time bicycles and automobiles have been largely used on account of the smooth, hard-surface roads which are characteristic of the city and vicinity. The road will comprise about 3½ miles of track laid with 105-lb. grooved rail in the business section and 80-lb. T-rail elsewhere. The railway will traverse the principal streets of the city and, beginning at the corner of Waddell Street and Avenue C in the northern section, in a thickly-settled residential neighborhood, it will run south on Avenue C, parallel with Biscayne Bay to Twelfth Street, the center of the tourist hotel district. Thence the route will lie along Twelfth Street, the principal business thoroughfare, across the Miami River into Riverside, a residential section, through Lawrence Estate to the baseball park. The Boston National League will make this park its winter training ground for the next five years. The terminus of the line is at Sixth Street, just beyond the ball park in the northwestern section of the city, where the carhouse and power house are located.

C. E. R. A. Meeting on November 19

A Joint Folder with Maps and Time-Tables Will Be Issued—There Was an Interesting Discussion on Automatic Substations and the Transportation of Package Freight—Abstracts of Two Papers and the Report on Standard Interchange Rules Follow

Friday's session of the Central Electric Railway Association's two-day meeting at Indianapolis, Ind., held on Nov. 18 and 19, was attended by more than 100 members, and the interest and lively discussions of the first session continued.

E. B. Peck, vice-president Terre Haute, Indianapolis & Eastern Traction Company and chairman of the joint folder committee, submitted the report of that committee. He said that the committee had been at work for more than two years endeavoring to bring the time-tables and maps of all member companies into one folder. For various reasons a number of the companies at first were opposed to this plan, but lately there had been a change of opinion. Active and progressive work and the immediate issuance of a joint folder were now possible. The committee recommended that the folder be issued monthly and that it show all lines and time-tables. As to the demand for the folder, Mr. Peck said that requests had come from all parts of the country for such information. From another standpoint he said the association had taken the lead in many things and should continue so doing by publishing the joint folder. It would induce interline and long-distance travel, and thus afford a means of increasing revenue. Concerning the possibilities of interline travel, he called the association's attention to that at the Indianapolis terminal. One railway company transferred 2714 passengers to two other railways during the month of August. This same road transferred 2272 passengers in September. This, he said, was evidence of the demand for interline travel and the necessity for promulgating information concerning the facilities for transfer at all junction points. To bring about the prompt issuance of a folder, Mr. Peck asked the association for an indorsement of the plan of the committee.

President Henry emphasized the importance of the work of the joint folder committee. At first the committee had met strong opposition, then there was a difference of opinion, and now practically all the railways in the association territory wanted the folder. He said that while the economy feature was attractive, it was the smallest advantage to be secured from the issuance of a joint folder. The advertising of the service, which in turn should induce long-distance passenger travel, was the greatest value of such a folder.

John Benham, International Register Company; F. R. Dunbar, Union Traction Company of Indiana, and S. B. Hutchins, Westinghouse Airbrake Company, also indorsed the recommendation of this committee. Each believed that a joint folder would stimulate traffic. Mr. Dunbar also suggested that this folder should advertise the interchangeable mileage now used by the member companies. At the close of the discussion a motion by E. F. Schneider, Cleveland, Southwestern & Columbus Railway, that the president appoint a committee of five to arrange for and supervise the publication of a joint time-table folder and give the committee full power to act, was unanimously adopted.

At this point W. A. Carson, Evansville Railways, moved that a committee be appointed to take up with experts the matter of general advertising with a view of evolving a plan which the association could adopt. He said he had in mind an advertising campaign such as was being used by the telephone companies, banks and electric appliance companies. If the electric interurban lines were kept before the public, Mr. Carson believed that this would serve as a passenger traffic accelerator. He was of the opinion that such an advertising campaign should be handled by a central committee to reduce the cost. Prepared advertisements and cuts could be used in the local newspapers and on cars. Acting upon this motion, which was approved by the association, the president appointed as members of the committee, W. A. Carson, chairman; A. D. B. Van Zandt, Detroit United Railway; J. H. Drew, Drew Electric & Manufacturing Company; C. J. Laney, Cleveland, Southwestern & Columbus Railway, and R. A. Crume, Dayton & Troy Electric Railway.

Automatic Substations

Edward Taylor, engineer General Electric Company, then read his paper on "Automatic Substations." In this paper Mr. Taylor defined an automatic substation as one which is operated entirely by the requirements of the system supplied. He pointed out that the determination of the necessity for starting a rotary converter, and the manipulations necessary in starting it, do not require the factor of human judgment. While there are abnormal conditions which arise quickly, each has a physical manifestation which can be utilized in operating suitable relays.

He showed how, under certain circumstances, considerable energy and labor saving can be produced by this type of substation, referring in this connection to the article by C. M. Davis which was abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 9, page 772. Mr. Taylor estimated that in some cases an automatic substation will pay for itself in about two years, and that a 300-kw. substation may show a yearly saving of $4,700 after so doing.

In order to make the paper concrete the author discussed the equipment of the Union substation of the Elgin & Belvidere Electric Railway, which was described in detail in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 18, 1915, page 583. In this substation an important feature is the load-limiting resistance which is automatically inserted to prevent excessive overload. He said that while a similar protection can be accomplished by the use of long feeders this is less economical of power.

Among the points which Mr. Taylor made in favor of the automatic substation and of the application of the same principle to the operation of station units were the following:

The distribution of d.c. power supply from a large number of substations of small capacity, rather than from a small number of large substations, results in a smaller voltage drop in the return system and therefore less danger of electrolysis troubles.

The same distribution results in a smaller line loss or a saving in overhead copper, or both, and may render unnecessary the use of voltages higher than 600 in some cases. The possibility of using automatic substations should, therefore, be considered in the selection of trolley or third-rail voltages.

The load-limiting device used with the automatic substation operates to produce more reliable power supply by eliminating unnecessary opening of circuit-breakers

and by reducing the danger of rotary converter flashing.

The use of a motor-driven drum controller insures the proper sequence of operations and the maximum economy of time in performing these operations.

The system is particularly well adapted to the control of motor-generator sets, which can be automatically connected to the line in six or eight seconds.

The automatic control features are applicable to substations containing several rotary converters, not necessarily to the extent of dispensing with all attendance but rather to permit reduction in the force and increase in the station load factor. A schedule of operations could be decided upon in advance and the apparatus adjusted to carry it out. For example, this schedule might be arranged thus: Up to 2000 amp. rotary No. 1 operates alone. After the load has been 2000 amp. for five minutes, or if it suddenly increases to 3000 amp., No. 2 is to be cut in. If the load goes to 4000 amp. for five minutes, No. 3 is to be cut in, etc. A similar routine would be followed in cutting units out of circuit. Such a schedule would be difficult to maintain with manual operation.

In concluding his paper Mr. Taylor discussed the reliability of the automatic substation. While no device is infallible, this apparatus contains fewer moving parts than a multiple-unit train control, it is simpler and more rugged than an automatic railway signal system, and it is less complicated and has fewer parts than a storage-battery and booster set. It contains standard relays and contactors such as are used in steel-mill service. They are arranged so that the failure of any single device would do no more than make the station inoperative until an inspector could give it his attention. The contact-making voltmeter is the same as the one successfully used for years in the Tirrill regulator where the service is many times more severe.

A lively discussion followed, confined largely to inquiries concerning how the automatic substation would meet operating conditions. A. Schlesinger, superintendent of distribution Terre Haute, Indianapolis & Eastern Traction Company, opened the discussion. He wanted to know how the automatic substation would take care of rotary converter buck-overs which, he said, frequently occurred, even when the utmost care was exercised. He also asked what safeguards were provided when work was being done on the transmission lines, and also, in case the machine became defective, what arrangements were made to cut it out of service.

In response Mr. Taylor replied that the automatic substation had limitations but that the new type of circuit breaker would prevent bucking over. In a station where it had been in operation for over a year the commutator was in perfect condition, and in numerous observations no sparking had been observed. In order to prevent the mechanical defects which might interrupt operation frequent substation inspections were necessary. Inspectors should also be on duty when anyone was working on the transmission lines.

G. H. Kelsay, superintendent of power Union Traction Company of Indiana, objected to the inclusion of resistance between the circuit breaker and the line. He was of the opinion that this would add load to the line which would make it impossible to meet abnormal conditions. He thought the resistance would reduce the capacity of the station and lower the voltage greatly. Mr. Kelsay also suggested that while a closer distribution of substations would help line voltage, the hourly service rendered by most electric interurban lines did not lend itself readily to such an economy. He also believed that the use of feeder taps near a substation was false economy. Concerning the elimination of substation attendants, he said that on his road most of the substations were located where the attendant also served as a ticket agent, hence the company could not dispense with his services. Mr. Kelsay also observed that lightning protection would be difficult to care for even though an automatic substation would make better provision for it than had been the case heretofore. He also asked how the automatic control installation would operate in case the old rotaries were used.

In response, Mr. Taylor said that the apparatus was designed to be installed in old stations and would prevent flashing over. The objection to the resistance in the outgoing lines, he said, was rather difficult to answer because the resistance was the same as a long feeder, and in his opinion much better. On the other hand, the resistance was in the circuit so short a time that the power losses were insignificant. Mr. Taylor stated that automatic substations were designed to pull capacity loads at all times, hence the resistance was necessary.

Mr. Kelsay then said that he thought that rotary converters for interurban road requirements should be designed more liberally, particularly as regards the size of the commutator. He believed that better results would be obtained where instantaneous high peaks occurred if the commutator was of 1000-kw. capacity on a 500-kw. rotary.

J. E. Cochran, superintendent of distribution Ohio Electric Railway, expressed the belief that electric interurban roads would be forced to adopt automatic substations as an economy measure. He said that during four hours of the night an attendant was unnecessary at substations in ordinary operation. There were, in addition, two or three hours when only freight trains passed over the line. In case the substation could be brought into service only when required, it would represent a considerable saving. He was rather skeptical, however, regarding switchboard maintenance, being of the opinion that it would be high with the additional apparatus necessary for automatic operation.

Package Freight on Passenger Cars

W. L. Foreman, traffic manager Louisville & Northern Railway & Lighting Company, continuing the program, then read a paper prepared by J. F. Strattan and himself, entitled "Package Freight on Passenger cars." An abstract of this paper is published on page 1078.

In the discussion which followed, F. D. Norviel, general passenger and freight agent Union Traction Company of Indiana, said that he believed it was good practice to handle package freight on passenger cars. Practically all the lines operating out of Indianapolis pursued that policy profitably. It was also desirable, in his opinion, to set some standard fixing the amount or size of package which passengers should be permitted to carry.

E. F. Schneider said that he was endeavoring to eliminate the carrying of package freight on passenger cars. When freight was carried on passenger cars it was impossible to discriminate against the undesirable classes; therefore, he believed the best policy was to eliminate the practice altogether. He also said that his road did not allow large packages in the racks, and in this way eliminated accidents to passengers from that source.

At this point President Henry closed the discussion with the statement that the meeting had been one of the most profitable in the history of the association. Before adjourning and upon motion, the hotel and arrangement committee was authorized to plan a three-day boat trip for the June, 1916, meeting.

Abstracts follow of convention papers and reports not published last week.

THE INTERURBAN

BY HON. J. F. McCLURE, MEMBER PUBLIC SERVICE COMMISSION OF INDIANA

The introduction of the interurban as an agency of transportation has tended more than any other factor to unify the neighborhoods of the State into the larger community. Formerly the inhabitants of near-by cities were comparative strangers, and by reason of their segregation and lack of intercourse, frequently entertained feelings of hostility for each other. The change in habits, customs and conventionalities of our social condition have been much greater during the lifetime of the older members of the association than during all the time since the discovery of America by Columbus.

There are, in round numbers, 2200 miles of traction lines in Indiana, including city lines outside of Indianapolis. The properties are operated and under the control of twenty-five different companies. The longest mileage of any one company is 428, and the shortest 10. The lines of practically every electric road parallel a steam road. This competitive condition does not exist between interurbans, except in a very few instances between near-by points. The companies maintain hourly service between the more important points, and a two-hour service for rural and smaller points, during eighteen hours of each day.

For the years 1912, 1913 and 1914, complete reports for all companies have been filed with the commission, which show the number of passengers carried per year to be as follows: 1912, 106,355,292; 1913, 113,621,528; 1914, 123,262,730. For the same years the operating revenues were: 1912, $10,546,910; 1913, $11,443,020; 1914, $12,293,622. During the latter part of this period there was a small increase in mileage operated, but not sufficient to account for increase in volume of travel or in receipts. The net revenues for the same years were: 1912, $4,130,304; 1913, $4,564,216; 1914, $4,748,234, and the percentages of net revenue to operating revenue were: 1912, 39.1; 1913, 39.8; 1914, 38.6. The revenues in most instances have been augmented from the sales of current for light and power to municipalities and individual consumers along the lines, and the net revenue is 7 per cent of the bonded indebtedness.

A recent comparison of the revenues of the principal companies, made by their own accountants, show a reduction in operating revenues for the first eight months of 1915, compared with the same months of 1914, of 7½ per cent.

The annual reports of the companies operating lines in Indiana show that there has been issued stock of the par value of $86,458,285, and that the bond issues aggregate $68,417,947. This shows a total average capitalization of more than $70,000 per mile of line, and an average bonded debt of $31,000 per mile of line. This would indicate that the par value of the bonds approximates the reproductive cost of the lines, based upon estimates from time given by men engaged in the business of operation. It would appear that the business of the interurban is not only sound, but is reasonably remunerative.

Competition from Automobiles

Within the past year a new element of transportation —somewhat erratic and undependable—has arisen, which introduces a competitive condition in street railway traffic. It is as yet problematic as to what effect the automobile, as a common carrier, will have upon the transportation question. It undoubtedly will be a factor to be considered, both by the State and by the electric railway companies, in the matter of regulation and as a competitive quantity. It would not seem that it would be a permanent or serious matter; at least, under present conditions. The difficulty of maintaining dependable service at all times of the year is quite out of the question; and, at most, under present-day conditions, it should be limited to a supplemental service to well-equipped and efficient car lines. I take it, however, that it only has an incidental effect upon the interurban, and would not be serious except for the fact that the properties are jointly owned and controlled.

The problem thus presented must be solved by the traction lines by improved service. This is particularly true of city service. The demand for more extended service brought the jitney into the field, and it will remain—under some regulations, perhaps—as long as the demand will justify its use. In fact, it appears that it may be made a useful facility to supplement the street car service.

The interurbans, however, must, we think, meet competitive conditions that arise or are likely to arise with steam roads. The steam lines entering Indianapolis, with one exception, are paralleled by electric roads for distances from 20 miles to more than 100 miles. Some of these steam lines are already double tracked and could be electrified to compete for the local traffic. It is probably true that the steam carriers under-estimated the competition of the interurban in the beginning, or there might have been greater effort made to keep them out of the field by providing local service along their lines. All the while inventions are appearing, intended to improve the methods and cheapen the cost of tractive power, and it is within the range of possibility that keener competition may develop between the different carriers.

Possible Future Improvements

The public justly demands adequate service at a reasonable cost of every utility. In the matter of adequacy of service, as applied to the electric roads, it involves frequency of trains, speed, comfort, safety and reasonable fares. The passenger is entitled to be provided with comfortable service. The average interurban car does not, under all conditions, do this. It may be said, I think, that the ventilation of the interurban car is crude and inefficient and that the heating methods employed are equally subject to criticism. Very little improvement has been developed in either of these important matters since the lines have been operated. Business has adjusted itself to all the modern time-saving devices, and the interurban railway is one of the most important devices of this character. This feature of the service is to be commended rather than criticised. Shortening of routes through cities and straightening track will aid in the expeditious movement of trains.

During the last five years the companies in this State —and I think it is true generally—have given to the subject of safety more serious consideration than at any previous period. Automatic block signals have been installed on a large amount of the mileage of the lines, and it is exceedingly desirable to have this equipment extended so that all lines operating opposing trains should be so protected.

In the matter of fare, both the public and the carrier are interested. The traveling public is willing to pay a reasonable charge for the service furnished. It should not be required to pay any more. In all the territory in which the members of this association are located passenger fares are fixed on steam roads, at least, by statute. This operates to keep interurban fares within the limitations of the statutes. The law generally declares the rule to be that the fares, tolls and charges of a public utility shall be so adjusted as to enable the owners thereof to receive a reasonable return on the value of the property devoted to the public use. It is

clear that two utilities cannot—operating in the same field under competitive conditions—furnish their service as cheaply as where one company supplies the entire demand, unless it be a telephone utility, which seems to be an exception. With interurban transportation, it is quite apparent that a consolidation of the lines under one management, or, at most, two companies, would be desirable. As between themselves they are not competitive, and therefore no objection to the merging of them could fairly be made. They will continue competitive with steam lines, and they should not be dominated by these interests. The economies capable of being introduced as a result of consolidation would be very great. In the matter of the reduction of power equipment, the increased volume of supplies to be purchased, better financing conditions and other incidental reduction in cost of operation would necessarily reduce the expense of operation and at the same time improve the service.

It is important that the interurban shall be strengthened and extended as a transportation factor. It is essential to the prosperity of the merchant, farmer and laborer. It is best adapted to providing means of transportation locally for the masses and makes the town and country one community, to the advantage of both, and adds, in addition to all these benefits, a large sum to the wealth of the State and aids in bearing public burdens.

PACKAGE FREIGHT ON INTERURBAN CARS

BY J. F. STRATTAN, TREASURER, AND W. L. FOREMAN, TRAINMASTER, LOUISVILLE & NORTHERN RAILWAY & LIGHTING COMPANY

Interurban companies generally have been confronted with the problem of what limit should be placed on the size of packages, other than baggage, which passengers expect to carry into the car with them and have transported free. To a certain extent they have felt that they should extend to their patrons all of the privileges granted by their steam road competitors, and allow passengers to carry packages of almost any size, although the electric roads cannot do this as well as the steam roads, because, as a rule, the electric cars are smaller than the steam railroad cars and are generally run in one-car trains.

We believe that the liability to accident is by far the most important item to be taken into consideration. We are all familiar with the dangers connected with the overhead package rack. While racks are almost a necessity, there is no doubt that in their present form they are a menace to public safety, and a rack which would combine both safety and convenience would be welcomed both by the company and the public. If the package racks were made safe and no restrictions placed on the size of the package carried inside of the car, the aisles and unoccupied seats would at times be filled with merchandise of every description, making entrance and exit very difficult and dangerous, and interfering with the quick and safe operation of the car. We shall try to explain what we have done toward solving this problem.

The Louisville & Southern Indiana Traction Company operates a line between Louisville, Jeffersonville and New Albany, via the Louisville and Jeffersonville bridge. It operates a freight car between these three cities, maintaining freight stations at each point, and it operates a passenger service on a thirty-minute headway throughout the day and on a fifteen-minute headway from Louisville to Jeffersonville during rush hours.

When the line started the cars were equipped with package racks, and no restrictions were placed on the size of any package which a passenger wished to carry free of charge. The cars are equipped with spacious platforms, and passengers were allowed to deposit any kind of package, which they could lift by themselves or with the help of another, onto the platforms. After a few months it developed that some means must be found to regulate this practice, which interfered materially with the operation of the line, increased the accident liability and in many other ways interfered with the transportation of passengers. It was finally decided to abolish the package racks and to make a charge of 10 cents for all packages carried onto the car which could not be conveniently held, provided passengers would place them on the front platform and remove them on arrival at destination. At this time it was not necessary for the package to be way-billed, the amount of the charge being collected by the conductor and turned in at the end of his run with the other remittance.

After this rule had been in effect for some time it was found that there was a demand for a quick express service between the cities served, request having been made by quite a large number of people who did not wish to accompany packages on the car but wanted us to handle them. As there were many teaming companies which operate between Louisville and the other two cities and can cut whatever rates are made at will, it was finally decided that all we could expect to get for packages carried on passenger cars was 10 cents. Packages of this character, it was ruled, must be presented to the freight agent and way-billed in the usual manner. These packages were placed on the front platforms with the motorman, and the freight agents at the different stations met the cars and removed the packages to the freight office, where they were called for by the consignee. By way of further explanation, no passengers were allowed to ride on the front platforms of our cars, and, as stated before, these platforms are spacious, and packages do not in any way interfere with the motorman in the performance of his duties.

We found that this not only increased our revenue without increasing our costs but left more space in the freight car for heavier freight. At the same time it reduced the liability to damage of the lighter packages.

For the convenience of shippers and to meet competition, a collection and delivery system was then inaugurated, and stamps in $5 and $10 books were sold at a discount of 10 per cent, provided that the purchaser would deliver the freight to our terminal for transportation. Advantage was taken of this service by a number of the larger stores in Louisville, which maintained a delivery service in New Albany or Jeffersonville, the traffic grew in volume, and we have always felt that it was very beneficial to us.

The system of having the conductor collect for packages accompanied by a passenger was not altogether satisfactory, as we had no check on how many packages were being carried other than what our inspectors could report to us. It was desirable to change this system, but we disliked to do anything which would make it more difficult for a passenger to travel and transport packages over our line. About this time the war tax stamp act went into effect, and we were obliged to make it a rule that all packages should be presented to our freight stations, everything being way-billed so that we then had a complete check on all shipments offered for transportation.

The operations of this company are more in the nature of a suburban road, although the towns which they connect are larger than those reached by most suburban companies, and it is therefore classed as an interurban road. This is not the case, however, with the Louisville & Northern Railway & Lighting Company,

it being an interurban, operating a line from the city limits of Jeffersonville to Sellersburg, with a branch to Charlestown and also a line between New Albany and Louisville. No package freight is handled on this division.

Tariffs are on file, naming rates on package freight carried on passenger cars between all points on the Louisville & Southern Indiana Traction Company, Louisville & Northern Railway & Lighting Company and the Indianapolis & Louisville Traction Railway Company; that is, between Louisville, New Albany and Seymour. These rates are approximately double the first-class freight rate, and there is a minimum charge of 20 cents on the Louisville & Northern to points on its line and a like minimum of 25 cents on the Indianapolis & Louisville for each package handled. No packages that cannot be conveniently held are allowed to be taken into the passenger cars, and all packages of a bulky nature are presented to the freight agent and way-billed in the usual manner. This freight is all handled on local passenger cars, most of which are equipped with baggage compartments, and when this is not the case, with spacious platforms. As 75 per cent of the free baggage carried is handled on limited cars, considerable unoccupied space is left on the local cars in which to handle package freight. These local cars leave Louisville for Charlestown and Seymour every two hours, so that the service rendered is even quicker than that of the old line express companies operated on steam roads, while the rates are considerably less. It must be borne in mind, however, that we do not make house collection and delivery.

Advantage is taken of this service not only by residents of the towns along the line but also by the farmers, who find it convenient to order what they wish from the city by telephone and have it in their possession within a very short space of time. Thousands of berry crates are also shipped to the larger cities each year by our lines, Indianapolis being the destination for the bulk of these shipments. The rate on berries is 50 cents per 100 lb. Early in the season, before enough berries are offered for shipment to make it profitable to operate a through fast freight car, these berries are handled up to 100 crates on the local passenger cars. Formerly the old line express companies received all of this business. This service places berries in Indianapolis in about five hours after they leave the shipping point.

CHARGES FOR REPAIRS TO FOREIGN EQUIPMENT

The report of the committee on uniform charges for repairs to foreign equipment stated that its report had been submitted at the meeting of the association on June 17, 1915, and was submitted at this meeting for definite action. The committee found that a large percentage of the member companies interchanged only freight equipment, although in a few cases passenger equipment is also interchanged. Some members of the association interchange equipment with steam lines, and in these cases the standard M. C. B. rules apply. The committee makes no suggestions with reference to this class of interchange.

An abstract of the recommendations for the interchange of electric freight and passenger equipment between the member roads of the association follows:

Such repairs shall be made of equipment defects as are necessary to return the equipment to the owning road.

All repairs shall be charged for at cost price of labor and material, plus 15 per cent, and an invoice shall be rendered as soon as the repairs are made, showing in detail the cost of the repairs.

CENTRAL ELECTRIC RAILWAY ASSOCIATION

.....COMPANY

Uniform Foreign Car Defect and Repair Report

To.....

(Place)....., ...

(Date)....., 191..

Attention of Mr. .....

The following defects were reported in your Car. No....., following our inspection at.....on.....191...

Defects Found	Repairs Made
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

Remarks .....

.....

Signed.....

FORM A—FOREIGN CAR DEFECT AND REPAIR REPORT

The operator will devote the same degree of attention in the operation and inspection of foreign equipment, while being so operated, as is regularly accorded to his own equipment.

In the regular inspection of foreign equipment, any defects found which do not necessitate repairs in order to place the cars in service will be promptly reported to the owner on Form A. Any defects found which necessitate repairs of a minor nature before the cars can be placed in service will be repaired by the operator, promptly reported to the owner on Form A and invoiced against the owner. In case any defects are found which necessitate repairs that cannot be executed to advantage by the operator, or as may be mutually agreed upon, the owner will promptly be notified by telephone or telegraph, followed by a confirmation of such report on Form A.

All materials and labor involved in cleaning, coaling, icing, oiling and inspecting cars will be borne by the operator.

All material removed from the cars in making repairs shall be returned to the owning company by freight or on regular way bill, notice and bill of lading of such equipment being forwarded to the owning company, using Form C.

In case of damage to foreign equipment by collision, derailment or fire, the owner will be notified promptly by the use of Form B.

In case of damage to foreign equipment by collision or derailment, the owner will promptly dispatch an inspector to the point where the car is being held, for the purpose of inspecting the car in consultation with the operator's representative, with a view of establishing an estimate of the cost of repairs, together with a

CENTRAL ELECTRIC RAILWAY ASSOCIATION

Uniform Notification of Foreign Car Damage

To.....

(Place)....., ...

(Date)....., 191..

Attention of Mr. .....

This is to advise you that your Car No.....was damaged by {Fire / Collision / Derailment} at.....on.....191....at.... {a.m. / p.m.} and is now being held by us at....., pending the arrival of your inspector.

According to the rules and regulations covering uniform charges for repairs to foreign equipment, the estimate of damage, including cost of repairs and length of time required for execution, must be agreed upon within forty-eight (48) hours following receipt of this notification.

Signed.....

FORM B—NOTIFICATION OF FOREIGN CAR DAMAGE

nominal length of the time required for the execution of such repairs, to be used as a basis of settlement by the companies involved. An agreement as to the cost of repairs and length of time required for them will then be made within ninety-six hours following the owner's receipt of the original notification, after which the report may be executed by either the owner or operator, as may be agreed upon. If a satisfactory basic estimate of damage cannot be agreed upon within ninety-six hours, the cars will be repaired by the owner, and the actual cost of material and labor, plus 15 per cent, together with rental charges, will be invoiced against the operator.

In case of damage to foreign equipment by collision or derailment, the responsibility shall be decided upon between the companies involved, and if a conclusion cannot be reached, the case may be placed before a board of arbitration, as hereinafter provided.

In case of damage to foreign equipment by collision or derailment, the operator shall pay the regular per diem charge as established by the Traffic Association to cover the ninety-six hours allotted to the joint inspection of cars and the estimated length of time required for repairs, when such estimates are agreed upon. In the event of a disagreement, the rental charges will cover the ninety-six hours and the time in days or fractions exceeding twelve hours actually required for the execution of the repairs, whether executed by the owner or operator. In the event of agreement, the operator may loan to the owner, and the owner should accept, a car for its use in lieu of the rental charges provided above.

(Front)

To.....

.....

Attention of Mr.....

From.....

.....

Via.....

(Back)

CENTRAL ELECTRIC RAILWAY ASSOCIATION
UNIFORM RETURNED MATERIAL TAG

Description.....

.....

Removed from Car No. .....Date.....191....

Remarks.....

.....

.....

FORM C—FRONT AND BACK OF TAG FOR RETURNED MATERIAL

On the first of each month the operator will forward promptly to the owner a statement of the individual mileage operated by the owner's cars, for its information in connection with maintaining mileage records of cars and car equipment.

Two clauses then follow in the proposed agreement relating to the methods of settling controversies over the interpretation of the rules and the establishment of a board of arbitration.

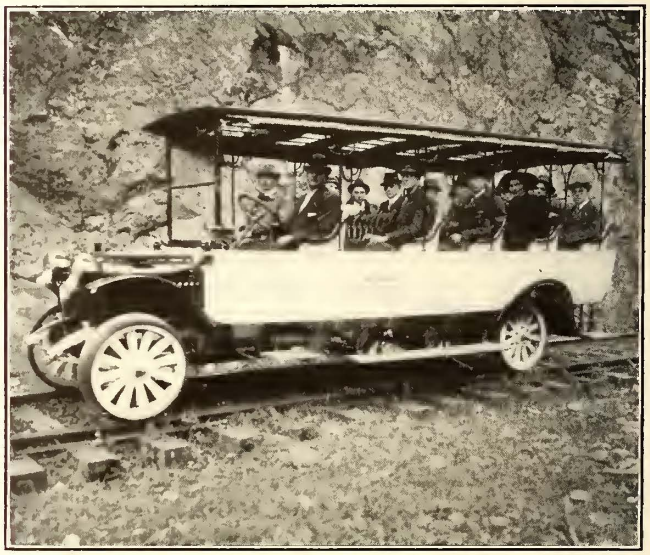
The report was signed by S. W. Greenland, H. B. Cavanaugh and S. R. Dunbar, committee, and also bears the approval of the chairman and secretary of the standardization committee.

The Missouri Public Service Commission has issued Vol. I for the period from April 15, 1913, to Dec. 31, 1914, containing the miscellaneous orders, authorizations, investigations of accidents, general inspections and conference rulings made by the commission during this period.

Gasoline Motor Car on Rails in the Pacific Northwest

When the bottom dropped out of the mining boom in the Monte Cristo district in the Cascade Mountains, 90 miles north of Seattle and 50 miles from Hartford, Wash., the railroad system, operating between Hartford and Monte Cristo, built by the Rockefellers at a cost reported to be in excess of $2,000,000, failed to pay expenses and was virtually abandoned. Some time later the Northern Pacific Railway attempted operation but found the cost prohibitive even for running cars at irregular intervals, and the railroad company turned over the right-of-way, tracks, good will, etc., to Rucker Brothers, timber dealers in Everett, Wash. This concern utilizes the line in logging-off a vast area of timber lands lying adjacent to the tracks.

In the section covered by this line, there are several hundred people who need some sort of transportation service. Rucker Brothers speedily discovered that it would be unprofitable to operate a railway service and instead are utilizing the motor car shown herewith which uses the rails already laid. The car is a 1½-ton White truck chassis, equipped with steel wheels, accommodating twenty-two passengers. The car is a stock model in all respects, with the exceptions that rubber-tired wheels are replaced by 29-in. steel wheels and the wheelbase is lengthened to 157½ in. Three steel trusses were added to the frame to support the extra wide body, and the steering arms were made stationary. The four-cylinder, 30-hp. motor, the four-speed transmission and the axles are regular in every detail.



MOTOR CAR ON HARTFORD EASTERN RAILWAY IN THE CASCADE MOUNTAINS

The front wheels are disconnected from the steering wheel and made rigid by using a long steering arm from a 3-ton White truck attached to the frame. The driver's duties are to collect fares and signal at grade crossings, the latter being done by a whistle attached to the end of the muffler. The cars have a maximum speed of about 30 m.p.h., which can be maintained with a full load over the maximum grades of 2.9 per cent in fourth speed, which is an over drive, geared 2.91 to 1. It is seldom necessary to travel in third speed or direct drive, which is geared 4 to 1. The motor car makes round trips of approximately 100 miles, and a regular service has been established, during the tourist season, of two cars a day.

Regulation of Public Utilities

Leonard A. Busby, President Chicago Surface Lines, Explains Why Electric Railway Regulation Is a Particularly Difficult Problem and Discusses the Factors Involved in Regulation and in Good Service

At a joint meeting of the Chicago section of the American Institute of Electrical Engineers and of the electrical section of the Western Society of Engineers, held at the Hotel Sherman on Nov. 22, Leonard A. Busby, president Chicago Surface Lines, presented an extended address on the "Regulation of Public Utilities." Mr. Busby said, in part:

"With the exception of steam railroads, electric railways are by far the most important of the public utilities that are now attempting to meet problems of regulation. Railroads have been subject to varying forms of governmental control, through constitutions and statutes, since the early seventies. It is only within the last decade that electric railways in our larger cities, including street railways, elevated roads, and more recently lines operated in subways, have fallen heir to about all the ills with reference to regulation that could affect any utility.

"The companies which supply our cities with gas, electric light and telephones render an invaluable service. This service, however, is neither so universally used nor so vitally necessary to the welfare of the community as transportation, nor does the regulation of these utilities present the difficulties involved in the regulation of street railway service. In this city we do not hear much about the regulation of the gas company or the telephone company, except as to rates, and then the agitation usually precedes a mayoralty campaign. Not so with the companies furnishing transportation in large cities. In nearly every large city in this country the traction question at some time has been made a political football, and in no city to a greater extent than in Chicago. This is a factor to be reckoned with in considering the question of regulation.

"True, the agitation, as a rule, is not so much over the rate which is fixed either by statute or by contract ordinance—almost universally at the flat rate of 5 cents —as over the question of service. This question vitally affects in a direct, personal way almost the entire population of our cities, and daily involves the comfort and convenience of almost every citizen. A car is delayed a few minutes by a breakdown on the tracks or a blockade or from some other cause. This will probably inconvenience several persons. If the weather is bad, the discomfort may be extreme. When the blockade is lifted, the first cars must run by the next group of waiting passengers to adjust the headway—another ground of complaint. Then there are the questions of heating and ventilating the cars. One passenger wants heat, regardless of ventilation; another wants ventilation, regardless of heat—more complaints—calling for expert advice on the question of heating coils, thermostats, the merits of ventilating fans and systems of so-called natural ventilation. Then there is the rush-hour problem. The cars are overcrowded—more inconvenience and discomfort, and more complaints. This same problem exists in every large city in this country. Then there are complaints about the non-rush-hour service, of the failure, at times, of trainmen to observe the service rules and regulations of the company, of running by passengers, starting the car too quickly, and other miscellaneous happenings.

"Now, most of these complaints are perfectly natural. No one likes to wait for a car, much less in the rain or extremely cold weather. No one likes to be passed up, or crowded, or jostled, or be obliged to stand up for several miles after a hard day's work, or to be treated discourteously by employees of the company. For some of these complaints the company may be charged justly with responsibility—some can be remedied, some cannot be eliminated entirely. The rush-hour problem has been with us for the last twenty-five years, and will be with us as long as the growth and development of this great city continue.

"But enough has been said to make it apparent that the field for the regulation of transportation utilities in large cities is broad enough to cover in principle about every question that can be raised with reference to any utility, and presents an inviting prospect to the socio-political agitator or reformer, and a very difficult problem to the utility. And with this promising field in sight the opportunity for experimental regulation has not been overlooked. State utility commissions, city councils, boards of control have all taken a hand, and in at least one instance all have tried their experiments on the same utility at the same time in respect to the same matters."

Mr. Busby then enumerated the various authorities which exercise supervision over the Chicago Surface Lines. They include the City Council, with its local transportation committee and transportation supervisor, the commissioner of health, the commissioner of public works, the commissioner of public service, the aldermen, each of whom has the transportation needs of his particular ward to look after as well as the transportation needs of the city, the Board of Supervising Engineers and the State Public Utilities Commission. Occasionally the orders from these different authorities clash and the companies are threatened with penalties if they do not do two opposite and contradictory things. For instance, at the present time the State board has ordered the company to operate trailers which are forbidden by the city ordinance. In this case the city has filed a bill seeking to enjoin the State board from enforcing this order and the company from complying with it. The matter now awaits the decision of the court.

Present Status of Regulation

Continuing his discussion of the general subject of regulation Mr. Busby said, in part:

"I shall not attempt to trace the history of utility regulation, but shall assume that the prevalent popular opinion is in favor of the necessity of some system of regulation. It is a legal concept that these utility companies have devoted their properties to a public use —that they are engaged in rendering a public service, and are, therefore, subject to be controlled through some governmental agency representing the public. Hence we have State public utility commissions and various local regulating bodies, such as city councils, boards of trustees, committees and boards created by ordinance.

"The American public is insisting year after year upon higher and higher standards of service. The street railway service which the public would have accepted ten years ago would not be tolerated for a moment today. In fact, all of the energy, resources and inventive ability of those who have developed electric railway service have been directed towards providing an im-

proved service. This improvement has taken the course of furnishing the most modern and efficient power plants, the best possible track, roadway and overhead equipment, the best lighted, the best heated and the most comfortable cars which the development of the industry so far has produced.

"But there is another side to this question. While all these improvements have taken place, the fare upon which the companies have been compelled to supply and develop this service has remained stationary. It was 5 cents in the city of Chicago when the first horse car in 1859 was operated on State Street from Randolph Street to Twelfth Street—a distance of a little more than 1 mile. It is 5 cents to-day for a continuous ride within the city limits, a distance of 30.5 miles.

"This situation has not, as a rule, received fair consideration by those who have had to do with the regulation of these utilities. If there have been instances in the past of unfair treatment of the public by the public utility companies, such a policy is the exception and not the rule to-day, and there can be no question that the unfairness and abuses of which some of these utilities may have been guilty in the past have been more than paralleled by the treatment they have received and are receiving at the hands of their regulators. Year after year they are subject to wholly unnecessary interference with the operation of their properties by over-regulation, with all of the expense and embarrassment connected therewith, and, finally, with a constantly increasing pressure towards decreasing the return upon the investments already made.

"Now it is perfectly evident that while these regulators may control, to a large extent, the fate of the capital already invested, there is one element over which they have no control, and that is the prospective investor whose co-operation is absolutely necessary to the development of this utility. Not only this, but the investor of to-morrow will determine his course of action by reference to the treatment accorded the investor of yesterday.

"The electric railway industry in the United States to-day represents a total capitalization of approximately $5,000,000,000; it employs approximately 300,000 men; it disburses in salaries and wages each year more than $225,000,000. In 1912 the business had a gross income of $585,930,517, and expended in operating expenses the sum of $332,896,356. During the same year, 41,064 miles of track were operated. Notwithstanding the amazing increase in this industry in former years, and the enormous capital involved, the last few years have shown a startling change with reference to its development.

"During the five-year period from 1902 to 1907, the capital invested in electric railways increased 63.5 per cent, while during the five-year period from 1907 to 1912 the increase in capital was only 24.7 per cent, and the figures so far available covering the period from 1912 to date show a still further decrease in the amount of capital seeking investment in this business. During the five-year period from 1902 to 1907 the gross income of street railway properties in the United States increased 71.6 per cent. During the five-year period from 1907 to 1912 the increase in gross receipts was only about one-half of this amount, or 36.3 per cent. The capital increase from 1902 to 1907 was $1,466,489,997, or at the rate of $5,640,346 per week. The capital increase from 1907 to 1912 fell to $933,796,045, or an average of $3,591,523 per week—a decrease of more than 36 per cent. While the first period was one of unusual growth, yet the heavy decrease during the last seven or eight years challenges attention and demands an explanation.

"While the rate of fare has remained stationary, almost every factor in the cost of producing the service has increased. In the United States wages of street railway trainmen increased during the period of ten years from 1902 to 1912, inclusive, approximately 20 per cent, and the actual increase in average hourly wage on the Chicago Surface Lines from 1902 to the present time has been approximately 44 per cent. Furthermore, the cost of most items of material and supplies used in construction and operation has increased. The length of haul in Chicago has increased from 13.3 miles in 1907 to 30.5 miles in 1915. The average fare per passenger, taking into account the issuance of transfers for the year ending Jan. 31, 1908, was 3.02 cents per passenger. It was 2.80 cents per passenger for the year ending Jan. 31, 1915. It has only been by the most rigid economy that the companies have been able to make the stationary fare meet the increased operating expenses and higher standards of service. It is also apparent to anyone familiar with operating problems that many of these economies have already been carried as far as they can legitimately go, that the 'irreducible minimum' has about been reached, and that further efforts to reduce operating ratios by decreasing the expenses for maintenance and up-keep of power plants, track and roadway and equipment, afford no real solution of this problem, and only delay the final reckoning.

Purpose of Regulatory Commissions

"We now have State public service commissions having jurisdiction over electric railway lines in twenty-six States, exclusive of the District of Columbia or the Philippine Islands. We have State public service commissions having jurisdiction over interurban, but not urban, railway lines in five additional States. We have State public service commissions having no jurisdiction over electric lines but having jurisdiction over steam roads in fourteen other States, leaving but three States, namely, Delaware, Utah and Wyoming, in which there is not a public service commission of some kind.

"An examination of the public utility commission acts now in force shows the following: In thirteen of the States the act requires the charge for the service to be 'just and reasonable'; in five States the requirement is 'reasonable and just'; in two the requirement is 'reasonable'; in one the requirement is 'just and fair'; in one the requirement is 'must be reasonable'; in another the requirement is 'just and reasonable,' with the further qualification that 'no street or interurban railroad is to receive more than 5 cents for one continuous ride within the city limits, excepts when shown that the same is justified,' and another makes no provision as to whether the charge shall be just and reasonable, but says: 'No street railway is to charge more than 5 cents for one continuous ride within the limits of any city or town'; the others make no specific provision on this subject.

"On the question of service, the general provision is that the service shall be 'safe and adequate,' 'reasonably adequate,' 'safe, adequate and sufficient,' 'just, reasonable, safe and adequate,' 'reasonable, efficient and sufficient,' etc.

"The theory of these acts is that a definite relation exists between the service furnished and the charge or price for such service. The theory is economically correct, the unfortunate thing is that it is not applied in practice. The difficulty is that the two factors are not equally considered. There is a definite and a necessary relation between the service standard, or quality of service, and the price which is being paid by the public for the service. This situation results too often in a disregard of the principle that no service can continu-

ously be furnished at less than cost, and that a street railway, or any other utility, in that regard stands in exactly the same situation as any other business.

FACTORS INVOLVED IN GOOD SERVICE

"The people want good service from these utilities. But before we consider how to get good service by regulation, it will be necessary to have a clear understanding as to what factors are involved where the avowed purpose of regulation is to secure good service. There are three controlling factors to be considered in any regulation with respect to service:

"1—*Continuity of Service.* Provision must be made, not only for good service to-day but for good service to-morrow, and thereafter so long as the service is needed.

"2—*Extension of the Service.* Provision must be made not only for the continuance of the service in the territory or community where service is needed to-day, but also for its extension to keep pace with the growth and extension of the community.

"3—*Improvement of the Service.* Provision must be made for constant improvement so as to keep pace with the progress and development of the industry.

"The difficulties which have arisen in attempting to regulate these utilities are largely due, in my judgment, to the failure on the part of the public and its representatives to realize that these three elements are necessarily involved in regulation. The public does not understand, and has not been shown, that no satisfactory regulation or permanent solution can be had otherwise. The fact that the public is not well informed on this subject is partly due to the failure on the part of the utility companies to place these facts fairly and clearly before the public. For that we may assume our share of the blame.

"There is nothing new in this—it seems commonplace—perhaps it is—but it is fundamental. If you think it is not, take the history of any of the bitter disputes concerning regulation that have been waged before commissions, in the courts, in the public forum and in the public press, and see if in the last analysis the disputes did not directly or indirectly involve these factors.

"The main difficulty on both sides has been that each has had too narrow a view of the practical elements involved in this problem of regulation. The question has been viewed from the standpoint of to-day rather than from the standpoint of to-day and to-morrow. A mere order directing compliance with a certain standard of service does not solve the question of regulation nor end the responsibility of the commission or regulating body. Adequate provision for the maintenance of the service in the future must be made. The offer of a utility company to supply service presupposes the existence and operation of a suitable plant and equipment, and this involves the consideration of adequate reserves for maintenance and renewals. Unless these reserves are maintained the service is bound to deteriorate. Efficient and reasonable regulation, therefore, requires that due allowance for these elements be made when any regulation or adjustment of service is being considered.

"Granting that it is necessary to provide for the continuity of the service, why should the extension of the service into new territory in the more or less distant future be considered as a factor in regulation? A little consideration will answer this question.

"Our population is steadily increasing; our cities are expanding. In Chicago, for instance, it is literally true that the cornfield of last year is the site of a new subdivision this year. But before people will move out they want to be assured of the advantages of the service offered by these utilities. Owing to the limited demand for service in the new territory, the service in nearly every case is, for a considerable time, rendered at an actual loss. In many instances these extensions are not voluntary but compulsory.

"The companies, as a rule, have no other means of raising money except their credit. This means that their ability to extend their service must depend absolutely upon their ability to go into the market and borrow money in competition with every other industry seeking new capital. Unless these utilities are able to offer as good terms and as good security as other enterprises seeking investment, they cannot possibly procure the capital needed.

"Nor is it sufficient to consider only the continuity and extension of service. The public demands the benefit of every invention and every improvement in the industry which will benefit the service. The candle, the kerosene lamp, the gas light, the electric light; the horse car, the cable car, the electric car—these words alone sufficiently indicate the development and progress made in the service furnished by these different utilities. These milestones of progress mean that plant and equipment costing millions of dollars have time after time become obsolete and been replaced by new plant and equipment in order to keep pace with progress. Will anyone say that new plant and equipment could have been acquired had it not been for faith in the future and a confidence that the capital invested in the old plant and in the new would be protected? What has happened may happen again. To-morrow some inventor may say: 'Scrap your present plant and utilize my invention, which has revolutionized the industry.' It may be of vital interest to the public that this be done. But it cannot be accomplished unless the credit of these companies is kept at the highest mark, and all doubts as to the security of the investments made and to be made are dispelled.

"The power to regulate carries with it the power to destroy. No fair-minded person, I take it, claims that the public utility commissions were created to destroy these utilities, and no one, I take it, denies that it is the duty of these commissions, in connection with and as an adjunct to their regulation of these utilities, to provide for their preservation and development.

BASIS OF SOUND REGULATION

"By sound regulation I mean regulation that will stand the test of time. I do not mean mere political experimenting, which promises something for the moment and ultimately ends in disaster. There is no magic in this matter of regulation, nor are commissions or other regulators able to obtain service at less than cost any more than a manufacturer is able to sell his product at less than cost and continue in business. It is obvious that if regulation is to succeed ultimately it must be by the application of sound business principles. Without attempting to enumerate all of the elements which should be considered in sound regulation, I submit these:

"1. *Regulation presumes just, reasonable and adequate service requirements, based upon just and reasonable compensation.*

"In the regulation of street railways where the compensation is practically fixed, a problem of constantly increasing difficulty is presented. These companies are now being called upon to face higher and, in some instances, drastic service requirements, together with a constant increase in operating expenses. There are only two sources from which the increased cost can be taken: maintenance and renewal funds, and the income to the investor. If taken from the first source, it means a

deteriorated service with a heavy bill to foot in the end. If taken from the second source, to the extent of impairing a fair return to the investor, it means the inability of the company to extend its service or provide for its improvement.

"Where a new contract between a street railway company and a municipality is being considered, another situation presents itself. Assuming that a fair valuation has been fixed and a fair rate of return has been agreed upon and assuming that a high standard of service is desired, the first essential is to provide for using the entire fare for transportation purposes, as by relieving it from the obligations to pave and clean that part of the street occupied by the company's tracks. These items are not unimportant. During the eight-year period ended Jan. 31, 1915, the surface lines in Chicago have expended approximately the following amounts for these purposes:

Paving right-of-way	$8,397,796.46
Maintaining paving	1,550,204.39
Cleaning right-of-way	2,905,391.53
Total	$12,853,392.38

"2. *Regulation must not be so directed as to destroy the incentive to economy and efficiency.*

"A standard of service is prescribed; the utility sets about to meet it. When through additional economies the company has adjusted itself to the new conditions still further burdens are promptly imposed. A utility company is no different from any other corporation. It responds to the same incentives. Its welfare and sound public policy both demand an incentive to further economies and greater efficiency. This incentive must be found in the reasonable hope of some reward for such efforts.

"3. *A reasonable standard of service having been prescribed, the method and detail of providing that service should be left to the utility.*

"The reports of the utility commissions show many controversies arising out of an attempt on the part of the commissions to regulate the details of operation. It is to be presumed that in the operation and management of their property the owners of the utility will themselves bring to their aid the best talent which they are able to procure for the efficient operation of their property. It is quite obvious that such details are better dealt with by the operators and owners of the property than by these commissions or regulating bodies, who could not possibly, under the present system and tenure of office, be expected to have the experience or familiarity necessary to enable them to deal satisfactorily with such questions.

"4. *Unnecessary interference with operation is bad and tends to increase the cost of the service and to increase the cost to the public of maintaining the regulation.*

"Commissions have a strong tendency to exercise the powers conferred upon them, regardless of the necessity or the advisability of doing so. The result has been an increasing tendency to interfere with the details of the management of these utilities. About all that has been effected in this way has been to cause considerable irritation on the part of the utility company, owing to loss of time, extra expense and interference with the operation of the property, and to incur a large amount of additional expense for clerical and other work on the part of the commission, which in the end the taxpayer has to meet.

"5. *The right to regulate these utilities is neither municipal nor State ownership.*

"Our regulators have a tendency to assume many of the prerogatives of ownership but, at the same time, to avoid carefully any responsibility for the outcome of the enterprise. In this the regulators are fixing the price, or prescribing the quality of service, or both, but they have assumed no responsibility for furnishing necessary capital or working out the problems of furnishing the service for the price fixed. There can be no question that all this is a departure from sound business principles, and must in the end work to the injury of the public. The important points that cannot be too often stressed are: That regulation is not management; that no property is of any real value without the beneficial use thereof, and that ownership and management must abide together."

St. Clair Tunnel Electrification Operating Data

Electric Operation During Six Years Has Resulted in Reduced Cost and Has Proved Otherwise Entirely Satisfactory

The Grand Trunk tunnel under the St. Clair River between Port Huron, Mich., and Sarnia, Ont., was electrified in 1908. The electrification was fully described in the issue of the Electric Railway Journal for Nov. 14, 1908, page 1364.

The system is single-phase, 3300 volts, six 66-ton Westinghouse locomotives being used. Two coupled together haul 1000-ton trains up the 2 per cent grades encountered in the tunnel at 10 m.p.h. Electric operation has made it possible to handle fully one-third more trains than was possible with steam operation and has eliminated danger from gas.

Through Walter D. Hall, superintendent of the tunnel, information regarding the results of six years of electrical operation of the tunnel has been made available. He states that the steam engineers who, after a few weeks of training, were put in charge of the locomotives are still operating them and, with two exceptions the same firemen, now called assistants, are with them. Not a passenger or member of the yard crew has been injured by electric shock and but two casualties have occurred to workmen in the electric bay of the shops.

The average cost per year for maintenance of the six electric locomotives has been $11,131 as compared with $21,173 for the four steam locomotives which they replaced. The average cost per car handled through the tunnel, a distance of about 5 miles, was 17.22 cents compared with 26.64 cents with steam locomotives, although the capacity of cars handled to-day is much greater than that of the cars of 1907 and 1908. The electric engines are available for service about 90 per cent of the time. The total yearly locomotive mileage for the six units averaged 208,810, or 34,800 per unit.

The commutators make from 60,000 to 99,480 miles between turnings and the brush mileage is from 40,000 to 60,000. The pinion mileage is from 64,000 to 118,000, and none of the gears has worn out in 254,000 miles of service.

Formerly the greatest mechanical expense was due to flange wear, the average mileage between tire turnings being 25,000. Since the installation of electro-pneumatic flange oilers, the invention of Mr. Hall, some tires have already made 184,000 miles since last turning, and are still in service. Tires which formerly made 12,000 miles now reach 83,000 between turnings.

The few train delays which have occurred were due mostly to insulator failures or flashovers caused by the steam locomotive exhaust. At first some short-circuits were caused by birds which alighted on the arcing tips of lightning arresters, but this cause of trouble was removed by installing porcelain perches over the arcing

tips. Such strain and special insulator failures as occurred were apparently due to expansion under the effect of temperature changes. Strain insulator trouble has been overcome by the use of fiber "shrouds" which protect from rain and steam locomotive gases. The tunnel insulator design was also improved by increasing the amount of insulation between wire and ground and making broken insulators more readily replaceable. A steel contact wire was also placed below the copper wire to reduce the rate of wear.

The wood section breakers gave some trouble due to warping. These have been removed and an overlapping arrangement of the contact wires has been substituted. The wire hangers of ¼-in. pipe proved satisfactory except where subjected to steam locomotive gases in the yard. In such places ⅛-in. x 1-in. galvanized or sherardized steel band has been used when hangers needed replacing. A special hanger or universal trolley-wire clamp was devised by Mr. Hall for use in supporting the iron contact wire. This consists of two grooved plates, held together by one carriage bolt with provision for attaching a band-iron hanger by means of which the clamp with attached wires can be supported from messenger wire or insulator.

The average cost of maintenance per mile per year of the 12 miles of overhead construction and rail bonding was $127 for labor and $72 for materials and tools. The saving in the cost of track maintenance in the tunnel alone is estimated at $1,500 per year.

The cost of fuel for the steam locomotives was $42,729 per year, while that for the electric locomotives was $17,186, with the electric locomotives handling a greater tonnage. While slack coal is used in the power plant in place of the hard coal formerly used on the locomotives, fewer tons of the former are consumed. The energy cost given also includes energy supplied for operating pumps, for tunnel, terminal, yard and engine-house lighting and for crane and other motors. The average watt-hours per ton-mile at the generator busbars were 37.6.

An interesting indicating device has been installed in the boiler room to supplement the automatic device used to adjust the rate of fuel consumption to the load. The latter consists of a diaphragm valve in the fan engine line, which controls both the fan speed and the engine speed through variation in boiler pressure. There are times when trains follow each other in such quick succession that it is not advisable to wait for the steam pressure to drop in order to bring in the auxiliaries. A coil was therefore placed around the cable feeding the contact wire and the induced current was utilized for ringing a bell and lighting lamps when a train requiring 800 kw. or more moves out of the yard toward the tunnel. This indicates to the fireman that he should prepare to handle a heavy train up the 2 per cent grade in three or four minutes. He can then cause the fan and stokers to speed up and be ready in ample time to care for a heavy load.

Meeting of Public Utilities Association of West Virginia

This association held its first convention at White Sulphur Springs on Nov. 18 and 19. The papers and discussion related largely to electric lighting and power matters, but the interests of electric railways also received some attention. At the Friday afternoon session S. B. Fortenbaugh, engineer General Electric Company, Schenectady, N. Y., discussed the relative merits of 1200-volt and 600-volt d.c. railway systems, and James Fagan, chief engineer Ohio Valley Electric Railway, Huntington, W. Va., described some special concrete track construction.

ASSOCIATION NEWS

The association has issued in pamphlet form "An Analysis of Ordinances Governing the Operation of Jitneys in Various Cities of the United States and Canada." This is a tabular compilation of data arranged under the direction of W. A. House, president United Railways & Electric Company of Baltimore, Md. It is issued as an appendix to the report of the committee on the operation of motor vehicles. The analysis covers ordinances in eighty-four cities, in thirty-four states and two Canadian provinces.

The association has also distributed copies of the full text of the opinion of the New York State Public Service Commission, second district, dated Oct. 20, 1915, on the petition of W. B. Gray for a certificate of convenience and necessity for the operation of a stage route by auto buses in New Rochelle, N. Y.

PUBLIC SERVICE SECTION

The regular meeting of company section No. 2 was held on Nov. 18 in Newark. The meeting was addressed by F. W. Doolittle, director of the bureau of fare research of the association, and Ernest Kopia, chief of the company's mailing department. Nine new members were received, mostly from the claims and welfare departments. R. E. Danforth, general manager of the company and chairman of the program committee, outlined and explained the tentative program for the session. On the list printed on one of the section's standard data sheets these items appear:

Dec. 16, smoker.

Jan. 20, "Construction of Carhouses and Shops," by C. F. Bedwell, assistant engineer, and R. H. Harrison, mechanical department.

Feb. 17, "Problem of Rerouteing for the Newark Terminal," speaker to be announced.

March 16, "Design and Construction of Rolling Stock," by H. A. Benedict, mechanical engineer.

April 22, "Valuation and Appraisal," by Dean M. E. Cooley, University of Michigan, a continuation of the address abstracted in the issue of the ELECTRIC RAILWAY JOURNAL for Oct. 30, page 913.

May 18, "Cost of Rush-Hour Operation," by George J. Roberts, vice-president, and H. C. Donecker, assistant general manager.

June, Newark Anniversary Celebration.

September, "Analysis of Operating Costs," speaker to be announced.

It is planned that, beginning with the January meeting, a short entertainment feature will be introduced at each meeting. This will probably take the form of motion pictures, of which advance notice will be given.

In his paper Mr. Kopia explained in detail how interdepartment and outside mail is handled, and he gave interesting statistics showing the magnitude of this work.

Mr. Doolittle's topic was "Psychological Aspects of Street Railway Service," and his talk was based upon one of the chapters of the forthcoming "Studies in the Cost of Transportation Service," which is to be issued by the association before the end of this year. Special studies had been made in Cleveland and Milwaukee to determine some of these psychological aspects, considerable numbers of individuals being interrogated in both cities to learn their attitude toward the service. As a result it was found that the average individual is utterly unable to estimate time or distance, or to set forth with any degree of definiteness the facts which determine whether or not service is satisfactory. Mr. Doolittle showed that many of the factors which the patrons consider as having a bearing on their satisfac-

tion with the service are entirely beyond the control of the railways. If the standards of service were laid down in accordance with many opinions expressed by patrons unlimited service complications would result.

A most important point made was that when a question was worded to suggest discomfort or poor service, this suggestion was reflected in the character of the answer. This susceptibility to suggestion is, therefore, an important factor in such investigations as those described. The amount of weight which is assigned by patrons to complaints published in the newspapers was also studied. As a result it was found that these were not considered as important by the public, although in Milwaukee statements of an official character did have a certain weight.

DENVER TRAMWAY SECTION

The thirtieth regular monthly session of the Denver Tramway Company section was held on Nov. 18. W. G. Matthews, who was recently elected president, gave a brief account of his trip to the San Francisco convention. After this there was a general discussion on the work of the section. One hundred persons attended the meeting.

COMMUNICATION

Preparedness in Transportation

Boston, Mass., Nov. 22, 1915.

To the Editors:

I am glad to see that the Electric Railway Journal is taking up seriously the possibilities of our great network of electric lines as aids to mobilization. With the truly enormous coast line which the United States possesses no practicable defense can be made without facilities for quickly massing men at points threatened. Our present standing army would provide us with about three men per mile of coast without making, even then, suitable provision for manning the fortifications. Consequently a big and peculiarly mobile army is a necessity to defense. Now our electric railway lines greatly increase the available trackage by which troops can be massed over most of the coast. From Maine to Maryland probably not less than 50 per cent extra trackage, both as respects coastwise lines and cross lines from trunk roads further inland, can be added when the electric service is fully utilized.

Take, for example, the stretch of coast from Boston to Portland, Me.; there are two direct railway connections here, one lying close along the coast, the other a few miles inland. There is also a complete electric railway line with ramifications which from several points tie the trunk lines together. In case we are required to mass men at some point between the termini all this railway trackage could be made extremely serviceable. Twenty-five or thirty cars will transport a regiment at at least five times the speed at which it could march, and by properly utilizing cross lines the transport of troops could be greatly hastened.

One advantage which is particularly conspicuous in electric service is the facility with which men can be entrained and detrained at any convenient point, thus relieving the termini of the transportation system from very great stress. For instance, it would not take more than a single division to tangle up traffic in a somewhat inconvenient space like the North Station in Boston so that it would be likely to take hours to get away the necessary trains through the somewhat cramped yardage. But a procession of electric cars in a well-cleared street could take a regiment aboard in a very few minutes and could push it out across country to be detrained at the nearest convenient point to the rendezvous. And, as you very properly say, street railway men are experienced in handling crowds. The efficiency with which a Harvard-Yale football audience half as big as our standing army is hustled away from the Stadium is good evidence that at a pinch the electric railways could send out great masses of loaded cars with promptness and carry them rapidly as far as interconnecting tracks reach.

The information necessary for utilizing the existing facilities is not difficult to obtain. It merely needs to be co-ordinated, as could very well be done by a committee of the association, acting in conjunction with officers of the General Staff. It is needful, first, to know for any point on our coast the direct routes by electric railways and the points of intersection of indirect routes with main railway lines from which troops could be transferred. This is a very simple matter to determine. Second, the ultimate power available for operating cars on each of the sections concerned should be ascertained, first considering the available output of the road's own equipment, and, second, the current which could quickly be made available by existing or easily-made connections with contiguous systems. All these facts are at hand within the knowledge of our skilled electric railway men. Every road superintendent knows how many cars he could swing on a given line with power which is available, also what he could do by borrowing all the power of his neighbor not involved in the scheme of mobilization, for in case of necessity all traffic would be suspended pending the transportation of troops to danger points. Third, it is necessary to know how many open, closed, and freight cars and of what capacity each road concerned in the mobilization at a given point has available, and how many more are available on interconnecting lines not concerned in that particular movement, for, of course, all these would be instantly commandeered for temporary service. Finally, it is important to know in how far the roadbeds, rails and clearances of each electric line considered permit, first, of hauling freight or passenger cars directly switched from the railroads and what effective power is available for drawing them, and, second, in how far the conditions of roadbed, bridges and clearances would permit of temporary use of locomotives drawing trains switched direct from the regular railways.

These last-mentioned matters of interchange of rolling stock may in certain instances be important, although no general interchange is to be expected. Still, at certain points and under certain conditions, the establishment of switching connections between railroads and existing electric railways might prove to be desirable enough to justify carrying out the work, or at least making all the preparations for its execution rapidly in case of emergency. Electric railway curves and grades are often forbidding in the matter of carrying ordinary railroad traffic, but in some instances this is not so, and points of advantage should not be dropped out of sight.

Louis Bell.

S. S. Bush, Louisville, Ky., who manages traction properties at Vincennes, Ind., Jackson, Tenn., and Rome, Ga., has adopted a profit-sharing plan to enlist the interest of employees in safety first work that has been very successful. Credits are given for freedom from accidents, and charges made when accidents occur. A man who goes through the year without an accident gets an extra cent an hour on Dec. 15 for the whole time he has worked, while the charges made against this account depend on the character and seriousness of the accident.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

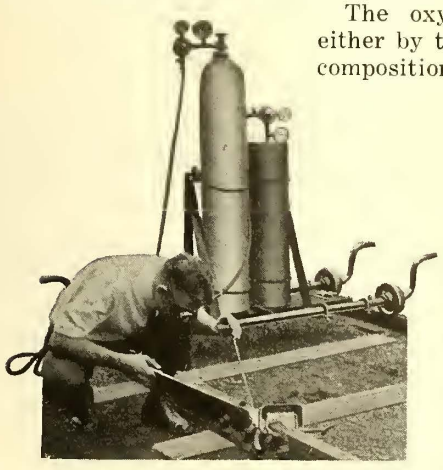
Gas-Weld Rail Bonding*

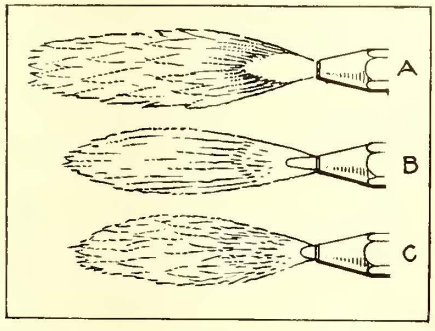
BY J. ROWLAND BROWN, ELECTRICAL ENGINEER OHIO BRASS COMPANY, MANSFIELD, OHIO

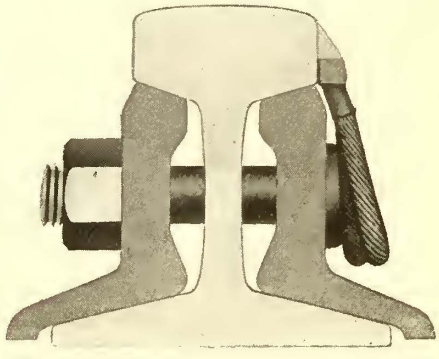
Rail bonds have been welded to rails by the use of the oxy-acetylene flame for years, but only recently have the obstacles to the general use of the process been removed. These obstacles consisted in the lack of an easily procurable supply of pure gases at a reasonable price and of readily portable tanks, in the use of torches not adapted to the particular job, and of copper wire, with its great power of absorbing gases when melted, for the welding material, and in the absence of a properly designed bond. These obstacles have now been overcome, and in the accompanying view is shown a modern welding equipment at work installing a bond.

The gases required for welding are pure, dry oxygen and acetylene, compressed or dissolved. These can be easily and safely handled in cylinders.

The oxygen is obtained either by the electrolytic decomposition of water or by liquefying air and removing the oxygen by fractional distillation. It is compressed in cylinders to about 1800 lb. per square inch pressure. A tank containing 100 cu. ft. of free air is generally used in bonding work as it weighs only between 100 lb. and 125 lb.







OXY-ACETYLENE WELDING—BONDING OUTFIT IN OPERATION—DIAGRAMS OF GAS FLAMES—CROSS-SECTION OF BOND TERMINAL WELDED TO RAIL

Acetylene gas compressed in a tank above 30 lb. per square inch pressure is highly explosive, and between 15 lb. and 30 lb. its action is doubtful. To prevent any possibility of explosion the tanks are packed with asbestos fiber having a porosity not greater than about 75 per cent. The asbestos-filled tank is then charged with liquid acetone to about 40 per cent of the volume of the tank. Acetone has the property of dissolving twenty-five times its own volume of acetylene for each atmosphere of pressure, and as the tanks are charged to 225 lb., or 15 atmospheres pressure, the tank contains about 150 times its own volume of acetylene gas under perfectly safe conditions. A tank of 100 cu. ft. capacity, weighing about 85 lb., is generally used.

A fitting is connected to each gas tank consisting of a pressure gage, a reducing valve and a gage for indicating the pressure in the hose and at the torch. There is a great variety of torches on the market, but they all consist of a tip having an orifice that controls the size of the flame and the rate of consumption of gas, and a mixing chamber with a shut-off valve for each gas. The best torches are simple and light in construction. The tip used for bonding consumes gas at the rate of about 30 cu. ft. per hour of each, with the pressure in each hose from 12 lb. to 15 lb. per square inch. Regulation to the correct flame is done by adjusting the shut-off valves on the torch and not by adjusting the reducing valves. The regulation of the flame is illustrated at *A*, *B* and *C* in the accompanying diagram. The acetylene is ignited first and then the oxygen is turned on. As the oxygen is gradually turned on the flame will appear first as in *A*, which shows an excess of acetylene. This is a reducing flame. Increasing the oxygen will soon produce the distinctly lined bead shown in *B*. This is the neutral flame of approximately equal parts of the gases, and is the flame desired for bonding. Increasing the oxygen reduces the size of the bead slightly as in *C*, and produces an undesirable oxidizing flame which consumes an excess of oxygen.

The proper design of bond for use with this process has only recently received the necessary consideration. In the first place, the weld should be made either to the head or the base of the rail. On account of the intense heat of the flame it is necessary to have a sufficient body of copper in the terminal to conduct the heat and to prevent burning or melting away of the terminal while the rail is being brought to the welding point. It is impracticable to weld the rail and the surface of the original terminal which is adjacent to it because the surfaces cannot be properly heated to the welding point. Therefore the welding wire is built up on top of the initial terminal, forming a new tapered bond terminal. This is clearly shown in an accompanying halftone. The bond now has a tapered terminal which prevents traffic from exerting a destructive shearing action, but causes all wheels or other destructive forces to glance off. Another feature of design is the provision of means for keeping the initial terminal about 1/16 in. away from the rail to allow the gases of the flame to escape and not form a pocket when welding into the

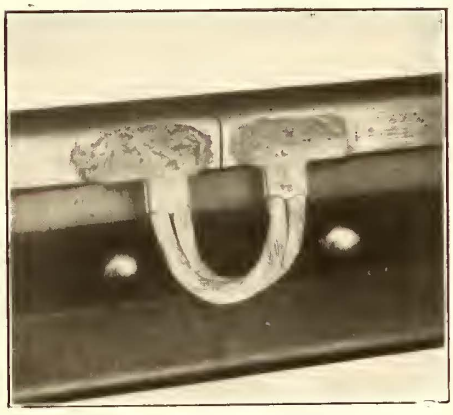
*A paper delivered before the Illinois Electric Railway Association, Oct. 29, 1915. For discussion see issue of ELECTRIC RAILWAY JOURNAL, Nov. 6, 1915, page 953.

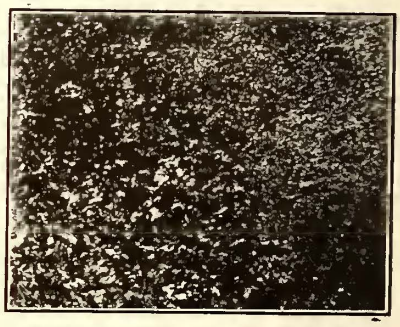
corner. The cable or ribbons of the flexible portion of the bond must also be protected for a sufficient distance by a sleeve to prevent burning by the flame.

Until recently annealed copper wire has been used for the welding wire or filling-in material, but as copper oxidizes and absorbs gases rapidly when melted it is impossible to produce even a fairly non-porous structure for the built-on part of the terminal with pure copper. A flux wire of non-oxidizing alloy containing a high percentage of copper has, therefore, been developed. This produces a more perfect weld free from porous spots, and is much easier to manipulate than copper.

It is not necessary to prepare the surface of the rail for the weld, but by some operators it is considered best to grind the surface. Grinding is an extra precaution to insure a uniform contact with the rail and does not demand as careful work on the part of the operator. On exposed rail, one end of the bond is clamped in position while the other end is being welded, and then the clamp is removed while the other end is welded.

In bonding in paved streets one or two paving blocks are removed and the bond is located by embedding the strand in some loose sand. When the rail is not to be ground the operator first coats the surface of the rail with flux metal, as by this method it is easy to see, from the manner in which the metal spreads over the rail, whether or not the oxide has been burned off. The flux metal is then built in between this coating and the initial bond terminal, producing the beveled terminal shown in the accompanying figures. A little practice will enable an average track man to control the flame and make a good weld by this method.





OXY-ACETYLENE WELDING—BOND WELDED TO RAIL HEAD—ETCHING OF RAIL SECTION SHOWING AREA AFFECTED BY WELDING—MICROPHOTOGRAPH OF ETCHED SECTION IN AFFECTED AREA

It is customary for a man doing welding of this kind to wear a pair of blue glasses, but there is no danger to a spectator and no such eye trouble develops as that experienced when working with or looking at the electric arc.

The connection between the terminal and the rail is very strong mechanically and will resist the shearing strains produced by traffic. In fact, it is impossible to tear the terminal from the rail contact and failure only occurs by fracture through the copper structure. The electrical resistance of the terminal contact is approximately 2.5 microhms, which is slightly more than has been attained by other terminals. This difference is due to the resistivity of the flux metal forming the terminal, which is greater than that of pure copper. This difference, however, is negligible and, as there is no depreciation of the contact, it is electrically very efficient.

During welding the terminals of the bond are heated to a bright red and sometimes the strand becomes a dull red for a short distance from the sleeve. This heating does not injure the bond in any way, as the mass of cold metal in the rail acts as a chill and anneals the copper. A series of vibration tests, comparing new bonds with welded bonds that had been cut from the rail, showed that in no case did the welded bonds break down before the unwelded ones.

A study of the effect of heat on the structure of the steel rail has proved very interesting, and after very careful tests and investigations it can be safely stated that the welding process does not have any detrimental effect. An etched section of the welded portion of a rail is reproduced herewith. The dark area adjacent the welded surface shows that the welding has changed the structure of the steel to a depth of ⅜ in. The affected zone does not extend longitudinally beyond the welded terminal of the bond. Another illustration shows a microphotograph of the etched section on the dividing line between the fine structure produced by the welding process and the normal structure of the rail. On the lower side of the line the normal structure consists of large pearlitic areas and patches of ferrite characteristic of open-hearth steel. On the upper side of the line the grain is finer, showing a fine pearlitic structure, which is the average structure of the area affected by the welding process.

The rail in the samples was open hearth with carbon 0.74 per cent, silicon 0.174 per cent, sulphur 0.025 per cent, phosphorus 0.020 per cent and manganese 1.07 per cent, hence the effect of the heating would show up more prominently than in a steel of lower carbon content. Scleroscope readings for hardness checked by tests with a Brinnell machine show the affected areas to be slightly harder than the rest of the rail.

The investigation showed that the areas affected and having a fine pearlitic structure have been heated to the critical point and were rapidly cooled by the mass of surrounding cold metal. The welding had refined the structure for ⅜ in. from the corner and had increased the hardness, but it had not detrimentally affected the steel. It is inconceivable that it could have affected the wearing properties of the rail or caused fractures or flaking.

A complete welding outfit, exclusive of the truck, which can be home-made, can be purchased for from $50 to $125, depending on the make of the torch and the extra accessories required for shop welding. The oxygen and acetylene consumed per bond cost approximately 10 cents, which cost varies with the distance to gas-charging stations. The flux wire used per bond will cost approximately 8 cents, the price varying with the copper market. The cost of labor with grinding of rail will average 6½ cents per bond on straight work and 4½ cents when no grinding is done.

Where rail grinding is done with an electric grinder,

three men are required in a gang, while without grinding only two men are necessary. A gang should average ten to twelve bonds per hour on straight work under average traffic conditions. An average cost of installation, therefore, exclusive of cost of bond but including depreciation and interest on investment, is 25¾ cents per bond with grinding and 23½ cents without grinding.

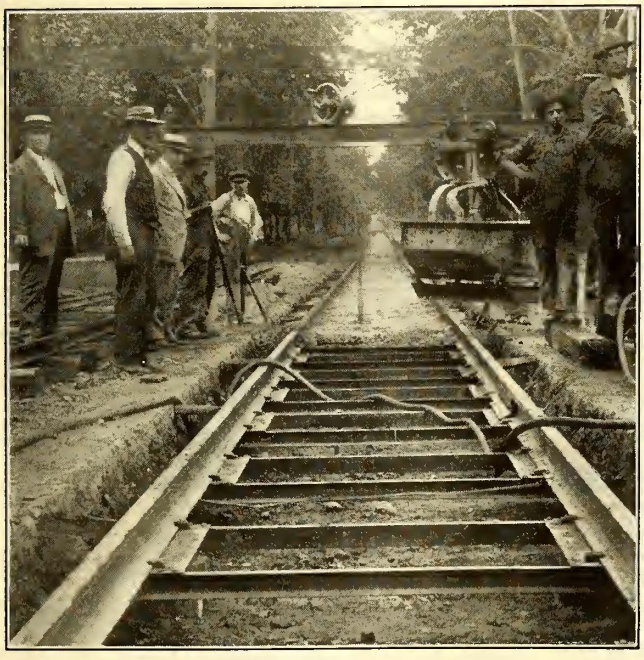
The advantages of this process of welding are as follows:

The investment in apparatus is small, resulting in low interest and depreciation charges. The utility of the apparatus in shop repair work makes it a 365-day-in-the-year machine. The entire equipment is compact and easy to handle and does not necessitate interference with traffic. No electric current is required, a matter of considerable importance in construction work and in a.c., or high-voltage d.c. installations. The welded contact has a high electrical efficiency and is permanent. The bonded joint is moderate in cost and easily inspected. When a length of rail is to be replaced one end of the bond can be cut loose from the old rail and rewelded to the new rail, thus saving the bonds.

Steel vs. Wood Ties in City Track Construction

BY J. A. NESTER, SUPERINTENDENT CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, ELYRIA, OHIO

On account of the scarcity of white-oak ties railway officials have for several years been looking around for something to take their place. As far as getting ties for city track construction is concerned, it seems that the problem has been solved.



TWIN-STEEL TIE INSTALLATION UNDER WAY

About four years ago the Cleveland, Southwestern & Columbus Railway decided to try steel ties in pavement work, and after careful investigation placed an order for International steel twin ties. These ties proved to be very much of a success and during the period since that time we have used them entirely in 6 miles of track in paved streets.

These ties are made of two channel irons, either 3 in. or 4 in. in depth and 6 ft. 4 in. long, connected by a plate 5/16 in. x 13 in. x 3 ft. At each end the plates are riveted to the channel irons, and a bar 5/16 in. x 1½ in. x 3 ft. also connects the channels underneath at each end. The rails rest on the plates and are fastened by means of clips which clamp under the plates and over the base of rail. The clips are securely fastened by iron wedges driven in behind them. Ties with 3-in. channel weigh 140 lb., and those with 4-in. channel weigh 160 lb. The clip holes are punched in plates so as to fit the section of rail being used. We space these ties 3 ft. apart and as the ties are 3 ft. wide this gives us 6-ft. centers. Consequently one tie, which costs about $4, takes the place of three and one-half wood ties. The initial cost is, therefore, not much more than that of wood ties.

The rail joints are placed in the center of the tie plates and concrete is tamped flush under the plates, making a proper support at the joints. The joints in the track that we installed four years ago are still in perfect condition.

The channel irons reinforce the concrete and we have been convinced, as have also the municipalities, that it is not necessary to have as much depth to the concrete base as would be needed with wood ties. We have, therefore, saved more than enough in the concreting and excavating to offset the difference in the initial cost. In addition to the saving in construction, my judgment is that the track will last a great deal longer than that with wood-tie construction. We are using 100-lb. A. R. A., 6-in., T-rail with nose brick.

While the track is in process of concreting it is blocked up to grade with old paving brick, placed under alternate ties, and wooden wedges are used to bring the track exactly to grade. Wooden braces are used to hold the track in proper alignment. The blocking and braces are allowed to remain and the concrete is placed around them, insuring perfect grade and alignment.

Below are given the construction costs of a piece of track 3825 ft. in length. These figures cover 9 in. of concrete below the rail.

640 steel ties, at $4	$2,560.00
1,856 cu. yd. grading, at 45 cents	835.20
779 cu. yd. concrete, at $3.50	2,726.50
Total	$6,121.70

The cost of construction of the same piece of track with wood ties on 20-in. centers, figuring 12 in. of concrete below the rail, would be as follows:

2,295 white-oak ties, at 75 cents	$1,721.25
2,280 cu. yd. grading, at 45 cents	1,026.00
974 cu. yd. concrete, at $3.50	3,409.00
Total	$6,156.25

The labor cost in both cases would be about the same.

Protecting Armature Coils from Cutting on Band Wire

BY W. A. ERNST, ARMATURE WINDER, ST. JOSEPH (MO.) RAILWAY, LIGHT, HEAT & POWER COMPANY

On a number of GE-210 motors in service on the cars of the St. Joseph (Mo.) Railway, Light, Heat & Power Company, a great deal of trouble was experienced because of the fact that the armature coils frequently became loose in the slots and worked against the banding until the coils grounded. As a rule, such armature coils would be damaged beyond repair because of the subsequent high temperature, and to remedy this difficulty it was decided to introduce strips of Peerless paper between the coils and the band wires as a protection to the coil insulation. These strips of paper were 0.062 in. thick and they had a width of

9/16 in. or ¼ in. more than the band slots in the laminated core of the armature.

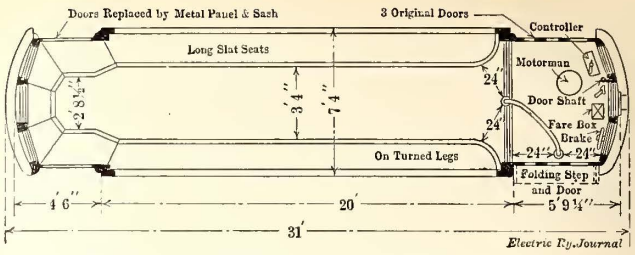
When these strips are applied the armature is heated, after it is completely rewound and is all ready for banding, until the insulation of the coils has become materially softened. The armature is then placed in a banding machine, and the paper strips are wound around the armature, being pulled down by the band wire until the coil is even with the bottom of the band slot. The paper thus forms a thorough protection to the insulation of the coils underneath the banding and it is of interest to note that in none of the rewound armatures that have been treated in this manner has there been any recurrence of the original trouble.

Dubuque Remodels Cars for One-Man Operation

In remodeling eight cars for one-man operation, the Union Electric Company, Dubuque, Iowa, recognized the fact that if the cars were to be an operating and popular success they would have to be equipped with modern devices for the accommodation of the car operator and the public.

The cars are of St. Louis manufacture, 31 ft. long over all with 20-ft. body. In remodeling the interior the bulkheads were removed, circular seating was installed at the rear end and slat seats on turned legs replaced the original boxed-in rattan seating. While the monitor roof was retained, ventilation was improved by fitting each car with four sets of E-4 Automatic intake and exhaust ventilators. These ventilators were installed in the ordinary monitor sash framing without defacing the car in any way.

Easy operation of doors and steps was assured by the use of the National Pneumatic Company's standard manual control of the double-shaft type. In this equipment all doors fold outwardly and extend upward above the header board and below the platform floor for 1 in. to 1¼ in. Therefore, when the doors are closed there is a perfect weather joint to prevent the entrance of cold air. The door shafts are made of rolled steel shafting with die-pressed master panel clips machined fast.



DUBUQUE ONE-MAN CAR—GENERAL PLAN

At the bottom, these shafts are fitted with thrust collars to hold the doors in proper vertical position on the ball bearings, and they are machine-tapered and fitted to operate in unison with the folding step. The use of ball bearings at all frictional points makes this equipment exceptionally easy to operate.

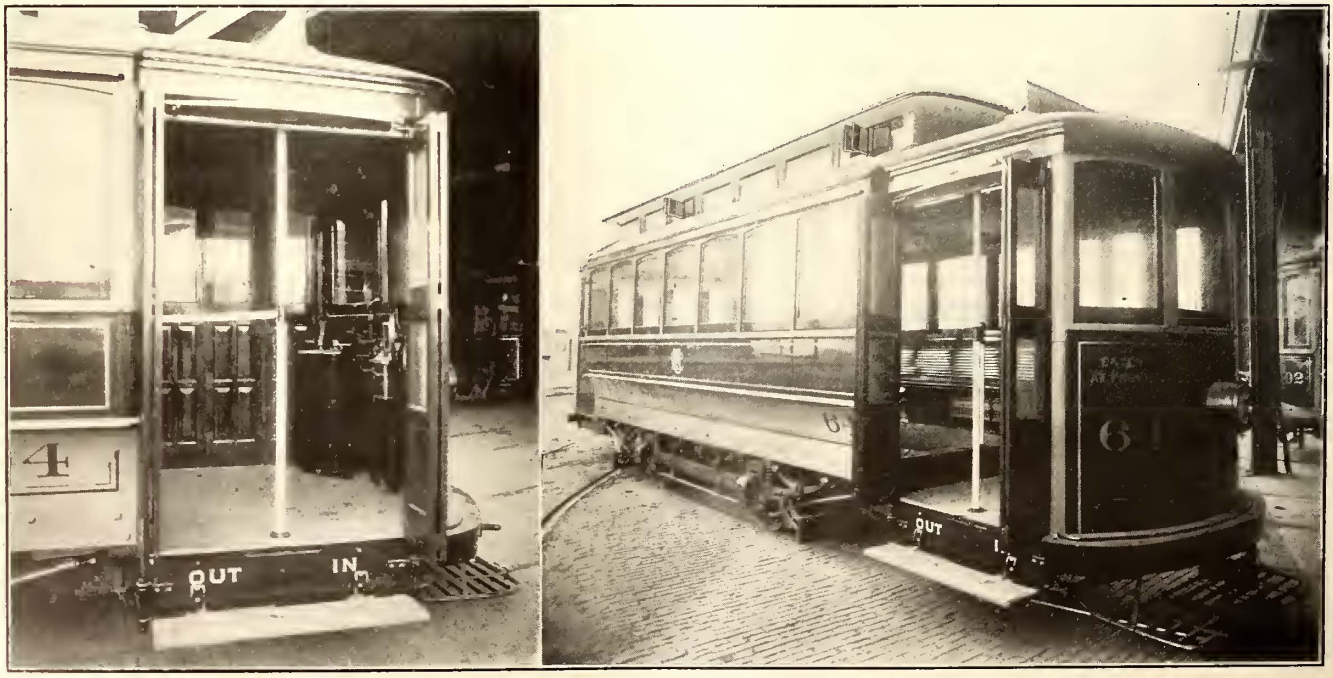
Other means for reducing the operator's duties as a motorman are the provision of the General Electric Company's C-P 25 straight air equipment and the staffless brake of the National Brake Company. The latter is exceptionally compact and light in weight.

To simplify the operator's duties as a conductor, the International Register Company's C-16 fare box is used. The special advantage of this fare box for one-man operation is that it relieves the conductor in large part in making fare collections, that it is accurate in count, and that it permits the passenger to pay the fare and pass into the car quicker than where the fare has to be handed to the conductor.

Other additions to these cars are Golden Glow headlights and Railway Utility thermostatic control.

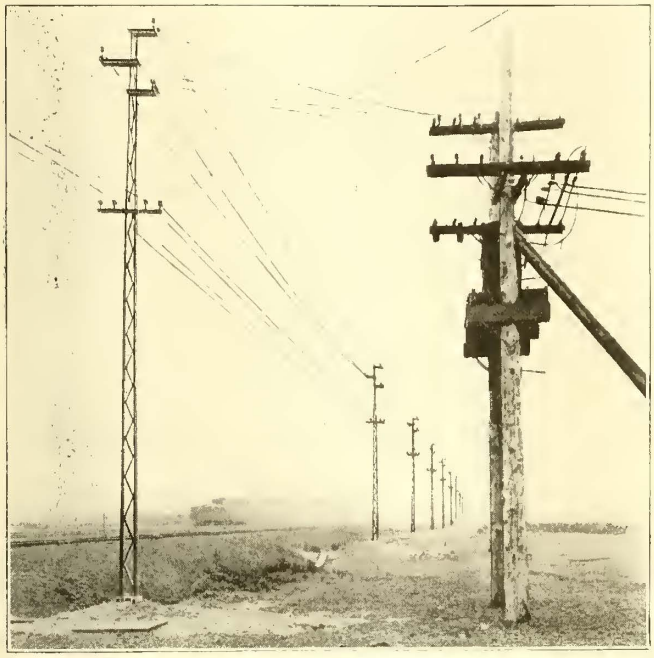
Expanded Metal Poles Replace Two Wooden Pole Lines

At a point on the right-of-way of the Elgin, Joliet & Eastern Railway near East Chicago, Ind., two wooden pole lines carried the 11,000-volt, three-phase transmission lines of the Northern Indiana Gas & Electric Company, and the telephone and telegraph lines of the Chicago Telephone Company and the railway company. To reduce the cost of maintenance and distribute the ex-



DUBUQUE ONE-MAN CAR—FRONT END INTERIOR SHOWING CONTROL DETAILS; VIEW SHOWING VENTILATORS AND OTHER DETAILS

pense of installation, these three companies installed approximately 1 mile of 35-ft. Bates Expanded Steel Truss Company's poles. The features of these poles were described on page 370 of the ELECTRIC RAILWAY JOURNAL of Aug. 28, 1915. The transmission line is carried at the top of the pole on cantilever arms made of steel angles, and the telephone and telegraph lines on a single cross-arm placed below these. The poles are set in the ground with portable concrete breast blocks,



EXPANDED METAL POLES INSTALLED ON ELGIN, JOLIET & EASTERN RAILWAY RIGHT-OF-WAY

which make concrete mixing on the ground unnecessary. These blocks are keyed and bolted to the pole at the ground line and at the base, and make as substantial construction as if the poles were set in concrete mixed on the site.

Features of Electric Railway in Alsace

In an article in *La Lumière Electrique*, J. Reyval has recently described the electric railway in Alsace, running from Münster to the Schlucht Pass in the Vosges, a district now in the hands of the Germans. An unusual feature of the line is the fact that some of the grades are operated on the ordinary adhesion principle and some by means of a rack-rail. The rack portion is about 1¾ miles long with grades varying from 18 per cent to 22 per cent. Grades as great as 6 per cent are, however, encountered on the other parts of the line. Rolling stock consists of motor cars and trailers. The motor cars sometimes run alone and sometimes draw a trailer; they carry forty passengers and the trailers carry thirty-two passengers.

The speed is at least 10½ m.p.h. on the adhesion section and 4.7 m.p.h. on the rack-rail. The motor coaches are mounted on double trucks, each of which has a motor driving one pair of wheels through single reduction gearings and another driving a spur wheel for the rack through double gearings. There is a band brake on the axle of the rack-driving motor and also block brakes on the four wheels acting at the same time. Another brake acts automatically on the rack-driving mechanism when the speed exceeds the safe limit, and provision is further made for electric braking by short-circuiting the motors. Each motor is of 85 hp. continuous rating or 100 hp. maximum capacity. On the rack-rail sections all four motors are in action and on the other parts only the two driving the ordinary wheels. The four motors are operated from one controller, by which series-parallel arrangements can be made as well as reversing and braking. The current is collected by a flexible bow trolley.

Report on Tramway Company in India

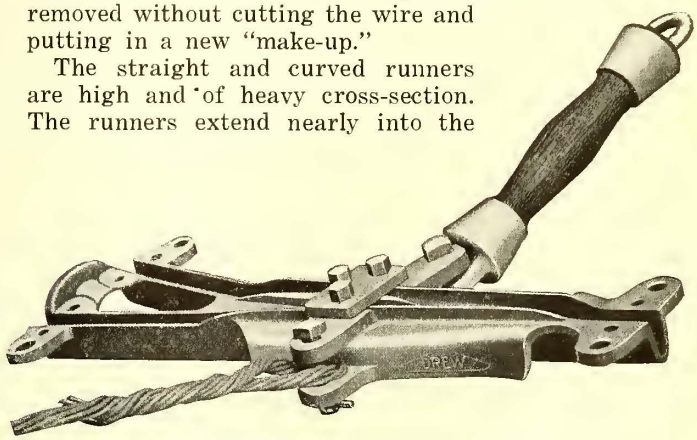
At a recent meeting of the Delhi Electric Tramway & Lighting Company, Delhi, India, it was stated that the net revenue for 1914 was $39,795 compared with $30,479 in 1913, but that both branches of the company had been affected by the war. The gross revenue of the tramways had increased by 10 per cent and that of the electric supply department by 19 per cent. The present unsuitable type of tramcar with its single motor equipment was said to be responsible for heavy annual maintenance charges and abnormal current consumption. Recommendations were made to install on the system cars more suited to the climate and particular local conditions, which would probably increase the receipts per car-mile.

New Double-Ear Overhead Switch

The overhead switch illustrated in the accompanying view has been tried out on a number of railways during the past two years and has given such good satisfaction that the maker, the Drew Electric & Manufacturing Company of Indianapolis, Ind., has decided to put it on the market regularly.

As shown in the illustration, the switch has a double ear or clevis on each side, with a cotter bolt for attachment to the supporting span. When it is necessary to renew either switch or trolley wire the bolts can be removed without cutting the wire and putting in a new "make-up."

The straight and curved runners are high and of heavy cross-section. The runners extend nearly into the center of the pan and take the wear of the wheel, stop "dragging" and tend to produce long life.



NEW DOUBLE-EAR OVERHEAD SWITCH

The Drew tapered, renewable approaches extend 6 in. each way from the frog, giving further protection to the wire and insuring smooth "take" and "leave." The switch pan proper is 20 in. long, the two approaches making the complete switch 32 in. long over all. The cross-bar between runners prevents the trolley harp from fouling.

A number of operating tests of Diesel oil-electric cars were recently conducted in Germany by the State Railways of Saxony, over the line between Dresden, Neustadt and Leipzig. Tests were made on grades up to 11.1 per cent. On one grade of 5 per cent a self-propelled car was able to haul a 47-ton trailer at 25 m.p.h. The greatest speed reached on level stretches was 47 m.p.h. without a trailer and 31 m.p.h. with a 47-ton trailer.

News of Electric Railways

SPECIFIC CHARGES IN McCALL CASE

Twenty Charges on Which Legislative Committee Bases Its Recommendation for Dismissal of New York Commissioner

The specific charges filed with Governor Whitman by the Thompson legislative committee on Nov. 22 against Chairman Edward E. McCall of the Public Service Commission of the First District of New York, and on which the recommendation for his dismissal is based, are as follows:

1. That Chairman McCall's acceptance of his appointment was in violation of law.

2. That he was at the time the owner of stock in a corporation subject to the supervision of the commission.

3. That thereafter he attempted to transfer such stock to his wife.

4. That such attempt was a mere subterfuge and a clumsy effort to evade the statute.

5. That he has participated in the consideration of matters pending before the commission affecting the value of such stock, whether owned by him or by his wife.

6. In various matters pending before the commission from time to time in which one or another of these companies was a party, Chairman McCall has improperly participated in the consideration and determination of questions affecting the value of the stock and has employed his influence for that purpose.

7. That he has neglected and failed to attend scheduled meetings and hearings on important matters pending before the commission.

8. That he has accepted in at least one instance a retainer from and rendered legal services to a corporation seeking to evade in the courts the payment of taxes claimed by the State to be owing by such corporation to the State. The chief owner of the stock of such corporation is also commonly reputed to be a controlling factor in the management of the Interborough Rapid Transit Company, one of the corporations subject to the supervision of the commission, of which he is chairman.

9. That in another case he has accepted a retainer in an action now pending in the Supreme Court, in which action the engineers in the employ of the Public Service Commission will be necessary and material witnesses.

10. That he has favored the public service corporations and that his official actions have been consistently prejudicial to the interests of the people of the city and State.

11. That he has appropriated to his own use an automobile belonging to the city of New York, that he has removed the Public Service Commission plate therefrom, has neglected and refused to make and return a record of the uses to which it has been put, and has monopolized the services of a chauffeur whose salary has been paid by the city, and that the expense of the operation of such automobile for the convenience of himself and his family has been charged to and paid by the city of New York, all in violation of the rules of the Public Service Commission.

12. That he has used his power as chairman to interfere with hearings pending before other commissioners, in order to prevent the conclusion of such hearings, and in the case of the Edison Electric Illuminating Company of Brooklyn he permitted an adjournment of a hearing pending before Commissioner Maltbie to a date subsequent to the expiration of Commissioner Maltbie's term of office.

13. Thereafter, and in the same rate case, before Commissioner Hayward, he exercised his power to permit the introduction by the said Edison Electric Illuminating Company of improper evidence which Commissioner Hayward, the hearing commissioner, was unwilling to admit.

14. That in the matter of the Third Avenue Railway and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Chairman McCall has not only neglected to enforce the commission's orders, but has used his influence to prevent the commencement of legal proceedings for the enforcement of such orders, and for the collection of the penalties which the law imposes for the violation of such orders, in violation of the mandatory provisions of the law.

15. That as to a competing company, the Manhattan & Queens Traction Company, he issued an order the effect of which in the event of a failure to comply therewith within the time specified, forty-eight hours, would have operated to cancel and annul the franchise of such competing company, thereby destroying competition beneficial to the city and its inhabitants.

16. In the matter of the certificate issued to the Manhattan Railway, dated March 19, 1913, he failed and neglected to reserve to the Public Service Commission and surrendered the power to supervise the award of the contract for the construction of the additional tracks of the Second, Third and Ninth Avenue elevated lines, and that as a result of such failure the lessees of the Manhattan Railway have entered into extravagant and improvident contracts under which its stockholders and the people of the city of New York have suffered and will suffer large losses.

17. That in the matter of the approval of the contract for the construction of the connecting lines under a certificate issued to the Interborough Rapid Transit Company, he authorized and approved a contract for such construction at an extravagant and exorbitant price and without competition, to the disadvantage of the city of New York and its inhabitants.

18. That in the execution of the dual contracts and certificates he permitted the inclusion of a provision under which the New York Municipal Railway Corporation will be permitted unwarrantably to deduct from the earnings of that company before the division of the net earnings between the company and the city can be accomplished a sum aggregating more than $10,000,000.

19. That in the negotiation and execution of the so-called dual contracts and certificates he surrendered and failed to exercise his powers and duties as a Public Service Commissioner of the State of New York.

20. That by his administration of the office which he holds, by his failure properly to supervise the expenditures of the Public Service Commission, by the extravagance of expenditure which he has permitted and by his failures and neglects as aforesaid, he has demonstrated his entire lack of sympathy with the purposes of the public service commissions law.

ARBITRATION HEARING HELD IN ALBANY

The committee selected to arbitrate the dispute between the United Traction Company, Albany, N. Y., and its employees, which caused a strike last September, heard the testimony of both sides on Nov. 19 and then took the case under advisement. The questions involved are whether it is fair to suspend an employee without giving him a hearing before the sentencing official, and whether the new procedure in discipline is in violation of Sec. 6 of the agreement between the company and the men.

The hearing lasted four hours. It was opened by Lynn J. Arnold, chairman of the arbitration committee. Sitting with him on the committee were William E. Woollard and Mayor Cornelius F. Burns of Troy. The company was represented by Harry B. Weatherwax, vice-president; John E. MacLean, counsel for the company; C. A. Coons, general superintendent, and N. R. Cass, assistant to Mr. Weatherwax. The case for the men was conducted by W. B. Fitzgerald, representative of the international president of the association, and with him were Joseph S. Droogan, president of the Albany local; Joseph H. McLaughlin, president of the Troy local, and Stephen Dwyer of the Albany local.

Chairman Arnold said he thought Sec. 6 was obscure in that it did not fix definitely whether the preliminary hearing should be before the general or division superintendent, and suggested that Mr. Fitzgerald and Mr. Weatherwax fix up the section so that it would be clear. Mr. Fitzgerald reiterated that this could not be done legally until next July, when the present contract expires. The section will accordingly be passed upon in the light of its present wording.

OPPOSITION TO MOON BILL ORGANIZING—OTHER PROPOSED RAILWAY LEGISLATION

The committee on railway mail pay, representing railroads operating 90 per cent of the mileage of this country, has announced that these 264 railroads, with a total of 218,000 miles, have joined in a protest to Congress and to the public against renewal of the efforts to effect the passage of the Moon railway mail pay bill.

This measure was introduced in the last Congress and failed to pass, and the Postmaster General has announced that it will be reintroduced when Congress opens in December. Under the Moon plan the Postmaster General would be authorized to establish the "space plan" of payment, whereby a railroad would be paid no more for hauling a whole carload of mail than for a partial carload. In their protest the railroads say that the Moon bill would empower the Postmaster General to make the rates for carrying the mails, with the only limitation that he could not exceed certain sums. On the other hand, he could reduce the rates with no restraint but his personal discretion.

The railroads contend that the highest rates which are permitted by the bill would be unjustly low, because they would be less than the receipts from passenger carrying, which the Interstate Commerce Commission has decided are unremunerative. They also say that the Moon bill delegates legislative power to the Postmaster General, and would bring the railway mail pay problem into politics. They say that the problem ought to be settled on a business basis, and direct attention to the fact that Chairman Moon of the post-office committee of the House of Representatives in asking support for his bill declared it to be a proposal of the Post-office Department.

The bill to regulate the issuance of railroad securities is another measure which the prophets of railroad legislation regard as sure to come before Congress. This bill is an item of "unfinished business," left over from the Wilson trust program. It has long been advocated by the Interstate Commerce Commission. When the bill was brought before the House on June 2, 1914, for debate and passage, Mr. Rayburn of Texas, its nominal author, declared that it contained three provisions deemed necessary by a majority of the committee. The first of these was greater publicity in the financial transactions of railroad corporations; the second, making it illegal for corporations to issue stocks and bonds "or other evidence of indebtedness" except for certain specified purposes to be approved in advance by the Interstate Commerce Commission; and the third, that within two years after the passage of the act, it should be illegal for one man to hold a directorship or official position in more than one railroad, and for any official to "appropriate, pay or receive as salary or dividends any money resulting from the sale of stocks and bonds." On June 5, 1914, the Rayburn bill passed in the form in which the committee on interstate and foreign commerce had prepared it. The vote was 325 in favor, twelve against, two answering "present," and ninety-four not voting. Going up to the Senate, the bill found its way to the committee on commerce, which reported it on July 23, cutting out, however, the interlocking directorate provision and making several amendments to the text. The session closed with the bill still on the Senate calendar. It was not revived at the winter session.

LITTLE PROSPECT FOR PEACE IN WILKES-BARRE STRIKE

James W. Steese and Patrick Gildea, mediators for the Pennsylvania State Bureau of Labor, continue their efforts to settle the strike of the trainmen on the lines of the Wilkes-Barre (Pa.) Railway. Mr. Steese would not discuss the plans that are being considered. Company officials declare that there can be no settlement which will involve concessions on its part, while strike leaders assert that there can be no peace on a plan which does not bring them a flat wage rate instead of the sliding scale.

Shopmen in the employ of the company ordered out on a sympathy strike refused to obey the order.

One of the most serious attempts at violence occurred when an effort was made to burn the company's bridge over the Susquehanna River between Wilkes-Barre and Plymouth. Mounted men of the State Constabulary extinguished the fire before it had done more than burn several spots in the bridge flooring, which had been saturated with gasoline. While using the northbound tracks to continue on their way when it was found that the southbound tracks were blocked by fallen overhead wires, several men who have replaced the strikers were hurt in a head-on collision on the Nanticoke line. Considerable violence was reported on Thanksgiving Day and service was abandoned in Plymouth.

The company expects to start running on a night schedule on Dec. 1. It is having a second story built under the roof of the Wood Street carhouse for the purpose of providing sleeping quarters for the convenience of the men who are now living there.

DES MOINES FRANCHISE ELECTION POSTPONED TO NOV. 29

Light registration indicates slight public interest in the election of Nov. 29 on the granting of a new franchise to the Des Moines (Iowa) City Railway. The Des Moines Chamber of Commerce, which was instrumental in drawing up the new franchise to the satisfaction of the company and the City Council, is working to overcome the public apathy on the question by sending out letters to voters. These letters explain the franchise draft and relate that it has the approval of every member of the City Council, including the Mayor.

The lack of interest shown by the voters in the election is partially explained by the fact that practically no opposition to the grant is in evidence. A few spasmodic expressions of disapproval have come from scattered and generally uninfluential quarters. Only one of the local newspapers opposes the franchise. Its opposition is of a minimum effect because organized labor favors the franchise. The local street car men's union has approved the franchise and is particularly enthusiastic about the clause which provides for the settlement of labor disputes by arbitration. It was intended originally to hold the election on Nov. 20.

Emil G. Schmidt, president of the company, was explaining the franchise at a recent public meeting when he was questioned as to the effect of the jitneys on the company. He said that the jitneys had cost the company about $25,000 to date, but that he believed they soon would be a thing of the past in Des Moines if the present rate of disappearance continues.

The Chamber of Commerce letter to voters is in part as follows:

"The street car franchise is a Chamber of Commerce measure, drafted by a committee of the organization and recommended by it for submission to the voters. It received the unanimous vote of the City Council after several other measures had been defeated by it.

"It provides for placing service in the hands of a commission, and when the commission cannot agree, arbitration is provided for. It places the capital for service at $4,110,000, which is $390,000 less than the capital offered originally by the City Council for all purposes. Service follows interest on bonds, taxes and depreciation and comes ahead of dividends. The capital is fixed at $5,000,000 for purchase by the city. The State Legislature has not yet given the city authority to purchase or determine a method for acquirement of street car systems by cities. The grant provides for the sale of six tickets for 25 cents, half fare for school children, etc. It also provides for new rolling stock, 8 miles of extensions in three years and $1,500,000 in three years for rehabilitation, etc.

"By the arbitration proviso in the service clause it is sought to take the question of service away from political and speculative influences. It is defined that 'service shall be as good as the best service in cities of the same size and class as Des Moines.'

"Salaries are limited to a per cent of earnings. It provides that stock can be issued only at par and when paid for in cash and that bonds must be sold in the open market. All proceeds from stock and bond sales must be invested in the property."

INTERURBANS ACCEPT KANSAS CITY PLAN

The five interurban electric railways entering Kansas City, Mo., have signed the agreement to accept the terms of the new franchise to the Kansas City Railways, as far as it affects their interests. These companies include the following: Kansas City, Clay County & St. Joseph Railway; Kansas City, Kaw Valley & Western Railway; Missouri & Kansas Interurban Railway; Kansas City Western Railway, and Kansas City, Lawrence & Topeka Electric Railroad.

Section 16 of the new franchise provides that interurban cars shall be under control of and be operated by the Kansas City Railways and its board of control from the time they enter the city limits. The city company shall pay to the interurban companies 15 per cent of passenger revenue on the interurban cars within the city limits. In the event that a central interurban station is built, this 15 per cent is to be paid by the interurban companies to the owner of the station.

Several franchises are pending in the City Council for building interurban electric railway stations. The interurban companies will have thirty days from the time when the new franchise finally goes into effect to agree on a location for such station. Such agreement is to constitute a recommendation to the board of control, which in turn has the privilege of recommending a site to the City Council for establishment by ordinance.

MELLEN RESPONSIBLE FOR NEW HAVEN TROLLEY PURCHASES

Charles S. Mellen, former president of the New York, New Haven & Hartford Railroad, took upon himself on Nov. 15 the responsibility for the New Haven's policy of acquiring electric railways in New England, which the Government in the trial of the eleven former directors of the road charges was a part of the New Haven's alleged plan to monopolize commerce. Mr. Mellen said:

"I told my directors time and again that the road ought to supply the public with its needs, and that meant electric railways, steamship and railroad lines. It was my policy, and I always put it forward, that the public should be supplied with all classes of transportation it demanded."

Sixty-five electric railways went into the New Haven system in pursuance of the Mellen policy, it was brought out, the acquisition of which the prosecution began to establish one by one. The evidence was admitted only conditionally, however, as Judge Hunt said that where the electric railways were shown to have operated within the borders of a single State, as in the case of many of the Connecticut lines, there was doubt in his mind that their acquisition was necessarily a violation of the Sherman law, which applies to interstate commerce.

CINCINNATI TRANSIT COMMISSION APPOINTED

In compliance with the law enacted by the Legislature last spring, Mayor Spiegle of Cincinnati, Ohio, has appointed the members of the commission to prepare plans for the proposed municipal rapid transit railway in that city. This step was taken on Nov. 16 when he announced the following appointments: William Cooper Proctor, president Proctor & Gamble Company; E. W. Edwards, president Edwards Manufacturing Company; William A. Hopkins, former city treasurer and for years connected with the public schools and city library; Edward H. Dornette, well-known architect, and Christian Schott, president Cincinnati Galvanizing Company. Both Mr. Proctor and Mr. Edwards were members of the old commission. The terms of the members range from one to five years, in the order in which their names are given.

City Engineer Frank Krug will be the engineer-in-chief of the commission. It is rumored that Mayor Spiegle, whose term expires at the end of the year, will be selected as attorney. City Solicitor Walter M. Schoenle and former City Solicitor Alfred Bettman will both have certain legal work in connection with the commission's activities.

The first work of the commission will be a careful study of the plans of that commission. Until this work is out of the way Council will not issue any part of the $150,000 of bonds authorized for the preliminary work. The members of the commission are to serve without salaries.

What is known as modification H of scheme No. 4 of the old commission's plan, described at some length recently in the Electric Railway Journal, will probably receive attention first. The cost of the rapid transit line provided for in this plan was estimated at $5,717,849, or if it is made a subway for the entire length, the cost would be about $12,000,000. Conferences will be held with officials of the various interurban roads to learn just what will be necessary to bring them to the business district.

The Cincinnati, Lawrenceburg & Aurora Electric Street Railway is working out a plan of entry of its own in connection with the West End Rapid Transit Company, which was incorporated some weeks ago. Edward H. Dornette said after his appointment as a member of the commission that an effort should be made to bring the Cincinnati & Indianapolis Traction Company into the heart of the city.

ELECTRICAL PROSPERITY WEEK NOV. 29 TO DEC. 4

On Nov. 20 the Society for Electrical Development sent out the last of the general publicity literature to be issued during the great Electrical Prosperity Week campaign, with the exception of the advance issue of *Collier's Weekly* Electrical Prosperity Week number of Nov. 27. The advance issue was for electrical men only. Of it 25,000 copies were mailed later. The special number of *Collier's Weekly* contains all of the "ads" shown in the advance issue and in addition thereto important articles on electricity—news pictures of what electricity will do and a vast amount of other interesting reading matter. It will have a circulation of nearly 1,000,000. The *Saturday Evening Post* of Nov. 27 also contains a number of Electrical Prosperity Week advertisements of leading electrical manufacturers. *Scientific American* of Dec. 4 and *National Food Magazine*, November issue, are electrical numbers. These magazines will reach fully 10,000,000 people.

With the assistance of leading sales and advertising experts last spring the society planned a large amount of co-operative material to be furnished—much of it free to everyone. The campaign soon became so big that the society reordered material many times—but still the avalanche of requests grew, many coming in at the last minute. For example, based upon every fact of past sales campaigns 5000 window lithographs should have covered the country. Up to Nov. 20 the society had already sent out 30,000. Of the 58,000 street cars in this country, more than 24,000 cars carry the society's Electrical Prosperity Week car cards. More than 5000 billboards are covered with the big eight sheet society design. Electric vehicles, wagons, etc., will carry 10,000 muslin signs. The 5,000,000 poster stamps have been distributed. It is said that never before in trade history has such a tremendous amount of dealer co-operative matter been distributed.

The Society for Electrical Development has been unable to fill orders for last-minute material, so great has been the demand on it. The society has now in preparation a booklet which is to recite the work done for Electrical Prosperity Week. Wishing to make the records complete, it asks that the chairmen of committees in charge of local celebrations send the society photographs, newspaper clippings and stories of the week.

AMENDED BUS PROPOSAL IN NEW YORK

The Fifth Avenue Coach Company placed a new proposal for an extension of its motor bus lines before the Board of Estimate of New York on Nov. 18 in opposition to the application of the New York Motor Bus Company. The Fifth Avenue company now suggests a profit-sharing arrangement, whereby the city shall obtain one-half the net profits after a certain preferential has been set aside, calculated on the cost of operation, the charges for amortization, 6 per cent on the capital invested, and an amount equal to the company's average profits for the last two years. The company is willing to guarantee that the annual payment to the city shall never fall below $75,000, and it asserts that in all probability, under this plan, the city's share would be at present $107,500 a year and in seven years not much under $225,000. The company proposes to charge for all its buses 10 cents, but to have a system of universal transfers. It has adopted many of the lines which the New York

Motor Bus Company has proposed, but has omitted some, to which opposition has developed.

Rhode Island Arbitration Award Postponed.—By agreement of the Rhode Island Company and its union employees the finding of the board of arbitration sitting in the wage case pending at Providence has been postponed an additional thirty days. The decision will probably be announced about Christmas.

Girardville Strike Settled.—The strike of the electrical workers of the Schuylkill Railway at the Girardville, Pa., shops has been settled as the result of a conference between W. S. Leib, general manager of the company, and a committee of employees. All of the latter will get an increase of wages ranging from 25 cents to 50 cents a day.

Strike on Buffalo & Depew Railway.—Demanding an increase in wages of 5 cents an hour, eight motormen and conductors, employed on the 7-mile line of the Buffalo & Depew Railway between Pine Hill and Lancaster have gone on strike. No effort has been made to operate cars, nor to fill the places of the eight strikers. William B. Cutter, Buffalo, president of the company, says the line has never paid expenses and that the company cannot increase the pay of the men.

Strader Finally Obtains His Liberty.—Alfred M. Strader, after having once been denied a pardon from the penitentiary, was finally granted his liberty by Governor Willis of Ohio on Nov. 16. Strader was convicted of having dynamite in his possession for unlawful purposes and placing dynamite on the street railway tracks in Columbus during the strike in 1910. For the first offense he had served five years and he had also served sixteen months of a five-year sentence for the second offense.

Report on Cleveland Bridge Approaches.—Frederick Law Olmsted, Boston, architect employed by the City Plan Commission at Cleveland, Ohio, has filed a report with Director of Public Service Sidlo, in which he objects to the approaches to the new bridge across the Cuyahoga River, as planned by the county engineers. He insists that the vehicle traffic should not cross car tracks at grade at either end of the bridge and this would be necessary under the present plans of the county engineer. Mr. Olmsted favors the subway approach for cars on the east side and is studying a new plan for the west side.

Matters in Status Quo in Detroit.—No question affecting the municipalization of the lines of the Detroit (Mich.) United Railway within the one-fare zone of Detroit may be submitted to the electors before July, 1916, according to the corporation counsel's interpretation of the city charter which prohibits more than two special elections in any one year. Because of this ruling the Board of Street Railway Commissioners has accepted the resignation of its secretary and will close its offices on Dec. 1. All three of the commissioners have indicated that they do not intend to resign from the board, but in a letter to the Common Council they point out that for the next eight months at least their activities will be governed more or less by the Council's requests.

PROGRAM OF ASSOCIATION MEETING

Pan-American Scientific Congress

The preliminary program of the coming Pan-American Scientific Congress, to be held in Washington at the Pan-American Building, Dec. 27 to Jan. 6, is just available. The congress will be divided into nine sections, of which one is devoted to "Transportation, Commerce, Finance and Taxation." L. S. Rowe, president American Academy of Social and Political Science, is the president of this section. Professor Rowe was chairman of the United States delegation to the first Pan-American Scientific Congress, which was held in Santiago in 1908. This section is divided into four sub-sections, namely, (1) Transportation, (2) Commerce, (3) Finance and (4) Taxation. The chairman of the committee in charge of sub-section (1) Transportation, is James S. Harlan, commissioner, Interstate Commerce Commission. The other two members of the committee are B. H. Meyer, commissioner, Interstate Commerce Commission, and Prof. Emory R. Johnson, of the University of Pennsylvania, Philadelphia.

Financial and Corporate

NEW YORK EARNINGS IMPROVE

Current Earnings of All Lines in Metropolis Show Substantial Increases—Outlook Now More Gratifying

According to current reports the elevated, subway and surface lines of New York City are practically all enjoying a marked boom in traffic. This came without warning, starting in October, and the current month is said to be showing capacity traffic. July, August and September, the first three months of the current fiscal year, were normal traffic months. The lines about held their own with last year, and in some cases reported smaller earnings. October was better, but in November the traffic began to show marked increases.

Earnings of the subway and elevated lines of the Interborough Rapid Transit Company are reported to be averaging $7,000 a day ahead of last year at this time. That means that about 140,000 more passengers, daily, are using the overhead and underground lines. The New York Railways is averaging $3,500 a day more than last year, so that the lines owned by the Interborough Consolidated Corporation are doing a daily business $10,500 more than last November.

In the first eighteen days of November, the Brooklyn Rapid Transit System reported total earnings that were $105,642 or 8.9 per cent in excess of the same period of 1914. Surface traffic increased $50,406 or 6.6 per cent, and elevated traffic $55,236 or 13.1 per cent. Frederick W. Whitridge, president Third Avenue Railway, is reported to have said recently that since the beginning of the current year in July there has been a distinct betterment in revenues and the outlook is more gratifying than for some time. The employment department of the company has lately noticed a large falling-off in applications for positions, which fact may be accepted as evidence of a general improvement in business conditions.

Harvey Fisk & Sons, New York, state that the Hudson & Manhattan Railroad is reporting substantial increases in the number of passengers carried. The number of passengers in October was 5,287,429, an increase of 4.48 per cent over October, 1914, while in the first half of November the number was 2,614,706, an increase of 11.3 per cent. Every station in the current month showed an increase except two, and here the traffic remained the same.

Officials of the traction lines unite in attributing the increase in traffic to generally improved business conditions in and around New York. They point to the capacity business of the big hotels as additional evidence, and also assert that the shopping and pleasure traffic, as well as strictly business traffic, is on a decided upgrade.

KANSAS COMPANIES MERGED

The Kansas Public Utilities Commission after an adjourned hearing on Nov. 9 gave its approval to a merger of the street railway and electric light plants in Lawrence, Emporia and Parsons with the Kansas Electric Utilities Company, a Lawrence corporation recently chartered. The plants in the three localities were inspected by commission engineers, and it was decided that the proposed amalgamation would be of general advantage.

In expressing its approval the commission issued three orders. One authorized the Parsons Railway & Light Company, the Emporia Railway & Light Company and the Lawrence Railway & Light Company to sell their franchises to the Kansas Electric Utilities Company. Another granted permission to the new company to operate as a common carrier in Kansas. The third authorized the new company to issue $400,000 of capital stock and $1,500,000 of first mortgage ten-year 5 per cent bonds, the sale of which is to provide funds for taking over the three old companies.

An unusual feature of the arrangement is that the capitalization of the new company will be less than the combined capitalization of the three companies which it supplants. The order issued by the commission provides that the new company will have $871,000 less in securities than the three old ones had outstanding. The commission, however, allowed exactly what the incorporators asked.

ANNUAL REPORT

Spokane & Inland Empire Railroad

The comparative statement of income, profit and loss of the Spokane & Inland Empire Railroad, Spokane, Wash., for the years ended June 30, 1914 and 1915, follows:

	1915	1914	Change in Per Cent
Railway operating revenues:			
Freight	$270,126	$310,930	—13.1
Passenger	401,644	483,191	—16.9
Street railway system	498,977	541,618	— 7.9
Other revenue	72,577	68,728	+ 5.6
Total railway operating revenues	$1,243,325	$1,404,469	—11.5
Railway operating expenses:			
Way and structures	$239,443	$254,400	— 5.9
Equipment	195,378	127,400	+53.4
Power	119,015	119,468	— 0.4
Conducting transportation	368,140	388,461	— 5.2
Traffic	18,936	21,759	—13.0
General and miscellaneous	126,384	150,588	—16.1
Transportation for investment—credit	14	.....	.....
Total railway operating expenses	$1,067,284	$1,062,080	+ 0.5
Net revenue, railway operations	$176,040	$342,388	—48.6
Auxiliary operations—revenue	$162,914	$136,840	+19.1
Auxiliary operations—expenses	10,634	10,282	+ 3.4
Net revenue—auxiliary operations	$152,280	$126,557	+20.3
Net operating revenue	$328,321	$468,946	—29.9
Taxes accrued	150,000	150,000	.....
Operating income	$178,321	$318,946	—44.1
Other income	2,456	3,840	—36.0
Gross income	$180,777	$322,786	—44.0
Deductions:			
Interest on funded debt	$235,238	$238,910	— 1.5
Interest on unfunded debt	231,224	214,427	+ 7.8
Miscellaneous	2,108	27	.....
Total deductions	$468,571	$453,365	+ 3.4
Deficit	$287,794	$130,578	.....

The interurban freight business during the year, in common with other business in the territory, especially the lumber business, suffered from the general depression. It showed a decrease in revenue received of $40,803, or 13.1 per cent, as compared with last year's figures. The interurban passenger business shows a decrease of $81,547, or 16.9 per cent, as compared with preceding year. This decrease was caused in some measure by the auto-bus and privately owned automobile competition, but largely by the prevailing depression.

The revenue received from the street railway system of the city of Spokane showed a decrease of $42,640, or 7.9 per cent, as compared with last year. This decrease was principally caused by the jitney-bus competition in the city. The revenue received from other sources shows an increase of 5.6 per cent over last year's figures. The revenue received from auxiliary operations—sale of power—increased $26,514, or 19.1 per cent.

The charges for operation showed a decrease in every department except equipment. The increase in the equipment department was brought about by depreciation being charged this year on all equipment under the new ruling of the Interstate Commerce Commission. Such charges during the current year amounted to $78,315. In addition to this, there were a number of wooden bridges on the Inland Division which were replaced by embankments, and it was necessary, under the rulings of the commission, to dispose of the depreciation on these wooden structures through operating expenses. The charges on that account amounted to $18,418, making a total charge for depreciation during the year of $96,733. As there were no corresponding items in the previous year's report, a comparison of the actual expenses for operation shows a decrease of $91,530.

The taxes of the company in the State of Washington for the years 1911 and 1912 were paid during the last year, a compromise being effected with the County and State officials in which all penalties and interest on account of taxes unpaid were cancelled. The funds necessary to pay these taxes were secured at 5 per cent. The current taxes were also paid.

The total expenditures for additions and betterments for the fiscal year amounted to $32,829. This amount covered payments of land contracts, municipal assessments, paving in the city of Spokane, bridges filled on the Inland Division, new depots at Kiesling and Steptoe and a new substation and equipment at McGuires, Idaho.

ACTUAL COST AND CAPITALIZATION

Judge Stuart in the Circuit Court of Honolulu is hearing an injunction suit brought by the Territory of Hawaii to restrain the Honolulu Rapid Transit & Land Company from making certain increases in its capital stock. The company's franchise provides that it shall not be lawful to increase the capital stock above the actual cost of the property plus 25 per cent thereof. The Territory, however, contends that this franchise provision constitutes merely a limitation, and the capitalization can be based only on the present value of the company's property, plus 25 per cent.

The choice of a valuation basis, therefore, forms the vital issue of this case. Judge Stuart, it is reported, has tentatively ruled in favor of the cost basis. He admitted some evidence regarding value, but indicated that it might be ruled out later. The actual cost of the company, as far as shown, is said to be approximately $2,171,000. On this basis the company might contend that it can issue stock up to $2,171,000 plus 25 per cent, but the present suit is confined to its right to issue stock up to $1,600,000. C. R. Forbes, superintendent of public works, and W. H. Barringer recently completed an investigation as to the company's present value, although their findings have not yet been offered to the court. W. A. Cattell, consulting engineer, San Francisco, Cal., has been retained by the company to investigate its plant and testify as to its proper valuation.

C. G. Ballentyne, general manager, has been testifying before the court in regard to the company's valuation and earnings. Of the sum paid for the franchise of the old Honolulu tramway system, approximately $300,150, Mr. Ballentyne stated that $150,000 was in bonds, $91,000 in preferred stock at par value and the balance in cash. This purchase price, it is asserted, should be included in the cost of the company. The total income from Aug. 31, 1901, to April 30, 1915, was approximately $5,693,032, of which sum $5,563,376 was taken in fares. The expenditures for the same period were $2,171,976.

$50,000,000 CORPORATION TO PROMOTE TRADE

Frank A. Vanderlip, president of the National City Bank of New York, announced on Nov. 23 the details of organization and the objects to be achieved by a new corporation for the promotion of American enterprises, industry and commerce in foreign lands. The name of the new corporation is the American International Corporation. It is incorporated in New York State with a capital of $50,000,000, of which $49,000,000 will be common and $1,000,000 will be managers' shares. The managers' shares will be paid for at par, the same as the common stock, and will have no advantage over the common until the latter pays 7 per cent. Any amount higher than this figure will be divided one-fifth among the holders of the managers' shares and four-fifths among the common shareholders. The managers' shares can be held only by those actively engaged in the management of the corporation. There will be no public offering of any of the stock.

The president of the new corporation will be Charles A. Stone, of Stone & Webster, Boston. Mr. Stone will come to New York to live. R. P. Tinsley, treasurer of the Standard Oil Company, will be secretary and treasurer. Mr. Vanderlip will be the chairman of the board of directors, which will be made up as follows:

J. Ogden Armour, Armour & Company; Charles A. Coffin, General Electric Company; W. E. Corey, Midvale Steel & Ordnance Company; J. P. Grace, W. R. Grace & Company; James J. Hill, Great Northern Railway; Otto H. Kuhn, Kuhn, Loeb & Company; Robert S. Lovett, Union Pacific Railroad; Ambrose Monell, International Nickel Company; Henry S. Pritchett, Carnegie Foundation; Percy A. Rockefeller, Standard Oil Company; John D. Ryan, Anaconda Copper Company; Charles H. Sabin, Guaranty Trust Company; William L. Saunders, Ingersoll-Rand Com-

pany; James A. Stillman, National City Bank; Charles A. Stone, Stone & Webster; Theodore N. Vail, American Telephone & Telegraph Company; Frank A. Vanderlip, National City Bank; Edwin S. Webster, Stone & Webster; Albert H. Wiggin, Chase National Bank; Beekman Winthrop, Robert Winthrop & Company, and Guy E. Tripp, Westinghouse Electric & Manufacturing Company.

The purposes of the new company were outlined by Mr. Stone as follows:

"It is organized for the purpose of doing an international business and promoting trade relations with the different countries which will help make a world market for our products; for financing and promoting the development in foreign countries by American engineers and manufacturers of great public and private undertakings; for assisting in financing the rehabilitation of industries in foreign countries; and for undertaking such domestic business as seems advantageous in connection therewith."

American Railways, Philadelphia, Pa.—The board of directors of the American Railways has issued to its stockholders a formal announcement of the details of its merger with the National Properties Company, New York, as described in the ELECTRIC RAILWAY JOURNAL of Nov. 6. In particular the announcement calls for the deposit of the American Railways outstanding common stock at the Continental-Equitable Title & Trust Company, Philadelphia, on or before Nov. 30, in order to be exchanged for new thirty-year collateral trust bonds of the National Properties Company. The depositors will receive negotiable receipts exchangeable for bonds after Jan. 3, 1916, if the agreement becomes operative by the deposit of the 75 per cent of the stock required. All depositors of stock will be entitled to receive the dividend upon the common stock now declared and payable Dec. 15, 1915, whether the agreement of purchase becomes operative or not.

Boston (Mass.) Elevated Railway.—The authorized $3,286,000 issue of 5 per cent gold bonds of the Boston Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of Nov. 13 and 20, has been sold at 97 and interest, to yield 5.2 per cent, by a syndicate headed by R. L. Day & Company, Boston. The bonds, dated 1912, are due in 1942.

Buffalo & Williamsville Electric Railway, Williamsville, N. Y.—The Buffalo & Williamsville Electric Railway, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 20, has been authorized to issue $49,000 of 5 per cent forty-year first mortgage bonds at 95, to net $46,550. All of this sum, it is now learned, is to be devoted to the payment of notes and bills payable. An examination of the affairs of the company revealed that while the assets have been less than the liabilities since the sale of its Batavia property, its present properties are being operated profitably. The permission for the present issue of securities is made on the condition that the company not pay dividends until this difference has been completely amortized, meanwhile maintaining a corporate surplus account of at least $10,000.

Cities Service Company, New York, N. Y.—Henry L. Doherty & Company, New York, is offering at 101 and interest five-year 7 per cent convertible coupon gold notes of the Cities Service Company. The notes are due on May 15, 1918, but are callable at 102 and convertible into preferred stock at par. Of the $10,000,000 of notes authorized in this issue, $7,000,000 are outstanding. It is also announced that John C. Mitchell, president Denver National Bank, has been elected a director of this company to succeed the late Dennis Sullivan.

Fort Wayne & Springfield Railway, Decatur, Ind.—I. A. Kalver, Decatur; A. Bornstein, Indianapolis, and A. Fernberg, Muncie, have filed with French Quinn, receiver Fort Wayne & Springfield Railway, a certified check for $5,000, accompanying their bid of $51,647 for the property of the company. It is said that their plan will be to wreck the road, sell the material and hold the real estate. It is not generally believed that the road will go to them, as their bid is much lower than the receiver's certificates and the court costs. The latest preceding item regarding this company's condition was published in the ELECTRIC RAILWAY JOURNAL of Oct. 23.

International Traction Company, Buffalo, N. Y.—Under the plan outlined in the ELECTRIC RAILWAY JOURNAL of Aug. 21, holders of more than 85 per cent of the $5,000,000 of 4 per cent cumulative preferred stock of the International Traction Company have retired their holdings, together with all accrued and unpaid dividends thereon, by the acceptance in exchange on a share for share basis of new 7 per cent cumulative first preferred stock. The company now offers to the holders of the remaining 4 per cent preferred issue the privilege of a like exchange at any time prior to Jan 1, 1916. The new 7 per cent issue will bear dividends from Nov. 15.

Jamestown, Westfield & Northwestern Railroad, Jamestown, N. Y.—The Public Service Commission for the Second District of New York has approved the lease of the Jamestown, Westfield & Northwestern Railroad line between Mayville and the Chautauqua assembly grounds to the Western New York & Pennsylvania Railroad and the Pennsylvania Railroad. The leased line is a 2.6-mile section along the shore of the lake that is not connected or capable of profitable connection with any of the other lines of the lessor. The lease was made last March, but through inadvertence the approval of the commission was only recently applied for.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The syndicate composed of Lee, Higginson & Company, Boston, and Reilly, Brock & Company, Drexel & Company and Graham & Company, Philadelphia, which recently purchased $7,000,000 of first and consolidated mortgage five-year 5 per cent gold bonds of the Mahoning & Shenango Railway & Light Company, dated Nov. 1, 1915, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 20, has disposed of all the issue at 97.75 and interest to yield about 5.5 per cent. The proceeds of these bonds will be used to retire $4,844,000 of first consolidated refunding bonds maturing on Jan. 1, 1916, and in addition pay a part of the cost of new construction, additions and improvements made during the last few years by the controlling company, the Republic Railway & Light Company.

Middle West Utilities Company, Chicago, Ill.—The Illinois Trust & Savings Bank, Russell, Brewster & Company and McCoy & Company, all of Chicago, are offering at 94.8, to yield more than 6.75 per cent, the remainder of a present authorized issue of $2,000,000 of 6 per cent ten-year collateral gold notes of the Middle West Utilities Company, dated Jan. 1, 1915. A large part of this has already been placed by the three foregoing firms and by W. P. Bonbright & Company and A. H. Bickmore & Company, New York. On June 30, an amount of $1,000,000 was outstanding.

Public Service Corporation of New Jersey, Newark, N. J.—The financial statement issued by Public Service Corporation of New Jersey for October shows an increase in gross business of nearly $160,000. For the ten month period ended with October the gross increase totaled more than $1,100,000. The actual gross increase in total business for October was $159,129, an increase of 5 per cent. The balance available, after payment of operating expenses, fixed charges, sinking fund requirement, etc., for amortization, dividends and surplus was $488,741. The decrease in surplus available for dividends over the corresponding month of 1914 was $32,697. For the ten months ended Oct. 31, 1915, the gross increase in total business was $1,127,841, an increase of 3.83 per cent. The balance available for amortization, dividends and surplus was $2,995,133, while the increase in surplus available for dividends amounted to $161,505.

Sandpoint & Interurban Railway, Ltd., Sandpoint, Idaho.—The stockholders of the Sandpoint & Interurban Railway, Ltd., have decided to issue $20,000 of bonds to take up notes in the sum of $15,000 and to make improvements.

Springfield (Mass.) Street Railway.—The Massachusetts Public Service Commission has authorized the Springfield Street Railway to issue 9472 shares of stock at 110. The proceeds, amounting with the premium to $1,041,920, are to be used to pay off floating indebtedness. The application for this issue was reported in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1914.

Toledo-Detroit Railroad, Toledo, Ohio.—The Toledo-Detroit Railroad, the successor to the Toledo, Ann Arbor & Jackson Railroad, is now operated by steam. The latter line, which took over the Toledo, Ann Arbor & Detroit Railroad, foreclosed, was organized to operate a 50-mile electric system, and 18 miles of line were constructed before it was sought to change to steam power.

Utah Securities Corporation, New York, N. Y.—All offers to sell Utah Securities Corporation 6 per cent ten-year notes of 1912 up to 89.99 were accepted on Nov. 18 by the Guaranty Trust Company, New York, as trustee. The amount deposited with the bank for the retirement of the notes was $1,000,000. It is now announced that the bank has on deposit an additional $1,000,000, in exchange for which offers of notes at not more than 101 and interest will be received up to Dec. 2.

Worcester (Mass.) Consolidated Street Railway.—The Worcester Consolidated Street Railway has received permission from the Massachusetts Public Service Commission to issue 18,140 shares of stock, par $100, to pay off floating indebtedness. As noted in the Electric Railway Journal of Dec. 12, 1914, the company had asked approval of an additional $1,880,000 of stock.

DIVIDENDS DECLARED

Manhattan Bridge Three-Cent Line, Brooklyn, N. Y., quarterly, 1¼ per cent.

Norfolk Railway & Light Company, Norfolk, Va., 3 per cent.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1¼ per cent, common.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period			Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m.,	Sept.,	'15	$467,622	.....	.....	.....	.....
1 "	"	'14	474,478	.....	.....	.....	.....
9 "	"	'15	4,003,518	.....	.....	.....	.....
9 "	"	'14	4,174,705	.....	.....	.....	.....

COLUMBUS (GA.) ELECTRIC COMPANY

1m.,	Sept.,	'15	$61,827	*$28,479	$33,348	$28,678	$4,670
1 "	"	'14	59,676	*25,715	33,961	28,791	5,170
12 "	"	'15	703,587	*324,010	379,577	344,888	34,689
12 "	"	'14	664,644	*280,648	383,996	313,304	70,692

DALLAS (TEX.) ELECTRIC COMPANY

1m.,	Sept.,	'15	$148,154	*$92,680	$55,474	$33,459	$22,015
1 "	"	'14	173,776	*94,673	79,103	33,357	45,746
12 "	"	'15	1,880,820	*1,112,887	767,933	400,834	367,089
12 "	"	'14	2,270,801	*1,345,632	925,169	350,694	574,475

EL PASO (TEX.) ELECTRIC COMPANY

1m.,	Sept.,	'15	$78,367	*$42,044	$36,323	$4,197	$32,126
1 "	"	'14	87,041	*48,718	38,323	4,203	34,120
12 "	"	'15	971,204	*520,934	450,270	50,355	399,915
12 "	"	'14	1,015,759	*569,239	446,520	51,300	‡395,226

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m.,	Sept.,	'15	$163,019	*$90,393	$72,626	$36,042	$36,584
1 "	"	'14	195,260	*104,718	90,542	35,921	54,621
12 "	"	'15	2,007,724	*1,202,491	805,233	433,047	372,186
12 "	"	'14	2,455,476	*1,351,522	1,103,954	440,562	663,392

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m.,	Sept.,	'15	$23,389	*$11,799	$11,590	$5,422	$6,068
1 "	"	'14	21,298	*14,384	6,914	5,646	1,268
12 "	"	'15	266,195	*160,828	105,367	66,764	38,603
12 "	"	'14	283,081	*181,514	101,567	67,106	34,461

JACKSONVILLE (FLA.) TRACTION COMPANY

1m.,	Sept.,	'15	$46,942	*$31,301	$15,641	$14,685	$956
1 "	"	'14	53,567	*38,084	15,483	12,475	3,008
12 "	"	'15	623,129	*435,080	188,049	172,502	15,547
12 "	"	'14	729,870	*472,570	257,300	153,004	104,296

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m.,	Sept.,	'15	$142,738	*$86,351	$56,387	$27,675	$28,712
1 "	"	'14	164,778	*89,972	74,806	26,541	48,265
12 "	"	'15	1,733,222	*1,035,928	697,294	328,970	368,324
12 "	"	'14	2,151,016	*1,199,189	951,827	307,704	644,123

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m.,	Sept.,	'15	$23,864	*$14,131	$9,733	$7,475	$2,258
1 "	"	'14	23,805	*15,612	8,193	7,659	534
12 "	"	'15	290,265	*181,223	109,042	91,653	17,389
12 "	"	'14	305,732	*196,394	109,338	91,545	17,793

*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

ATLANTIC CITY COMMISSION REVERSES ITSELF

Political Expediency Said to Have Governed Jitney Legislation at Coast Resort—Independence Measure Upheld—Ordinances Passed in St. Louis and Logansport

In direct contradiction to an article published in *Commission Government*, the organ of the city officials of Atlantic City, N. J., the City Commissioners absolutely and finally refused to pass proper and reasonable regulation of the jitney traffic. The article in question stated in part as follows:

"For the first time with the authorization of the City Commissioners, jitneys are to be brought under at least a pretense of regulation. An ordinance will be introduced requiring jitney operators to cover specified routes instead of running as they please; to prohibit smoking in the cars; to stop at the far sides of all street intersections, and to pay a license fee of $50 each, instead of $25, the former charge being the amount assessed upon the trolley cars."

After asserting that trolleys are essential to the further development of the resort and maintaining at the same time that the expulsion of jitneys from Atlantic Avenue is out of the question, the official statement says:

"It must be patent to every mind that the Board of Commissioners cannot be called upon to solve the problem of competition. The commissioners cannot be expected nor called upon to protect either the dividends of the electric railway or the profits of the individual jitneys. Both are lawful enterprises, and it is for them to work out the problems of competition. There has been a demand for the bonding of jitneys, but the law department of the city has decided that this cannot be legally done. That it has been done in other cities does not make the act legal."

All matters taken up with reference to the electric railway and the jitneys in Atlantic City seem to have been decided from the standpoint of political expediency on account of the fact that all of the present City Commissioners will be candidates for re-election next May. At the present time the 400 or more jitney operators and their friends evidently loom up as holding the balance of elective power.

The *Ohio Law Reporter* for Nov. 15 contains the text of the decision by Judge Foran in the case of Mike Kaczmarek vs. the Village of Independence et al., decided on July 28 in the Common Pleas Court of Cuyahoga County. The village of Independence last April passed a jitney regulatory ordinance requiring, among other things, a $10,000 bond for jitney owners, and the plaintiff, who was arrested in violation of the ordinance, brought suit claiming that the restrictions were excessive and that the Village Council did not have power to pass the ordinance. Judge Foran held that an irresponsible jitney driver "is as dangerous a menace to the community as a truck load of dynamite in the custody of a drunken driver." He upheld the validity of the ordinance as well as the reasonableness of its provisions.

A bill providing stringent regulations for jitney automobiles was passed by the Board of Aldermen of St. Louis, Mo., on Nov. 19, by a vote of twenty-one to six. The measure requires owners of jitneys to pay a license fee of $25 a year and to give bond of $10,000 to indemnify pedestrians and other persons, excepting passengers and chauffeurs, for injuries to themselves or property in jitney accidents. Jitneys must display signs showing their destination and the fare charged, and are prohibited from being overloaded. No person may ride on the running board or body of the auto, and no higher fare than that specified shall be charged, under penalty of a fine of from $5 to $500. When the top is up after dark the jitney must be lighted.

An ordinance has been passed by the city of Logansport, Ind., to regulate the jitney. The conditions imposed are quite severe. Among other things the measure prescribes a license of $100 a year for each automobile with a capacity of five persons or less, including the driver, $150 a year for a machine of seven passengers, including the driver, and $250 for a machine of more than seven passengers, including the driver; a $10,000 bond; a charge of not more than 5 cents per passenger, and operation subject to regulations as to routes, etc., by the Board of Work.

MILWAUKEE COMPANY WANTS FARE INCREASE

Brief to Commission Shows Burdens of Regulation—For First Half of 1915 City and Suburban Lines Earn Only 1.075 Per Cent on Cash Investment

After a campaign of advertising for several weeks, as previously described in this paper, for the purpose of putting its side of the case before the public, The Milwaukee Electric Railway & Light Company for the city lines in Milwaukee, Wis., and the operated Milwaukee Light, Heat & Traction Company for the suburban lines have petitioned the Wisconsin Railroad Commission for increased fares. A brief filed with the commission cites various reasons why such an increase would now be justified.

In the first place it is stated that under commission orders the rates of fare charges have been repeatedly reduced in various ways—by requiring in August, 1912, the sale of thirteen tickets for 50 cents, by extending the single fare limits, and by forcing the issuance of two transfers for a single fare in spite of franchise provisions. In January, 1914, the commission extended the single-fare limits materially beyond the points provided for in the franchises and established suburban 2-cent zones in connection with certain minimum fares. In October, 1914, the commission ordered the sale of thirty zone tickets for 50 cents, or 1.66 cents per zone, and extended the city fare zone so as to eliminate certain outlying zones. In January, 1915, the commission rescinded the thirteen-tickets-for-50-cents order but left the single fare limits unchanged. In November, 1913, the commission fixed certain standards which are said to have required service in excess of that needed and to have imposed expenditures for construction and maintenance exceeding any possible revenue derived from the change.

In addition to the foregoing burdens, the companies have been required by the municipalities to make large capital and maintenance expenditures for building new lines into outlying districts and making unprofitable extensions, paving streets, sprinkling the streets and removing snow. The building and maintaining of pavements alone cost the city lines $166,856 a yaer. Furthermore, The Milwaukee Electric Railway & Light Company is being subjected to large unremunerative expenditures for separating grades at steam railroad crossings, and proceedings are now contemplated to require the company to clean the streets in Milwaukee. On the suburban lines the Milwaukee Light, Heat & Traction Company has been similarly burdened with heavy paving obligations, and further impositions are sought in requirements to clean, sprinkle and oil the tracks and roadbed. In general, too, taxes and operating costs for material and labor have increased.

On the basis of commission figures the increase in capital expenditures on the city system in the five years from Jan. 1, 1910, to Jan. 1, 1915, was $5,403,237, while the gross revenues in this period increased only $323,394 or less than 6.2 per cent of the capital increase. This sum is less than one-sixth of the amount necessary to cover operating expenses, depreciation and a 7½ per cent return on the capital invested. Moreover, irrespective of the capital expenditures required, the operating expenses during the five years have increased on the average 218 per cent faster than the gross revenues.

The brief mentions the inequalities shown in jitney and railway regulation, and sums up with the statement that the present rate of return is prohibitory of further development. For the first half of 1915 the return secured by the petitioners on the basis of merely the earning value set by the commission was 1.388 per cent. On the basis of the cash investment for the city lines based on the United States Circuit Court decision as of Jan. 1, 1897, with cash additions to date, and the cash cost of the outside lines as stated by the commission with the actual cost of additions since, the return for this half year was 1.075 per cent. On the valuation as determined by the Wisconsin Tax Commission, however, the return was 1.056 per cent.

During the four years ended June 30, 1915, the companies secured returns on the different valuations as shown by the accompanying table. The lines inside and outside the city were forced by too low rates, high taxes and long hauls to earn $1,408,865 less than they were entitled to on the Wisconsin Railroad Commission's rate valuations; $3,124,068 less than the 7½ per cent fare return on the actual admitted cash investments in physical property, and $3,145,148 less than a 7½ per cent return on the tax valuations. These results are held to be confiscatory, and fares and zone limits sufficient to yield a reasonable return are demanded.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.
(Covering City Lines)

	1912	1913	1914	1915
Tax valuation	$18,191,000	$18,700,000	$20,060,000	$20,740,000
Percentage return	6.656	5.530	4.237	3.206
Investment valuation	$16,563,559	$17,508,284	$19,071,144	$19,278,353
Percentage return	7.310	5.906	4.456	3.449
Rate valuation	$12,502,836	$13,862,874	$15,265,896	$15,096,096
Percentage return	9.684	7.460	5.567	4.405

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.
(Covering Lines Outside City)

	1912	1913	1914	1915
Tax valuation	$5,780,000	$6,900,000	$7,084,000	$7,360,000
Percentage return	7.505	3.324	4.289	2.996
Investment valuation	$7,781,305	$7,890,635	$8,124,627	$8,315,733
Percentage return	2.604	2.907	3.739	2.652
Rate valuation	$6,184,929	$6,195,208	$6,274,889	$6,281,838
Percentage return	3.276	3.702	4.841	3.511

RAILWAY ESTABLISHES INTERURBAN BUS SERVICE

The Washington Auto-Bus Company, a subsidiary of the Puget Sound Traction, Light & Power Company, Seattle, Wash., on Nov. 15, inaugurated an auto bus service between Seattle and Bothell, a distance of approximately 15 miles. The Seattle-Bothell line is similar to those which have been operated by the company at Bellingham, Auburn, Edmonds and other points as auxiliaries or feeders to the various electric railways. On the Seattle-Bothell line, transfers are issued and accepted between the buses and the Cowen Park Railway, or at the Seattle terminus of the line, which is located at the Seattle-Everett Station, Fifth Avenue and Pine Street. The first auto-bus leaves Bothell at 6.40 a. m. and arrives at the Seattle terminus at 7.45 a. m. Three cars are in service morning and evening and two during the remainder of the day. The bodies of the cars are glass inclosed and are mounted on Mack trucks. The forward wheels are equipped with pneumatic tires and the rear wheels with block non-skid solid rubber tires. Each car seats twenty passengers, exclusive of the driver. The cars are lighted with electricity and are heated from the engine exhaust.

PACIFIC ELECTRIC CURTAILS PASADENA SERVICE

Paul Shoup, president of the Pacific Electric Railway, Los Angeles, Cal., and J. McMillan, D. W. Pontius and F. K. Hawkins, of the company, have sent a letter to Chairman Hamilton of the City Commission of Pasadena, Cal., setting forth the fact that owing to decreased revenues the company has found it necessary to change its running schedule in Pasadena. The letter follows:

"The Pacific Electric Company has found it necessary because of decreases in its passenger revenues during the last fifteen months to economize in its transportation service, and its new time card will become effective on Nov. 14. The principal point is that the public and railway can get along best without that service which is least patronized.

"Notwithstanding the decrease in revenue between Los Angeles and Pasadena, so far, fortunately, we have been able to get along without increasing the intervals between trains, which we are very loath to do, so it may be said that your most important service is not affected.

"Some changes have been made in your local street car service, about which you have been advised locally, which is only taking off some cars which we voluntarily put on some time ago. Conditions on our local city lines in Pasadena are expressed by comparing September, 1915, with September, 1912. During the former month we operated 130,000 car-miles and took in $19,939, while three years ago we operated 118,000 car-miles and took in $24,700.

"We regret the necessity for these economies and trust that normal conditions in all lines of business, which of course includes ours, will return before long."

One-Man Cars in Everett.—The Puget Sound International Railway & Power Company is operating cars on the North Colby-Rucker extension in Everett, Wash., except between the hours of 4 p. m. and 6 p. m., at which time traffic is the heaviest.

Car Seat Vandals in Buffalo.—Because of the number of car seats damaged by passengers and others cutting them with knives and other sharp instruments, officials of the International Railway, Buffalo, N. Y., have offered a reward of $25 for the apprehension of such individuals. Notices to this effect have been posted in all cars.

"Trolley Topics" a Year Old.—The November issue of *Trolley Topics*, the house organ of the Louisville (Ky.) Railway, is a special number, being the anniversary and Thanksgiving number of the publication and the thirteenth issue, which was published for the first time in November a year ago. The special number contains, with covers, thirty-four pages, printed on a book paper and illustrated. Samuel Riddle, superintendent of transportation, is editor of the publication.

Question of Jurisdiction Settled.—The Appellate Division at Toronto, Ont., has dismissed the appeal of the Hamilton, Grimsby & Beamsville Electric Railway from the judgment in favor of Rev. J. S. Ross and others, Hamilton, Ont. The company contended that the Ontario Railway Board had no jurisdiction to order sanitary conveniences in the company's cars, since the railway had been declared for the general advantage of Canada. It is held by the court that the board has jurisdiction.

Skip-Stop Vote in St. Louis.—It was proposed by the United Railways, St. Louis, Mo., to permit its patrons to vote on Nov. 22 on the question of the continuation of the skip stop there. It is stated unofficially that the stops already eliminated have resulted in a saving of six minutes in the regular schedule of the Broadway line in each direction, making a saving of 7½ per cent, and that three minutes have been clipped from the time in each direction of the Delmar and University lines, making a saving of 7 per cent to the passengers.

Chicago Surface Lines Introduce Fresh-Air Cars.—The popularity of the twelve fresh-air cars being operated on the Elevated Railroads of Chicago, Ill., has led to the inauguration of a similar service, with sixty cars, on the Chicago Surface Lines. These cars are operated five each on twelve different lines and bear conspicuous signs stating that they are fresh-air cars. Like the cars operated on the elevated lines, those on the surface have all the windows and doors open. The cars were placed in service at the request of John Dill Robertson, health commissioner of the city. They will be continued in service indefinitely.

Something New in Railway Bowling.—A series of games between picked teams of the Public Service Railway, Newark, N. J., and the Denver (Col.) Tramway bowling leagues is now in progress. The first three games were rolled by both teams on Saturday, Oct. 23. In order that the play might be made simultaneously, the contest was arranged to begin in Denver at 7 p. m., mountain time, and, in Newark, at 9 p. m. Eastern time. Returns of each game were telegraphed by the teams immediately after the finish. The first series resulted in a victory for Denver, with a total gain of 171 pins. After the games are finished, the losing team will prepare an engrossed copy of the scores, suitable for framing, and will present it to the winner.

Toronto Running Board Ruling.—Judge Winchester, in his judgment in the charge of criminal negligence against the Toronto (Ont.) Railway for operating cars with running boards, delivered on Nov. 19, says: "On the evidence I find the Toronto Railway has been guilty of criminal negligence, and that the charge has been proved. Since the hearing herein an interim order relieving the company from the obligation imposed by Sec. 107 (1) of Chap. 185, R. S. O., 1914, as to all the routes in the city until the application has been finally disposed of, has been made by the Railway Board, that only affects the rights of the parties since its date. While finding the railway guilty of the charge I do not impose any sentence at present, and will wait a reasonable time to permit the company to carry out the provisions of the statute. I will, therefore, defer sentence until the General Sessions of the Peace, to be held in May, 1916. In the meantime, if a reserved case be desired to the Court of Appeal on the above I shall grant it."

Detroit Skip-Stop Campaign.—Some form of skip-stop plan will be tried by the Detroit (Mich.) United Railway within a short time, provided the necessary permission is forthcomng from the city authorities. The company's idea is to conduct the first experiment on the Woodward line, the heaviest passenger line in the city, and if satisfactory to the riders to make the plan effective on other lines. For the last three weeks the company, through its weekly publication, *Electric Railway Service*, has been seeking the opinions of its riders on the skip-stop plan. The response in favor of the idea has been so large and so unanimous that it is believed the time is opportune for the experiment. Congestion in some of Detroit's main thoroughfares has been increasing at such a pace recently that in the rush hour many of the cars cannot average more than 7½ m.p.h. Half trips on some of the lines which are scheduled to be made in thirty minutes are taking from thirty-eight to forty-one minutes. The company's plan, generally speaking, is to have the cars going in one direction stop at every other block and on the return trip stop at the blocks which have been missed in going in the opposite direction.

Campaign in Brooklyn Against Reckless Vehicle Driving.—According to the Brooklyn (N. Y.) Rapid Transit Company there were 434 accidents to vehicles on its lines in September. In 60 per cent of these mishaps the company held the drivers of motor and horse conveyances were to blame. In a statement which it has issued the company says: "We commend these figures to all those who are responsible for the operation of commercial or pleasure vehicles in the streets of Brooklyn. In common with other street railroads we are spending thousands of dollars each year in instructing our operating employees in safety and in following up this safety education by a comprehensive system of inspection and report. Where operating employees are found deficient in their knowledge of safety duties through the occurrence of accidents or other means of disclosure, we see to it that they are promptly and effectively reinstructed and the man who cannot or will not understand such instruction does not remain long in the service." The company announces that hereafter it will have its car crews report the numbers or owners' names of vehicles recklessly operated which may be involved in accidents, and, if such reports are substantiated after investigation, notices will be sent to the owners, advising them of the circumstances.

New Traffic Rules in Louisville.—Traffic regulations which are revolutionary for Louisville have been ordered put into effect by the Board of Public Safety, of that city, and promise to be very effective in remedying traffic conditions on Fourth Street, the principal retail street in that city. From Main Street to Broadway, six blocks, there is always a large amount of traffic, and this stretch of street has been most troublesome for the Louisville Railway. The Fourth Street line is the principal line of the company and, in addition to the through travel, it carries a large number of transfer passengers in the central part of the city. Blockading of traffic here has often seriously interrupted schedules and discommoded passengers transferring from these cars to cross-town cars. The rule promulgated now provides: That no vehicle shall be left standing at the curb on Fourth Street between Main Street and Broadway, or on Walnut and Chestnut Streets between Third and Fifth Streets; that traffic in or out Fourth Street between Main Street and Broadway may not turn across the street to pass into cross streets, *i.e.*, to the left, although traffic from cross streets may turn into Fourth Street; that no vehicle in any of the described squares shall stand within 15 ft. of a fire hydrant and that an additional safety zone shall be established on Fourth Street between Green and Walnut Streets. Authority is given to the police to enforce these regulations and to prosecute offenders in the ordinance court. Another improvement is being installed in the form of a semaphore tower at Third Street and Broadway, the arms to be operated by the officer seated in a signal tower at the corner. This is a very busy corner and it has been selected to make an experiment. If the plan proves desirable here the city will probably make similar installations at other corners.

Personal Mention

Mr. R. E. L. Kolb has succeeded Mr. F. M. Bright as roadmaster of the York (Pa.) Railways.

Mr. Warren Dougherty has succeeded Mr. T. Carman as master mechanic of the Atlantic & Suburban Railway, Pleasantville, N. J.

Mr. H. A. Robson, commissioner of Public Utilities for Manitoba, has resigned to become general counsel for the Union Bank of Canada.

Mr. O. E. McCormick has succeeded Mr. George Otis Spencer as assistant secretary of the Middle West Utilities Company, Chicago, Ill.

Mr. Irving E. Forbes has succeeded Mr. W. W. Forbes as president of the Unanoonuc Incline Railway & Development Company, Manchester, N. H.

Mr. George Grove has been appointed engineer of maintenance of way of the Montoursville (Pa.) Passenger Railway to succeed Mr. P. Hettler.

Mr. W. H. Chesebrough has been elected vice-president of the United Railways Investment Company, New York, N. Y., to succeed Mr. Moritz Rosenthal.

Mr. Henry Malloch has been elected secretary and treasurer of the Navada County Traction Company, Grass Valley, Cal., to succeed Mr. L. W. Pryor.

Mr. L. C. Fritch has been appointed general manager of the Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont. Mr. Fritch is general manager of the Canadian Northern Railway, Eastern Lines, and will now occupy the dual position.

Mr. E. J. Peartree has been appointed superintendent of transportation of the Trenton & Mercer County Traction Corporation, Trenton, N. J., to succeed Mr. C. E. Hart, who resigned some time ago. Mr. Peartree was previously connected with the United Traction Company at Troy, N. Y., for twenty years.

Mr. David M. Bunn, superintendent of the engineering and construction department of the Appalachian Power Company, Bluefield, W. Va., has also been appointed manager of the Bluefield division of the company. The property of the company includes 6.25 miles of electric railway, connecting Graham, Va., and Bluefield, W. Va.

Mr. E. M. Willis, secretary to President Howard W. Elliott of the New York, New Haven & Hartford Railroad at Boston and a director of the Berkshire Street Railway, the Vermont Company, the Hoosick Falls Company, and the Old Colony Railroad, has been appointed assistant to the president, with offices in the south station, Boston. Mr. Willis was assistant chief clerk to Mr. Elliott when the latter was president of the Northern Pacific Railway.

Mr. W. Norris, formerly general manager, chief engineer and purchasing agent of the Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont., has been appointed general superintendent of that road. Mr. A. C. Johnstone has been appointed accountant, and Mr. L. W. Mitchell, Toronto, treasurer and purchasing agent of the Canadian Northern Railway, has also been appointed purchasing agent of the Chatham, Wallaceburg & Lake Erie Railway.

Mr. George W. Burke, who has succeeded Mr. T. R. Crumley as master mechanic of the Evansville (Ind.) Railways, entered electric railway work with the Evansville Suburban and Newburg Railway as a motorman. At the beginning of construction of the Evansville Railway's lines he accepted a position running a locomotive on construction work for the company. On the completion of the line he continued with the company and ran a locomotive in freight service for a period of three years. He was then appointed shop foreman of the company, in which capacity he served four years.

Mr. William B. Graham, for the last nine years superintendent of the Essex division of the Public Service Railway, Newark, N. J., who has been transferred to take charge of the Southern division, with headquarters at Camden, was waited upon by 400 employees of the company at the Roseville carhouse on the night of Nov. 15 and was presented with a diamond ring, the gift of the conductors and motormen of the division. The supervisors of the division gave him a pair of diamond-set cuff buttons. Mr. Graham thanked the men and expressed his regret at leaving the division. He was followed by General Superintendent Newton W. Bolen, who, during the course of his remarks, introduced Mr. Williams, the successor to Mr. Graham on the Essex division. There was an informal program of songs and stories, participated in by representatives of the various carhouses in the division.

Mr. Charles A. Stone of Stone & Webster, Boston, Mass., is to be elected president of the American International Corporation, organized with a capital of $50,000,000, to promote American enterprise, industry and commerce in foreign lands. It is announced that Mr. Stone will remove his residence from Boston to New York. He was born at Newton, Mass., on Jan. 16, 1867, and was graduated from the Massachusetts Institute of Technology in 1888 with the degree S. B. He is a member of the firm of Stone & Webster and is a director of the Stone & Webster Construction Company, Stone & Webster Engineering Corporation, Stone & Webster Management Association and many other corporations, including the Blue Hill Street Railway, Brockton & Plymouth Street Railway, Dallas Electric Corporation, El Paso Electric Company, First National Bank of Boston, Houston Electric Company, Jacksonville Electric Company, Massachusetts Gas Company, Minneapolis General Electric Company, Old Colony Trust Company, Railway & Light Securities Company, and the Whatcom County Railway & Light Company.

Mr. James Forgie, consulting engineer of New York, is awaiting the receipt of a Telford gold medal which was awarded to him by the Institution of Civil Engineers of Great Britain in recognition of his paper on "The Laxaxalpam Aqueduct Tunnels in Mexico" and of his achievement in engineering, the subject of the paper. The award was formally announced at the meeting of the institution on Nov. 2. Among the very few men in this country who have received this honor are Col. W. H. Harts, Mr. William Barclay Parsons, Mr. W. J. Wilgus and Mr. J. V. Davies. Mr. Forgie has for many years been prominently identified with the solution of rapid transit problems in cities; notably in New York the Pennsylvania Railroad tunnels and the Hudson & Manhattan Railroad tunnels under the Hudson River, and is an authority on tunnelling and construction works of a subaqueous character. Twenty years ago he helped to solve the difficulties connected with the growing density of traffic in the first underground electric railroad in London. The experimental train as recommended by Mr. Forgie was a success, and at the annual meeting of the City & South London Railway on Feb. 1, 1915, it was adopted as a remedy to alleviate the crowded conditions at the rush hours.

OBITUARY

Lieut. Cecil G. Weitzmann, traffic manager of the Para (Brazil) Electric Tramways, was killed in action with the Allies in France on Sept. 25.

S. W. Divine, a pioneer in electric railway work in Chattanooga, Tenn., died in that city on Nov. 16. He was sixty-seven years old. Mr. Divine was for many years a director of the Chattanooga & Lookout Mountain Railway and also was vice-president and a director of the Rapid Transit Company of Chattanooga, both of which are now included in the system of the Chattanooga Railway & Light Company.

E. M. Van Frank, president of the Petaluma & Santa Rosa Electric Railway, Petaluma, Cal., died at his home in Santa Rosa on Nov. 13. Mr. Van Frank was born at Quincy, Ill., on Jan. 15, 1866. After graduating from the high school at Quincy, Ill., Mr. Van Frank when a mere boy made a trip to South America. On his return he settled in San Francisco and assumed a position with the General Electric Company. Later he superintended the construction of the Sutro Street railway in San Francisco, also of the power houses of the system and after the completion of the road he became its general manager. When this road was absorbed by the United Railroads, Mr. Van Frank entered the employ of that company. He resigned from the United Railroads in May, 1906, to assume the management of the Petaluma & Santa Rosa Electric Railway. He is survived by his widow.

Construction News

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

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

RECENT INCORPORATIONS

*Summers Street Realty Company, Charleston, W. Va.—Chartered in West Virginia to construct an electric railway in Charleston. Capital stock, $25,000. Incorporators: J. S. Hill, R. G. Hubbard, Guy A. Porter, R. E. Eskins and G. C. Porter, all of Charleston.

FRANCHISES

Rhodes, Iowa.—The Iowa Railway & Light Company has asked the Council for a twenty-five year franchise to supply electricity in Rhodes. The proposal will be submitted to the voters on Dec. 9.

Methuen, Mass.—The Bay State Street Railway has received a franchise from the Council to construct double tracks on the new river boulevard from Lowell Street to the Lawrence line.

Trenton, N. J.—The New Jersey & Pennsylvania Traction Company will ask the Council for a franchise to double-track West Hanover Street from Green's Place to Calhoun Street.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a one-year's extension of time from February, 1916, on its franchise to construct a line on Morrison Street from Chapman to Washington Streets. The franchise was granted nearly two years ago and the track should be laid and in operation by February.

Chattanooga, Tenn.—The Central Power Company, recently incorporated, has asked the Council for a franchise to build an interurban railway from Chattanooga to Cleveland, about 25 miles. G. B. Adams, Chattanooga, is interested. [Oct. 23, '15.]

TRACK AND ROADWAY

Fort Smith Light & Traction Company, Fort Smith, Ark.—A tentative agreement has been reached between the Fort Smith-Van Buren Bridge Commission and officials of the Fort Smith Light & Traction Company which is expected to result in the company's early use of the Fort Smith-Van Buren bridge, abandoned last December after the Supreme Court annulled its forty-five-year franchise.

Connecticut Company, New Haven, Conn.—Work has been begun by this company on the construction of an extension of its line on East Grand Avenue to Lenox Street, New Haven.

Sandpoint & Interurban Railway, Ltd., Sandpoint, Idaho.—The stockholders of this company have decided to issue $20,000 of bonds to take up notes in the sum of $15,000, and to make improvements. Among the improvements is a spur track to the Great Northern Railway depot.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—Cars are now being operated on the new track on Franklin Avenue between Bloomington and Normal. The track was removed from the west side to the center of the street when a new pavement was laid.

*Chicago, Ill.—A proposed line, about 8¼ miles long, to connect various suburban towns in the southern part of Chicago and villages and cities adjacent to the southern city limits, is meeting with wide favor. A joint committee, representing various commercial and civic organizations in this suburban territory, has gone over the proposed route from Calumet Park to State Line Street, West Hammond. The various organizations interested are the Blue Island Commercial Club, Riverdale Improvement Association, Dolton Civic Club, West Hammond City Club and the Hammond Chamber of Commerce.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—This company is constructing a bridge over the tracks of the Chicago, Milwaukee & St. Paul Railway just south of Milwaukee. The bridge consists of a 185-ft. skew through girder span, a 140-ft. truss span and a 55-ft. skew deck girder span. The company has built the concrete abutments and piers and the contract for the steel work has been let to the Wisconsin Bridge & Iron Company.

Kankakee (Ill.) Electric Railway.—This company has been repairing its track in the commercial subdivision and cars will soon be running into that part of the city. This plan follows an agreement between the railway and the Kankakee Commercial Club for the opening of the subdivision. The company agreed to operate cars when enough families had moved into the district to cover operating expenses, the entire plan being one designed to enlarge the growth of the city. The ultimate plan will be to construct a loop to connect with the East Court Street line at one terminal and with the Electric Park line at the other.

Indiana Railways & Light Company, Kokomo, Ind.—This company is erecting 12 miles of 6600-volt transmission line connecting its present lines with Hillisburg, Circleville and Kempton, and is installing a distributing system in each of the three towns.

Lafayette & Northwestern Traction Company, Lafayette, Ind.—This company is being reorganized in Lafayette and plans to proceed with the enterprise undertaken by O. L. Brown. Mr. Brown will not be connected with the new company. W. L. Moyer, Rensselaer, is interested. [Oct. 23, '15.]

Fort Madison Street Railway, Fort Madison, Iowa.—Announcement has been made that this company, which is owned and operated by the Mississippi Valley Electric Company, will spend about $50,000 to rehabilitate its line.

Lawrence Railway & Light Company, Lawrence, Kan.—It is reported that this company has offered to pay $1,000 toward the expense of equipment of an ornamental lighting system in Lawrence. About $3,000 will be raised by a special tax.

Wichita Railroad & Light Company, Wichita, Kan.—This company plans to construct a line to the race track to be built on East Thirteenth Street. A bridge will be built across the canal at Twelfth Street, at which point the tracks will extend north alongside the site of the grandstand.

Cumberland & Manchester Railroad, Barbourville, Ky.—Work has been begun on the construction of this company's line from Barbourville to Manchester, 24 miles. It is expected that the road will be completed next spring. M. E. S. Posey, Barbourville, chief engineer. [July 10, '15.]

Holyoke (Mass.) Street Railway.—Plans are being considered by this company to construct an extension in South Hadley Falls on West Main Street to Canal Street, on Canal Street to Taylor Street and on Taylor Street to North Main Street, with a possible loop down North Main Street to the end of the present line.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—Operation has been resumed on this company's beach route from Gulfport to Dubuys.

Lincoln (Neb.) Traction Company.—Work has been begun by this company on the construction of track from the present terminus of the North Sixteenth Street line to the intersection of Sixteenth and W Streets.

*American Sugar Refining Company, Brooklyn, N. Y.—This manufacturing company is preparing estimates for possible electric operation over the track connecting its plant with freight floaters. Third-rail, overhead and storage battery operation are all being considered, the freight cars to be hauled by one electric freight locomotive. Energy could be supplied from the company's own powerhouse.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The commission has approved the award by the New York Municipal Railway Corporation of a contract to Connors Brothers Company, Inc., for the construction of the second section of the new elevated railroad in Jamaica Avenue, for $726,168. The work will include the erection of the steel work between Walnut Street and Cliffside Avenue. The railway submitted the contract for competitive bidding and received seven bids, of which that of the Connors Brothers Company was the lowest.

Otsego & Herkimer Railroad, Cooperstown, N. Y.—It is reported that this company proposes an expenditure of about $250,000 for betterments.

New York, N. Y.—The contract for track laying on the new rapid transit lines in Queens Borough has been awarded by the Public Service Commission for the First District of New York to the Thomas Crimmins Contracting Company, the lowest bidders, for $204,898.

Interborough Rapid Transit Company, New York, N. Y.—Bids for the supply of special work for the Lexington Avenue subway from its junction with the existing subway at the Grand Central Station to 138th Street, The Bronx, where the east side and west side branches diverge, will be received by the Public Service Commission for the First District of New York on Dec. 7. The special work called for includes all frogs, switches and cross-overs for the line, comprising nineteen separate pieces. Delivery of the articles must begin within two months and must be completed within eleven months after the delivery of the contract. The contractor will be required to furnish a bond in the sum of $5,000.

Manhattan & Queens Traction Corporation, New York, N. Y.—The Manhattan & Queens Traction Corporation, which has a franchise to operate from the Queensboro Bridge through Queens to the city line of Greater New York has succeeded in obtaining an extension of the time in which it agreed in its franchise to complete its lines from Jamaica, where they now terminate, through St. Albans to the city line.

Ohio Service Company, Cambridge, Ohio.—This company has just completed the construction of its transmission lines from Newcomerstown to Dennison and from Dennison to Tippecanoe. Its entire transmission line system from Coshocton to Cambridge and to New Philadelphia has been placed in operation.

Oklahoma & Interstate Railway, Oklahoma City, Okla.—It is reported that this company is considering the construction of an interurban line from Bartlesville to Nowata, 28 miles. Bartlesville proposes to raise a $50,000 bonus, give the company a free right-of-way of practically half the distance to Nowata and a franchise to come in over its streets. If Pawhuska citizens will raise a like bonus and furnish a free right-of-way it is proposed to extend the line to that city, 28 miles from Bartlesville. This company proposes to build a chain of interurban lines that will connect towns in southeastern Kansas, southwestern Missouri and northeastern Oklahoma. John R. Rose, Oklahoma City, president. [Nov. 13, '15.]

Chatham, Ont.—Plans are being considered to construct a hydro-radial line between Petrolia and Chatham.

London & Lake Erie Railway & Transportation Company, London, Ont.—Plans are being made by this company to extend its line from Lambeth to Delaware.

Toronto (Ont.) Civic Railway.—A report is being prepared by R. C. Harris, commissioner of works, on the extension of the St. Clair Avenue line to Avoca Avenue, Toronto.

Toronto (Ont.) Suburban Street Railway.—Track has been laid by this company on its extension from Lambton to Guelph, 46 miles, over the Humber River bridge to the junction with the line on Dundas Street at Lambton Park. Ballasting work is now under way. Contracts for the catenary line equipment will be let in the near future.

Galveston-Houston Electric Company, Galveston, Tex.—This company, with the other lines leasing the causeway across Galveston Bay, consisting of all steam roads entering Galveston, has agreed to bear its pro rata of three-fourths of the cost of constructing a temporary wagon bridge to connect the two ends of the arch bridge with the mainland. Construction work will be started immediately by the engineers of the railroads.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—The work of double-tracking its extension from Orchard to Clinton, 3 miles, has been begun by this company. This extension is only a preliminary step toward connecting up the double track out of Ogden and out of Salt Lake City, thereby giving the road double track all of the way. It is reported that the double track work over the remainder of the route will be pushed as rapidly as possible. Contracts have been let by the company for the erection of two bridges, one at Hunter's cut and the other near Roy. The construction of a viaduct at Lagoon to carry the public highway over the tracks is contemplated but the plans are being held in abeyance until an agreement can be reached with the town of Farmington as to the division of expenses.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—A contract has been awarded to the Wasatch Construction Company, Provo, for grading this company's extension from Spanish Fork to Payson.

SHOPS AND BUILDINGS

Lincoln (Neb.) Traction Company.—The Lincoln Terminal Company has recently been organized with W. E. Sharp, president of the Lincoln Traction Company, as president, for the purpose of erecting a building on a corner of the principal business street in Lincoln, to be known as the Terminal Building. The structure will be 85 ft. x 142 ft., ten stories, and will be of steel, terra cotta and granite. A large room on the main floor of the building will be used as a display room for the Lincoln Traction Company's electric appliances and fixtures. The basement, which will be finished off in marble and tile, will be equipped for the convenience and entertainment of the trainmen when off duty. The third floor will be used as the general offices of the railway company. It is expected that the building will be ready for occupancy by next summer.

International Railway, Buffalo, N. Y.—H. C. Young, superintendent of bridges and buildings International Railway, and Edward E. Franchot, of counsel for the company, presented plans for improving the freight and passenger terminal of that line in Lockport at a hearing before the Public Service Commission on the complaint of certain residents of West Lockport to have the International Railway and the Buffalo, Lockport & Rochester Railway construct a new passenger terminal in the city. The plans of the company call for the addition of a second story to the existing structure and complete remodeling and improvement of the waiting rooms, etc. The Lockport offices of the company will be on the second floor according to plans submitted, and this will increase the size of the waiting room and ticket offices. It is expected the company's plans will be accepted.

Interborough Rapid Transit Company, New York, N. Y.—The Public Service Commission for the First District of New York has ordered this company to construct and maintain a new local station on the Sixth Avenue and Ninth Avenue elevated line in the neighborhood of 150th Street. Residents and property owners in the vicinity of 150th Street recently petitioned the commission to order a station at that point. The exact location of the station was left open, with instructions to the chief engineer of the commission to report upon the most suitable site. As soon as he makes his report the company will be ordered to begin the construction of the new station.

New Midland Power & Traction Company, Cambridge, Ohio.—This company reports that it is building a new $4,000 carhouse at Dennison.

Toronto (Ont.) Civic Railway.—In compliance with a request of the Board of Control of Toronto for a report on the cost and advisability of building municipal car shops in Toronto, R. C. Harris, commissioner of works, reports that he considers it inadvisable at the present time.

POWER HOUSES AND SUBSTATIONS

Richmond Light & Railroad Company, New York, N. Y.—A report from this company states that it is installing a 7500-kw. Westinghouse turbo-generator in its power plant at Livingston.

Ohio Service Company, Cambridge, Ohio.—This company's power house which was begun two years ago has been completed. A new water wheel and a new head-race are being installed at the hydroelectric plant and the old dam has been repaired. The company's substation at Dennison has been completed. A new 500-hp. boiler is being installed at Coshocton and a new engine and 400-kw. d.c.-a.c. generator will be installed at Hanover.

Mitchell Street & Interurban Railway, Mitchell, S. D.—This recently organized company is investigating the water-power at Great Bend, about 78 miles north of Mitchell, with a view to installing a power plant to supply electricity to the proposed railway and to furnish electrical service to surrounding towns.

Manufactures and Supplies

ROLLING STOCK

Visalia (Cal.) Electric Railroad recently lost by fire one of its passenger cars.

City Light & Traction Company, Sedalia, Mo., expects to purchase eight single-truck, light-weight, one-man cars.

Lake Erie & Northern Railroad, Galt, Ont., has ordered three Westinghouse electric locomotives.

Long Island Railroad, New York, N. Y., has issued inquiries for twenty-five trailer cars for use in its electric zone.

Mississippi Valley Electric Company, Iowa City, Iowa, will order within a week four 28-ft. one-man passenger cars.

Durham (N. C.) Traction Company has ordered three 26-ft. and three 31-ft. semi-steel city one-man car bodies from the Southern Car Company.

New Midland Power & Traction Company, Cambridge, Ohio, has converted its single-truck cars into pay-as-you-enter near-side one-man cars.

Des Moines (Ia.) City Railway is reported as having placed an order for forty front-entrance, center-exit motor cars equipped with multiple-unit control.

Springfield (Mass.) Street Railway is having ten of its fourteen-bench open cars rebuilt by the Wason Manufacturing Company into prepayment semi-convertible cars.

New York (N. Y.) Municipal Railway will soon place orders for 100 additional subway cars for the Sea Beach Line, which will make a total of 400 cars ordered by this company.

Menominee & Marinette Light & Traction Company, Menominee, Mich., has rebuilt twenty single-truck cars and equipped them with door and step operating mechanism for one-man near-side stop operation, with front entrance and exit only.

Interborough Rapid Transit Company, New York, N. Y., noted in the Electric Railway Journal of Nov. 13, 1915, as having issued requests for bids on 311 new subway cars, including 234 motor and seventy-seven trailer cars, has placed an order for these car-bodies with the Pullman company.

Boston (Mass.) Elevated Railway lost by fire seven automobiles at the company's Harrison Avenue garage on the night of Nov. 23, at a loss of $12,000. The blaze was caused by an explosion of gasoline which occurred while a tank was being filled. The company's purchasing bureau will shortly be in the market for new machines.

Pittsburgh (Pa.) Railways, reported in the Electric Railway Journal of Nov. 20, 1915, as expecting to purchase a large number of cars, have ordered 125 motor cars and fifty trail cars. An order for seventy-five cars was placed with the Cincinnati Car Company and an order for the remaining 100 was placed with the St. Louis Car Company. These cars are all to be of the low-floor type, as described in the Electric Railway Journal of April 11, 1914.

TRADE NOTES

Baldwin Locomotive Works, Philadelphia, Pa., has equipped three cars of the Ironwood & Bessemer Railway & Light Company, Ironwood, Mich., with Baldwin L-type trucks.

Simmen Automatic Railway Signal Company, Buffalo, N. Y., has appointed W. H. Crawford as Pacific Coast representative. Mr. Crawford will maintain headquarters at 609 Spalding Building, Portland, Ore.

Curtain Supply Company, Chicago, Ill., has received orders to equip with ring No. 88 curtain fixtures and Rex all-metal rollers the three cars recently ordered by the Laredo Railway & Electric Company, Laredo, Tex., and one car ordered by the Walnut Ridge & Hoxie Light, Power & Transit Company, Walnut Ridge, Ark., from the Southern Car Company.

Standard Paint Company, New York, N. Y., manufacturer of P & B insulating tape, has just placed upon the market a rubber friction tape, under its IMP brand. The IMP friction tape will not compete with or in any way displace the P & B tape, which is especially adapted for work in mines and weather-exposed locations. The IMP tape is treated with rubber compound and finished by the friction process. It is suitable for all kinds of wiring work.

Russian Society for Electrical Enterprises, Ltd., Petrograd, Russia, address, No. 5, Marsowo, which controls electric lighting stations in Pawlowsk, Uman, Kamenetz-Podolsk and tramways in Elizabethgrad and Uman, has opened at the present time a branch for resale of electrical machines and apparatus and insulating materials, and also of steam and naphtha engines as well as of water turbines, and desires to enter into relations with first-class factories in the United States producing these goods with the view of becoming their agents in Russia. The company refers to the Russian & French Bank as to its responsibility.

ADVERTISING LITERATURE

A. L. Drum & Company, consulting engineers, Chicago, Ill., have recently published a pamphlet discussing the construction features and advertising advantages of underground plazas to relieve traffic congestion at subway stations in important traffic districts. They show diagrams and sections of such proposed underground plazas at Herald Square and Times Square in New York, at the junctions of the subway systems at those points. These plazas would be constructed about 12½ ft. below the surface of the street, directly over the train platforms of the subways to which they would furnish access. When built simultaneously with the passenger subway station the additional cost would be very slight, while the increased earning capacity of the basement shops facing on the plaza and of shops on city property in the underground plaza will be very large. Thus it is estimated that the additional cost of the underground plaza at Herald Square would be less than $400,000, while the rental value of the shops on the plaza should exceed $100,000 per year, and the additional show-window space to the retail dry goods stores fronting on the plaza would be worth $300,000 per year. Similarly, the additional cost of the underground plaza for Times Square would be less than $200,000, while the rental space would amount to $60,000 per year and the value of the show-window space to the present stores would be at least $250,000 a year.

WORK OF NEW YORK LEGISLATIVE TAX COMMITTEE

The legislative committee on taxation, of which Senator Ogden L. Mills is chairman, has completed its work in New York City and will hold several sessions in cities up-State. The committee expects to return to New York City in December, examine more witnesses and then prepare its report for submission to the New York Legislature next January. On Oct. 16 Senator Mills was quoted as follows:

"If we can work out and solve the personal tax problem, and the Legislature is willing to treat with our suggestion, we can go on, but if what we propose is thrown out of the window by the public and the Legislature, it would be idle to continue. Yesterday's test question seems to have been misunderstood, partly through a suggestion made by me to the effect that it would be possible by means of an income tax running from 1 to 3 per cent to raise some $45,000,000.

"The estimate was not made by me, nor was it in any sense accurate or final, in so far as the income tax proper is concerned. The committee is not committed to the plan either tentatively or finally. As a matter of fact, at the last executive session of the committee the chairman was authorized to prepare two or three substitutes for the personal property tax.

"In view of the misunderstanding which seems to have arisen about an income tax, I desire to state that public service corporations are a separate and distinct class. They enjoy special privileges from the State, and should pay higher taxes. The subject of taxing public service corporations is, however, so vast and intricate that the committee has been and is unable to consider it in the short time at its disposal. A Connecticut commission took some two years to complete this task, while this committee has but six months at its disposal. I hope that the committee at some future date may be able to take up this question, but any discussion at this time on taxation must be understood not to include public service corporations."