# Electric Railway Journal

Published by the McGraw Publishing Company, Inc.

Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLVI NEW YORK, SATURDAY, OCTOBER 23, 1915 No. 17



**BIGGER AND BIGGER STEAM TURBINE UNITS**

The rate of development of the art of steam turbine construction is indicated by the fact that just about three years ago, in the issue of the Electric Railway Journal for Oct. 5, 1912, to be exact, we were describing the 20,000-kw. turbines then in process of installation in the new Northwest station of the Commonwealth Edison Company in Chicago. That plant was laid out to contain twelve such units in two buildings. Two units were installed at the outset but the program has now been altered so that there will soon be added a 35,000-kw. unit, the largest yet ordered. While it is true that a turbine of 35,000-kw. capacity has been placed in Philadelphia, the Chicago turbine is rated at a lower power factor, hence is actually larger. While the largest turbines producing power exclusively for street railway purposes are those in the Seventy-fourth Street power plant of the Interborough Rapid Transit Company in New York, both the Commonwealth Edison and Philadelphia Electric companies furnish large amounts of power for traction purposes. Hence these great turbines can be properly considered a part of electric railway progress. The causes impelling the increase in size of unit are numerous. The increasing concentration in power production renders practicable the economical loading of large units. It thus becomes possible to take advantage of the small floor space, fuel consumption, operating costs, etc., of the large unit. If the present rate of increase in size of unit is maintained, and it may be estimated at 5000 kw. per year, but three years will elapse before the 50,000-kw. unit, now the subject of vague rumors, will become a reality. There is no apparent reason why it should not do so. The magnitude of these giants is indicated by the fact that a single 50,000-kw. unit would furnish power for 1600 20-ton cars, or for 2,000,000 20-cp. incandescent lamps, enough for a city of very considerable size.

**WANING PROBLEM OF MOTOR-BUS COMPETITION**

To those super-enthusiasts who have prophesied the throttling of interurban freight and express business by the motor bus we commend the account published last week regarding the latter's very comprehensive failure in southern California. Following the lead of the jitney, motor-bus competition for long-distance express traffic has in this case started down hill, and the net result of a costly experiment has been that a number of people have learned that the terminal handling and transfer of freight, which is eliminated by the motor bus, is but a small part of the cost of service. This is something that could have been much more readily demonstrated by a little investigation and a few calculations, but because it contained one factor that made for profit, the business was inaugurated on a large scale under the fine old doctrine of optimism that advocates first to make the leap and then to look. It is, perhaps, especially fortunate that the bogey of motor-bus competition in freight service has been exposed at this time. The electric railways sadly need a relief from the bedevilment that has come from this new form of transportation, and there are still two features in connection with it that display evidences of activity. One of these is the growth of the privately-owned automobile; the other is bus service *de luxe* at an increased fare, and while the latter does not appear any more alarming than the original "jitney menace," the former provides enough material for the electric railways to worry about without having to include any other motor-bus problems.

**REPORTING THE SAN FRANCISCO CONVENTION**

Considerable interest having been expressed as to the manner in which the Electric Railway Journal was able to mail a 94-page paper, containing a practically complete report of the proceedings, on the day following the closing of the San Francisco convention, a few facts regarding the circumstances are given. It has been customary for the paper to issue four dailies during each convention, giving the proceedings day by day. This year this plan would have meant that the dailies, mailed in San Francisco, would not have brought their report of the convention to our subscribers in the East until a week or so after the convention closed. Hence an adequate telegraphic report was substituted. For the convenience of the convention attendants, however, a small daily bulletin containing matter of transient and local interest was printed and distributed at San Francisco. In reporting the discussion at San Francisco and the papers that were not available in manuscript form previous to the calling of the convention, a total of nearly 18,000 words was telegraphed, the last message being received at 7.40 Eastern time, Friday evening. The lateness of the last dispatches was due to the considerable difference in time between San Francisco and New York and to the time required to file and transmit the message after the close of the ceremonies at the Exposition. However, the last form was closed by midnight and complete copies of the issue began to come from the bindery at about 10 o'clock on Saturday morning, practically according to normal schedule. While our readers undoubtedly missed the

dailies there were some compensating advantages accruing from the use of this year's plan. It permitted an ideal arrangement of the reports of society proceedings in the order of occurrence, and the featuring of some of the leading papers in a style more nearly commensurate with their importance than under the plan of previous years. Moreover, the facilities of the ELECTRIC RAILWAY JOURNAL'S own printing office, one of the largest and most complete plants in appointments in New York, were at its disposal. It was a great pleasure to be able to give our readers genuine newspaper service and there is evidence that it was appreciated, thus justifying the effort and expense.

## PUBLIC INTEREST IN SURPLUS

The testimony in the recent Interstate Commerce Commission investigation of the Rock Island mismanagement appears to bring out the idea that the public should have no interest in the disposition of net corporate income or surplus so long as rates are reasonable. To our minds this attitude deserves the censure bestowed upon it by the commission. While nominally the surplus belongs to the stockholders and the public has no concern in its disposition so long as such is made legitimately, an indirect public interest does cling to the surplus in that any dissipation of it is almost certain to work harm to the railway factors in which the public is directly interested. As the commission states, if the funds derived from transportation services are expended wastefully or corruptly, the inevitable result must be either increased rates, in order to enable the company to obtain money to pay operating expenses, or bankruptcy.

To critics of this view it seems absurd to imagine that the rates of the Rock Island, for example, are higher because somehow or other the bottom was kicked out of the company's treasury, but they miss the point. We shall take no time to argue whether or not these particular rates are higher on this account, but the real issue, and the only one in which we are concerned, is that with the condemned system of management, they would have to be raised sooner or later, and the public, knowing of this eventuality, has a right to be concerned in all practices that would, from its point of view, result in an adverse effect upon the existing rates.

It can hardly be denied that the analysis of the theory of railroad rates begins with a study of railroad expenditures, and the honesty that is shown by a management in handling its surplus account is a fair criterion of its general honesty. If it misuses the surplus account, it would feel no qualms of conscience in skimping maintenance, paying excessive salaries and otherwise depreciating the property and pinching the stockholders, and in time the officials would be obliged to plead for higher rates to cover their misdeeds or else submit to bankruptcy or a complete reorganization. When property, service and rates are thus threatened, it cannot truthfully be said that the public must look on unconcerned. At present rates are fixed to pay a reasonable return on the fair value of property used by the public. Railway officials have no right to misuse the portion of this reasonable return left after fixed charges so as to restrict the company's earning power and make the whole rate of return seem inadequate.

## THE TIME LOST IN MAKING STOPS

With the impetus that has been given to consideration of the influence of stops per mile on schedule speed by the remarkably comprehensive report presented by the committee on schedules and time-tables to the Transportation & Traffic Association at San Francisco, it might be pertinent to call attention to one factor that may be overlooked in discussions of the subject. This is that the time involved by a stop includes not only the interval during which the car is stationary, but also the losses due to slowing down before the stop and to accelerating afterward. These losses frequently amount to more than the actual time that the car remains stationary, and the fact should be clearly specified in case it is intended that they are to be left out of consideration.

It is probable that the extent of the acceleration and braking periods has been frequently underestimated in the past, as some authorities have vehemently asserted that elimination of stops could have only a slight effect upon schedule speed in city service, this fallacy clearly arising from a failure to comprehend that a stop involves more than the time lost in standing still. But as a matter of fact, the braking and acceleration losses are subject to close approximation by calculation and they are much more constant in amount than most of the other units entering into transportation problems. For their determination it is necessary only to arrive at the "average non-stop speed" of a car on the route under consideration and then to apply the elementary formulas of mass acceleration, using the known rates that are established by the capacity of the motors and of the brakes.

The "average non-stop speed" is a figure that may be approximately described as the speed at which a car could be run over the route behind a long gap in the schedule and without accepting passengers, thereby avoiding all passenger stops but subject to the usual vehicular interference. It is materially less than the maximum speed of the car, because on any city route there are of necessity many slow-downs due to various causes other than passenger stops, and while these slow-downs are irregular in number their average is fairly constant and may be well established on any particular route. City cars, for instance, are quite frequently geared for a maximum speed of 20 m.p.h. on level track, but the average non-stop speed for large cities is very generally somewhat less than 15 m.p.h. The difference is inevitable, but that it is reasonably constant under any given set of conditions is easily demonstrable.

For example, on five routes of a certain large city system the schedule speeds were found to range from 7.2 m.p.h. to 9.4 m.p.h., the schedules being generally considered to be easy, and the average number of stops per mile was found to range from 14.4 to 7.7. Allowing for a fifteen-second loss at each stop and deducting the

resulting time loss per mile on each route from the respective schedule time per mile, there is provided a basis for estimating the non-stop speed for each route, and this works out at a figure that ranges from 12.2 m.p.h. to 13.8 m.p.h., giving a variation of only 6 per cent above and below the mean. So small a variation from a constant figure for the non-stop speed in this city is significant in view of the widely different conditions with regard to stops and schedule speeds that existed on the five routes under consideration, the speeds varying more than 13 per cent from the mean figure and the stops per mile no less than 30 per cent.

Once that the average non-stop speed on any route is determined by trial or estimate—the latter being really accurate enough for all ordinary purposes—the calculation of the time lost in retardation and acceleration becomes simple. Assuming, for example, a braking power that provides retardation at the frequently used figures of 2 m.p.h.p.s. and an average non-stop speed of 15 m.p.h., the operation of bringing the car to a stop will require 7.5 seconds, during which time the car will travel 82.5 ft., according to the old formula to the effect that distance equals one-half the rate of acceleration multiplied by the square of the time interval.

If the brakes had not been applied, however, and the car had continued to move at a speed of 15 m.p.h., this distance of 82.5 ft. would have been covered in 3.75 seconds, instead of the 7.5 seconds that were actually used up during the braking period. In consequence the loss in time due to braking would be the difference between the two figures, or 3.75 seconds. By the same method it may be determined that an acceleration of 1.5 m.p.h.p.s. would cause a loss of five seconds, so that the total loss due to both braking and acceleration would be 8.75 seconds. This loss, added to the average space of time that elapses while the car is actually stationary at a stopping point, or, say, seven seconds, gives a total loss of some fifteen seconds per stop, and this figure will be found to be not far from a general average in any city service.

Of course, a car does not, literally speaking, approach every stop at the average non-stop speed. Frequently the presence of a wagon on the rails just ahead of the car will involve a dragging stop from a speed of 5 m.p.h. or even less. But on the other hand this is offset by the cases wherein the car has a clear street ahead of it and also by the fact that acceleration in the majority of instances is carried to a speed materially exceeding the average that is permitted by the interference of vehicular traffic.

On this basis, then, the savings in time effected by eliminating stops on any particular route may be at least approximated, and as indicated by the foregoing figures, the saving will be important even when the average time devoted to passenger interchange at each stop is at the absolute minimum. When, however, this interchange time amounts to seven seconds or more, as is frequently the case, and the additional time loss due to acceleration and braking makes the total loss at each stop average some fifteen seconds, the stops may actually involve the expenditure of about as much time as is devoted to getting the car over the road. Twelve stops per mile, to be specific, will produce a time loss of three minutes per mile, and even under favorable conditions will set a practical limit of 8.5 m.p.h. for the schedule speed. The elimination, however, of six of the stops will cut the time loss to 1.5 minutes and, under similar conditions, will raise the limit for the schedule speed to 11 m.p.h.—an increase of 30 per cent.

## A UNIVERSAL CAR

If the latest car of the Bay State Street Railway had nothing more to commend it than its mechanical ingenuities it would still be a remarkably fine example of car design. But the designer had bigger things in view than to make a stanchion form part of the conduit system or to cast a motor nose integral with the magnet frame at its center of weight. In brief, the car has been designed from the standpoint of the progressive operator rather than from the standpoint of the equipment man alone.

During the past three or four years the industry has been favored with some very radical departures in car design, all to the end of securing lower floors and easier boarding facilities. The Bay State car attains the same desirable ends while holding to the standard car outlines, and public criticism of freakishness is avoided. The blend of old and new practices appears most prominently in the access and fare collection features. Ordinarily the car will be operated as a modern fully-vestibuled, non-bulkhead car; but when winter or other special conditions demand it, bulkhead doors may be withdrawn from pockets which do not project even to the outer line of the corner seats. As for fare collection, prepayment with a platform fare box is the rule for one-fare operation, and inside collection with a register for multi-fare operation, and both of these conditions have been provided for.

Another aspect of accessibility appears in the pneumatic door and step control which is operative from any part of the car. This is an excellent feature. Motormen and conductors who have to open and close heavy doors several hundred times a day become too sluggish to do quick work; and in any event the mind of one should be concentrated on the road ahead and of the other on the collection of fares. Many a fare is overlooked and many a precious second wasted when the conductor has to tug at heavy, clumsy door and step mechanisms. In addition, the possibilities of modern steel-car construction have been splendidly exploited in an arrangement of sash that really does make the same car equally agreeable for winter or summer, and in a width of seat rarely found except in steam railroad cars.

Manifestly, the Bay State car has been designed to meet a wide range of operating conditions. In fact, its congeries of metropolis, cities, towns, villages and wide stretches of open country served by means of 1000 miles of track is matched by hardly any other system in the country, and a design so adaptable to practically every class of service and to every brand of climate may well be characterized as universal.

# Bay State Combination Car

New Car for All-the-Year-Round Service on Both City and Suburban Lines Has Been Built by the Bay State Street Railway, Special Regard Having Been Given to Convertibility, Accessibility, Convenience and Safety of Operation—This Article Describes the Body Equipment

The Bay State Street Railway, Boston, Mass., has recently completed a convertible car embodying many novel features of design and representing in many respects a noteworthy advance in practice. The new design is the outcome of several years' study of the varied service conditions on the system and exhaustive comparisons of rolling stock designs in different parts of the country, and special recognition was accorded to the importance of the following desiderata: Accessibility, convenience and general appearance from the standpoint of the traveling public; safety in operation; convenience for the operating crews; adaptability to all-the-year-round service; economy in use, and suitability to the company's present and future needs.

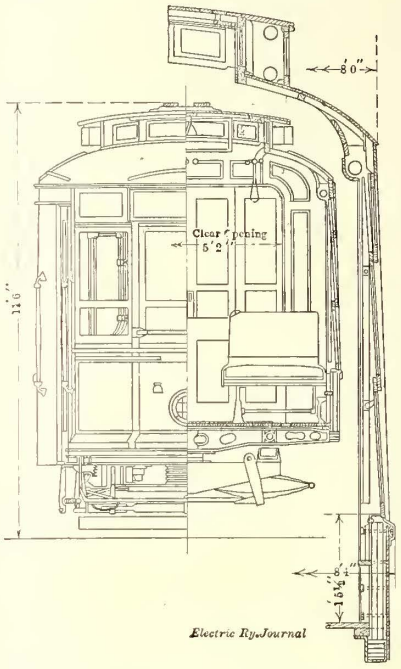
The new car was designed by E. W. Holst, superintendent of equipment Bay State Street Railway, and was built at the works of the Laconia Car Company under the immediate supervision of the railway's equipment department. The general dimensions are shown in the following table:

| | |
|---|---|
| Length of body | 30 ft. 6 in. |
| Length over bumpers | 42 ft. 9 in. |
| Width over side plates | 8 ft. 2 in. |
| Height, rail to trolley base | 11 ft. 6 in. |
| Seating capacity | 44 to 47 |
| Height, rail to first step | 13 in. |
| Height, second step | 12½ in. |
| Height, platform to door sill | 9½ in. |
| Diameter of wheels | 30 in. |
| Truck centers | 20 ft. |
| Weight, completely equipped | 40,970 lb. |

## Needs of Passengers First Consideration

Accessibility is one of the main features of the design. The vestibules are built with a clear door opening of 3 ft. ½ in., and the first step is only 13 in. high or 3 in. nearer the rail than in previous Bay State cars. The car has a width of 6 ft. 3 in. over vestibule corner posts, and the elimination of the ordinary wooden folding-door construction for the motorman's inclosure gives a liberal area within the vestibule which may be traversed or occupied by passengers. From the rail to the vestibule floor is only 25½ in., and the 9½ in. rise from the platform to the door sill is easily negotiated.

The side view of the car illustrated on this page shows the size of window opening to be so liberal that the body of a seated passenger is visible to the knees.

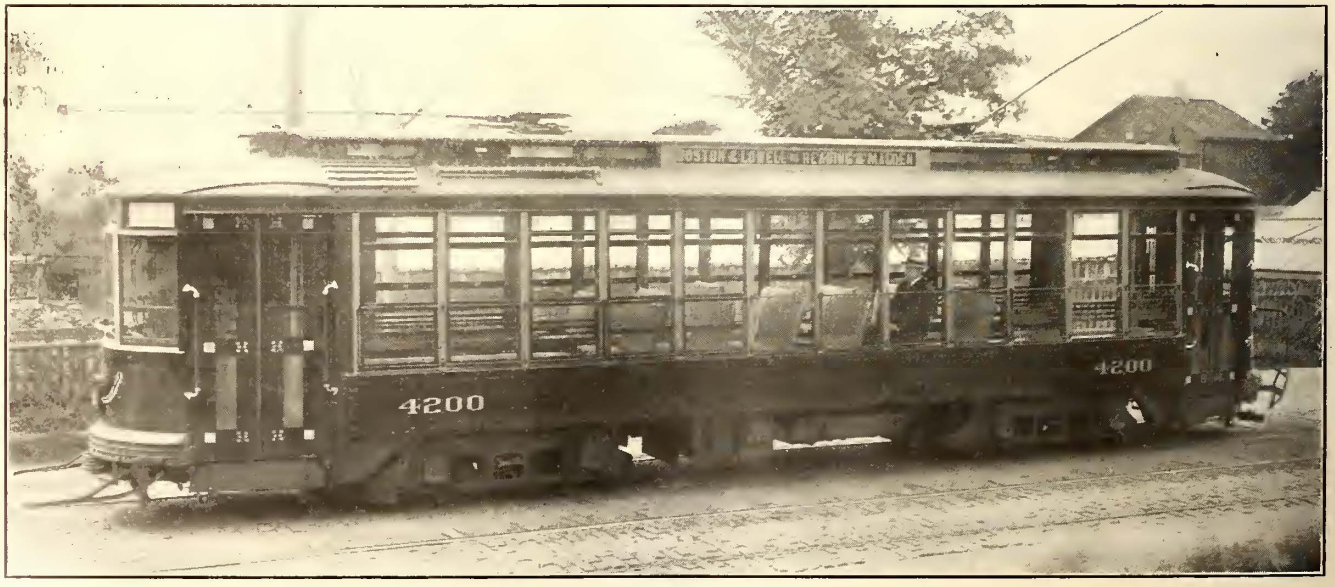



BAY STATE CAR—CROSS-SECTION SHOWING SIDE SHEATHING AND WINDOW ARRANGEMENT

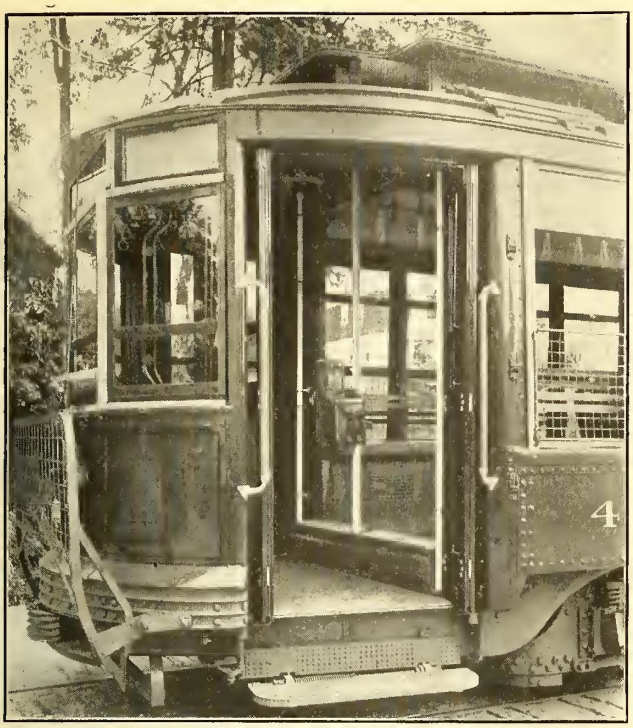
The suitability of the car for open service is therefore self-evident. The front corner view, shown on page 856, displays the liberal length of grab handles, 2 ft. each, and the unusually large signing facilities, as well as the steps folded beneath the vestibule door well within its vertical plane.

## Fare Collection

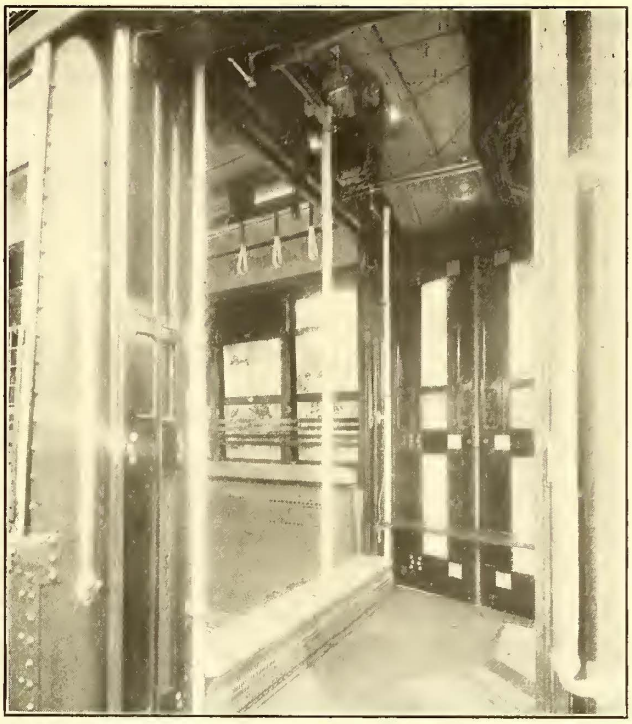
The arrangement of the fare box is shown in the two illustrations at the top of page 855. In one of these the box is in position ready for prepayment service, and in the other it is pushed up out of the way into the monitor extension. The box is equipped with an International register. It records dimes, nickels and pennies, and slides up and down on a white-enameled 1¾-in. steel tube that is provided with a ¼-in. slot. The register is carried on a saddle extending through the slot




BAY STATE CAR—GENERAL VIEW SHOWING THE EXTENDED MONITOR OVER THE VESTIBULE; WINDOWS REMOVED FROM THE REAR HALF OF THE CAR



BAY STATE CAR—VIEW SHOWING FARE BOX LOWERED INTO OPERATING POSITION



BAY STATE CAR—FARE BOX CONCEALED IN ROOF MONITOR. HEATER UNDER THRESHOLD

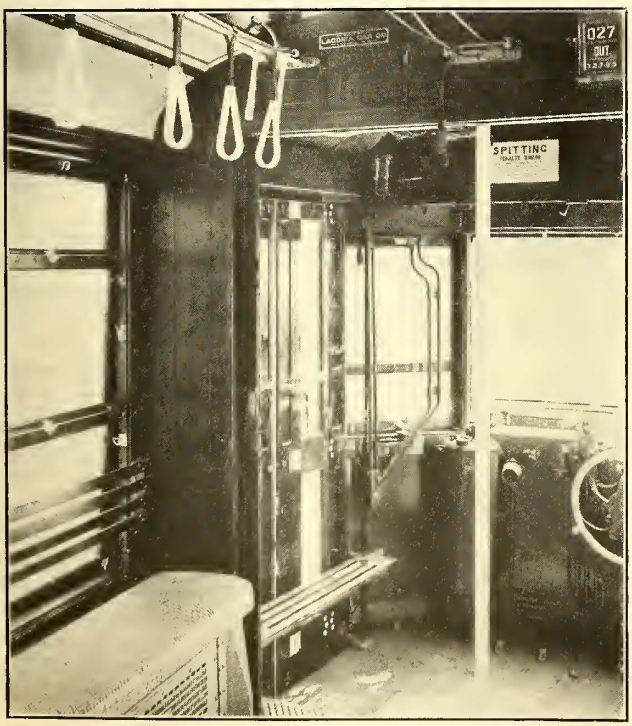
to a plunger about 11 in. long, the inside of the tube being lubricated. In the monitor extension is a specially designed spring counterbalances for the weight of the fare box on the tube runway.

The register saddle is of pressed steel and it is equipped with a lug for padlocking the fare box. When lowered the register locks automatically in place. At the top and bottom of the vertical rod the register locks into place with a spring catch that may be released by hand.

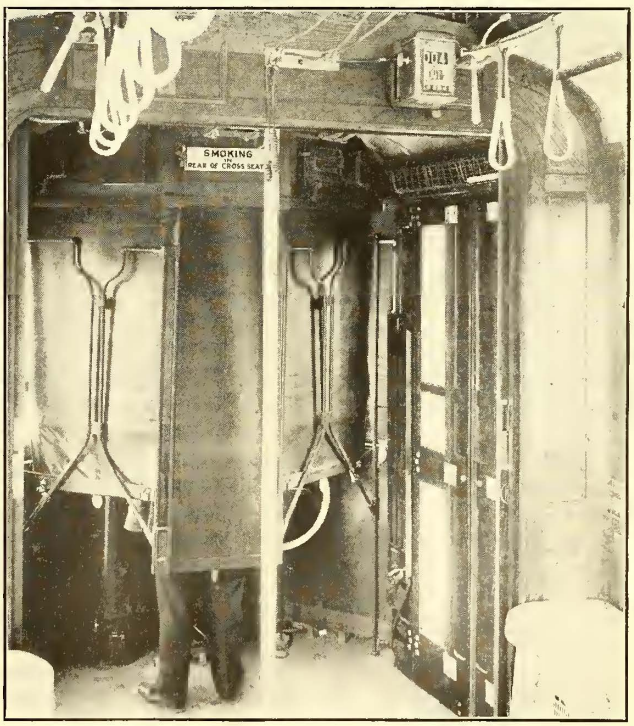
This arrangement greatly facilitates the use of the car on lines in which hand collection of fares may be in effect, or in interurban service that involves the collection of fares at fixed points or the collection of a large number of fares at a certain limit, followed by extended operation without the prepayment feature. The rod supporting the fare box is also utilized as a grab handle.

Within the car a new and compact design of fare and transfer register is in service. the equipment being mounted against the head of the bulkhead, as shown in the view on this page. These units are also of International design and are each only 5½ in. square and 8 in. high. The figure displays, however, are full-sized, as in previous larger registers.

A view on this page also shows the motorman's curtained compartment, which has a frame of ½-in. tubing.




BAY STATE CAR—VIEW SHOWING PIPE FRAMING FOR MOTORMAN'S CAB FOLDED OUT OF THE WAY




BAY STATE CAR—VESTIBULE SEAT FOLDED. MOTORMAN'S CURTAINS AND FARE REGISTER

Directly behind the motorman the curtain is carried to within 2 ft. of the floor, the diagonal curtains on either side being 12 in. shorter. The tube framing affords an extremely light and convenient means of throwing a cab into service, and it is designed to fold against the oblique sides of the vestibule. This arrangement adds to the comfort of the motorman in both summer and winter by reason of the improved ventilation secured at his working position and it enables him to gain instant privacy with ease.

The vestibules are each provided with two folding wooden seats holding three persons each. There is a clearance of 3 in. between the back edge of each seat and the door framing, virtually giving a 10-in. width for occupancy by the passenger. When the vestibule seat is not in use, it is turned flat, the front end of the seat being hinged to a folding bracket that effects the change in position with the minimum amount of radial movement inside the vestibule, the bracket being equipped with a spring which tends to hold the seat in a flat position against the door frame when not lowered. When lowered, the seat drops into place with a slot at the free end fitting the vertical tubing that serves as a hand rail at the inside edge of the bulkhead.

The operating handles used by the motorman are arranged within easy reach of his seated and standing positions. These include, in addition to the master controller, hand-brake wheel and air-brake valve, a combination switch for the arc and incandescent headlight, whistle cord, sander control, destination sign handle and door-operating handles. The lighting, heating, air-brake and circuit-breaker switches are mounted in the vestibule near the ceiling.

Each pair of vestibule doors is opened and closed by a pneumatic engine mounted in the upper part of the vestibule above the doors and in a compartment fitting closely under the bonnet. The valves are controlled by horizontal rods with lever handles inside the car body proper and by wirepull rods located above the motorman and conductor in the vestibules. Any pair of doors can be opened from either vestibule. Ball bearings are used in the bulkhead doors and in the brackets of the vestibule doors. The door-operating engines on one side were built by the Burdett-Rowntree Manufacturing Company, Chicago, and those on the other by the Consolidated Car Heating Company, Albany. A wire basket for holding signal flags is mounted on the vestibule door header, and in place of the usual card regulating smoking, a reversible "Limited Smoking" and "No Smoking" sign is provided. The shape of the brackets enables the sign to be reversed by a single lifting movement of the hand, avoiding the delay and "thumbing" so often encountered in the reversal of card signs tightly banked against a close-fitting frame.

### New Ideas in Legible Sign Arrangement

Extra sign spaces are provided at each side of the destination sign in the vestibule hood, for use in connection with special car or other temporary service. The letters on the route signs are 6 in. high. All the signs are of Hunter make, the side signs being illuminated by the regular lamps employed in interior car lighting. The extra sign panels in the vestibule hood are each equipped with a shutter revolving on a horizontal axis, so that when the sign is not in use, all the light from a sign lamp mounted in the center of the compartment behind the destination panel passes through the latter. When the shutter is opened the flux then divides between the signs without noticeably decreasing the legibility of the front indication.


BAY STATE CAR—FRONT VIEW OF THE CAR AND GENERAL VIEW OF THE INTERIOR, SHOWING LOW WINDOW SILLS AND TRIPLE SASH WINDOWS

The sign frame forms part of the car framing, as a gusset extending upward from the post in the vestibule front ties the latter into the frame, the post being cut off at the overhead compartment.

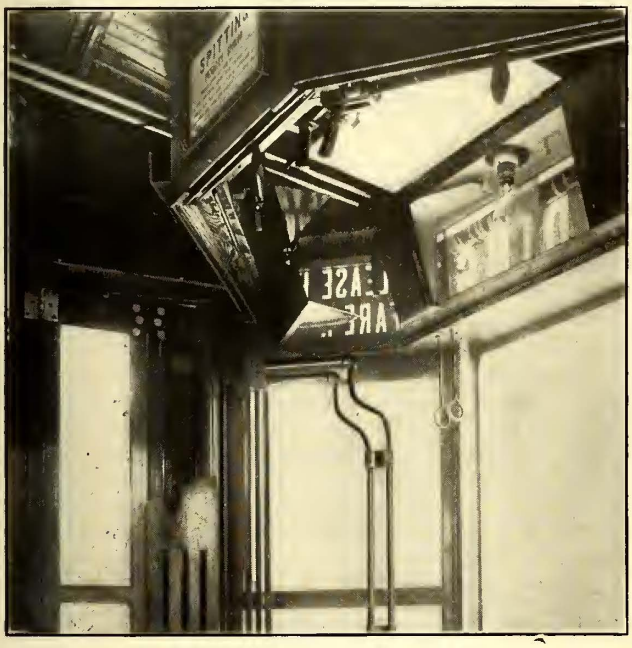
The car interior is lighted by 56-watt lamps mounted in "Holophane" reflectors, the general lighting following the company's practice as described in the ELECTRIC RAILWAY JOURNAL of Sept. 28, 1912, and Sept. 27, 1913. Seven interior lamps are used, mounted in the center of the monitor, and in the vestibule an additional lamp with reflector is mounted below the ceiling over each door and providing flood-lighting at the steps. The air gages in the vestibules are each equipped with a hooded incandescent lamp of low power, supplied from the trolley circuit through resistance.

The thresholds are provided with safety treads of "Aero" metal. This metal is also used for all interior fittings. The space beneath the threshold is made available for the installation of two truss-plank electric heaters for vestibule service, perforated covers

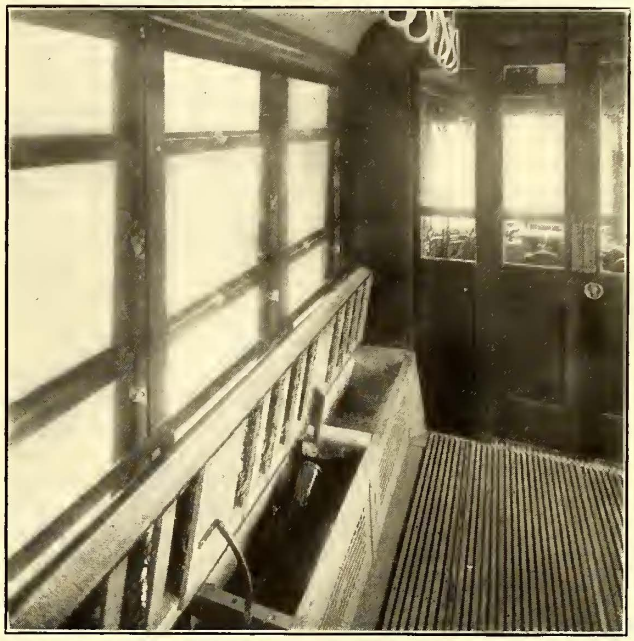
being provided on the riser. The threshold is 8¼ in. wide and the ramp leading into the car has a rise of 2 in. in a distance of 5 ft., making both ascent and descent scarcely noticeable. Vertical tubes at the inner edges of the bulkheads are used as combination grab handles, as stiffeners for the bulkhead framing and as electric conduits.

### SEATS EQUIVALENT TO STEAM RAILROAD WIDTH

The seats were made by Heywood Brothers & Wakefield Company to the railway's special design, the twelve cross-seats being mounted on pedestals spaced on 29¾-in. centers. The width of these seats is 16 in., and the spacing gives extra room for the passenger's knees and for hand baggage. As the pedestals are set somewhat close to the aisle, a footrest 23 in. long is made possible, also affording increased comfort. Again, between the cross-seats and the longitudinal seats a space of 11 in. is provided as compared with ordinary practice of 8 in. or 9 in. The longitudinal seats are 7 ft. long and 16 in. wide.



BAY STATE CAR—SIGN BOXES AND SWITCHES ON HEADER OVER MOTORMAN'S COMPARTMENT



BAY STATE CAR—COMPARTMENTS FOR JACK, WEDGING BLOCKS AND CREW'S WEARING APPAREL UNDER SEAT

The cross-seat backs are of cane, tapered at the lower portion of the back and formed around a ¾-in. x 4-in. hardwood back frame. This method of recessing provides an extra inch on each side of the lower part of the seat back, adding to the comfort of the rider in the seat and affording additional knee space as well. The cross-seats are 32 in. long, and as the window ledges are not carried above the seat level the full width of the seat is available. The car sides extend but 17½ in. above the floor and allow one overhang of 6 in. at the window sill and 4 in. over the aisle. The total length of seating space figures 42 in. or enough for three persons to the seat in a pinch.

### OTHER DETAILS, INCLUDING VENTILATION

The upper windows, 49 in. x 24 in., are permanently fixed. They are built into one frame, the rails being gained into the posts under the post cap, to form a longitudinal reinforcement in the framing of the superstructure. This takes the place of the usual wide letterboard. On each side of the car are four sections of electrically welded screens extending 20½ in. above the window seats. The window pockets are wide enough to permit the emergency installation of a 7-in. x 24-in. cold-weather sash, this sash being capped by an arm rest screwed into the sides of the posts. The lower movable sashes, each 18 in. x 24 in., are interchangeable and can be lowered into the window pocket when released by eccentric catches.

At the bottom of each window pocket are two rubber stops ½ in. thick, bolted to plates covering handholes on the under side of the side framing, which can be quickly removed for cleaning. The window pockets are 22½ in. deep below the sill and are 2¾ in. wide inside. The sashes are ⅝ in. thick. The arrangement enables the windows to be left open at the top and bottom; open at the top only; at the bottom only, giving a protection of shoulder height; and in winter with cold-weather sash in place, a 10½-in. opening can be obtained.

A Barrett jack of special design for oblique application up to 45 deg. is housed with two wedging blocks in a compartment below one of the longitudinal seats. At the further end of the seat is a compartment for the crew's wearing apparel, lost articles, etc. It is lined with galvanized iron, which can be removed for cleaning, and which is provided with ½-in. holes for draining out of doors. Panel heaters in front of the compartment hasten drying.

Under another long seat are two compartments for sand. The forward compartment is provided with a spout leading to the wheel, the latter merely providing extra storage capacity. Electric heaters in front insure dryness. Under one of the longitudinal seats, also, are mounted a magnetic switch and a supply switch for the heater system, which is of the Consolidated type, with two circuits of twelve units each. Thermostatic control is provided and all heating units are interchangeable.

The ventilation system is unique in its combination of the usual monitor sash, of "Automatic" ventilators (also in the monitor) and of special ventilators placed in the vestibule ends of the monitor. These are built as balanced sash, acting as outlets or inlets according to speed conditions. The equipment also includes Rico sanitary straps, Kilbourne sanders and Wilson trolley catchers.

The second article will treat the framing, motors and control of this car.

# Notes on Mountain Railway Electrification

A Comparison of Effective Grade Reduction by Lengthening Grades and by Electrification, and a Study of Electrification Possibilities, Theoretical and Practical

BY F. CASTIGLIONI, NEW YORK

In a recently published book describing the construction of the Grand Trunk Pacific Railroad* the writer described the successful efforts of the engineers to avoid the use of grades greater than 0.4 per cent and curves sharper than 4 deg. This was done to produce a high-efficiency line, the efficiency being limited by the ruling grade. In this case the grades were kept within limits by lengthening the line as necessary. The Canadian Pacific Railway spent $1,250,000 in doubling the length of the "big hill" which lies between Hector and Field in the Kicking Horse Pass. These illustrations are cited to show to what great lengths steam railroad companies will go to keep down the grades and will serve as a point of departure in discussing the relation of electrification to mountain railway work.

It will be shown that for electric railways the limits of low gradient can be made higher than for steam railroads, which means that under the same satisfactory conditions of operation an important saving can be effected in the first cost of the line, as a consequence of the fact that steeper grades in mountain railroads may often mean either a shortening of the route or the choice of a cheaper right of way.

## Mechanics of Mountain Traction with Reference to Cost of Road

To illustrate some of the problems involved in crossing mountain ranges let us assume that the terminals of a mountain division of a railroad are 100 miles apart, that they are at the same elevation, that there is a mountain ridge between them, that the summit of the pass over which the road must run is midway between termini and 2640 ft. above them, and that the grade is uniform. The grade will then be 1 per cent and there will be 50 miles of line on each side. Next assume that an alternate design providing for 0.5 per cent grade is prepared, necessitating the lengthening of the line on each side to 100 miles. Then the relative amounts of energy necessary to reach the summit in the two cases will be, assuming 8 lb. per ton friction, 7,392,000 ft.-lb. per train ton for the 1 per cent grade and 9,504,000 ft.-lb. for the 0.5 per cent grade.

It should be noted that the reduction of the average grade from 1 per cent to 0.5 per cent means not only an increase of 28 per cent in the energy necessary to reach the summit, but also a nearly double construction cost corresponding to the doubled length of the line.

A further remark is that the easier grade is more likely to compel the adoption of helicoidal approach tunnels, such as are encountered in the Simplon and Gothard lines, which tunnels are costly undertakings for the scant gain of about 100 ft. in elevation which they afford.

Looking at this problem from another point of view, there might be the case that, with the same length of the roads, the solution with 1 per cent grade offers the possibility greatly to reduce the length, or entirely to abolish the long summit tunnel that is necessary for the solution with 0.5 per cent grade. With 8 lb. per ton resistance, 147,840 ft.-lb. per mile of track are required on a 1 per cent grade and 95,040 ft.-lb. are required on a 0.5 per cent grade, an increase of but about 55 per cent in energy which might well be compensated by the decreased interest charges.

The great cost of reducing grades emphasizes the advantage of electrification of the heavy grades instead of lengthening the line to reduce them. The electric locomotive is particularly adapted to steep grades, especially if part of the energy consumed in climbing the grade can be restored to the line in descending it. The advantages of electrification are greater the higher the grade, not only on account of the larger possible saving from regeneration but also because, with a given resistance, the amount of energy required to climb the grade in less than proportional to the grade.

## Theoretical Possibilities of Energy Regeneration

Taking up more in detail the matter of regeneration, the possibilities of this can be seen more clearly by means of a few simple calculations. The efficiency of regeneration may be taken at 80 per cent at the locomotive so that after deducting from the tractive effort due to the grade the tractive effort lost in friction, 80 per cent of the balance will be available for restoring power to the line. Fig. 1 shows the average tractive effort up and down hill with different grades and with regeneration under the above-mentioned conditions. Fig. 2 shows the ratio of the regenerated to the necessary tractive effort over the same range of grade. The effect of the grade-reducing qualities of regeneration is clearly brought out in these figures. These results, of course, will be obtained only when all of the regenerated energy can be utilized locally. If the energy must be transmitted to any considerable distance line losses will reduce the saving. The calculations show the theoretical maximum saving.

As a grade of less than 0.5 per cent was taken as the standard in the Grand Trunk Pacific case, it will be of interest to compare the tractive efforts required on different grades with that corresponding to one-half of 1 per cent grade. The calculations for this comparison are shown in the accompanying table and the results are plotted in Fig. 3. The ratios given represent also the increase in the length of an incline of one-half of 1 per cent grade necessary to cause the same total energy consumption for up and down travel as is required on the corresponding grade of the original length. For instance, the same amount of energy would be expended for the round trip on 10 miles of 3 per cent grade as on 15.56 miles of 0.5 per cent grade.

These calculations give weight to the assertion that the steepness of the grade and the elevation of the summit are much less important if regenerative electrification is adopted, and indicates that it may pay to take a railroad over a hill rather than to adopt a circuitous route around it.

Coming now to the practical side of operation it needs no argument to show that the electric locomotive has been commercially developed so that its use is entirely practicable on mountain divisions of steam railroads. It has not only shown better overload capacity than the steam locomotive, but it can take care of overloads without warning much better than can its steam competitor. Electrifications, such as those completed or contemplated, involve special divisions with their own locomotive requirements whether steam or electric

*"The Making of a Great Canadian Railway," by Frederick A. Talbot, published by Seely, Service & Company, Ltd., London.

locomotives are used. While it would be desirable to have one locomotive that would be satisfactory on heavy grades and level track, this is not a necessary requirement. With electric locomotives in many cases, the only difference between the locomotives on the plain and mountain divisions would be a difference in gear ratio.

### RESULTS ACHIEVED WITH THREE-PHASE ELECTRIFICATIONS

For regenerative purposes the system par excellence is, of course, the three-phase one. Withholding for the present any judgment as to the regenerative qualities of the single-phase system now being tried out in this country and the regenerative direct-current system soon to be tried out in practice, it will suffice to refer to the simple three-phase system in which regeneration is an inherent and automatic quality.

Although the three-phase system has been one of the main contestants in the "battle of the systems" and has made a fine record, it has not been advertised as much as the older systems. Pending the development of the universal system of electrification we must for the present be contented with selecting the right system for the right place. Some of the facts regarding the achievements of the three-phase system in mountain work are worthy of consideration.

In an article printed in the issue of the ELECTRIC RAILWAY JOURNAL for March 6, 1915, by G. Pontecorvo, it was stated that the Italian three-phase electrification comprised 417 miles of track in operation or being electrified, 300,000 hp. in locomotive capacity, grades of 3 per cent and 3½ per cent, locomotives of 2000-hp. capacity, regeneration up to 54½ per cent, etc. In addition to the technical data given in Mr. Pontecorvo's article there are other facts which must be kept in mind. In comparing the mileage and total capacity of the three-phase system in Italy with that of other systems the difficulty experienced in securing the necessary capital must be considered, as the Italian railways do not earn enough to permit the paying of a reasonable rate of interest.

Furthermore, the three-phase system was selected in Italy by the railroad engineers primarily to fit the requirements which they regarded as being of foremost importance, namely, ruggedness of rolling stock and energy recuperative ability. It was difficult to secure the co-operation of manufacturers in developing the system. Again there is a great deal of objection to the use of the double overhead contact line, but in Italy the double overhead line has given no trouble. Some engineers in America have suggested that the voltage of 3000 used on the Italian railways was the limiting voltage, but that this is not the case was demonstrated by F. Spinetti in the *Bollettino del C.N.Ing Ferroviari.* He shows that the working potential between overhead wires is limited only by the reliability of the transverse insulating bridges at the overhead switches, which, following the construction adopted in Italy, is related to the distance between the current collecting devices of the locomotives. Figures are given to demonstrate that a comparatively small increase of this distance, to be obtained with somewhat larger locomotives, would allow the adoption of 8000 to 12,000 volts as a safe working potential, with corresponding improved design of the motor to work directly on this voltage without need of interposed transformers. The operation of the Cascade Tunnel electrification on the Great Northern Railway demonstrates that the three-phase system is not impossible under American conditions.

It is true that in the electrifi-

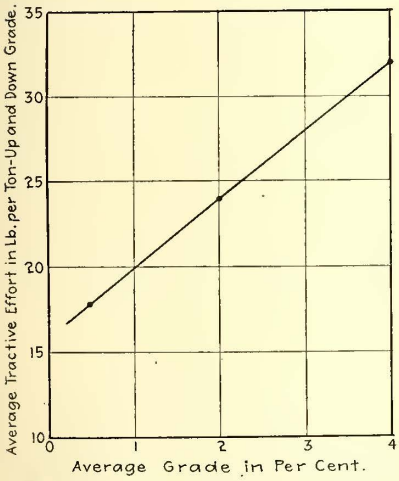



FIG. 1—AVERAGE UP-AND-DOWN-GRADE TRACTIVE EFFORTS WITH REGENERATION

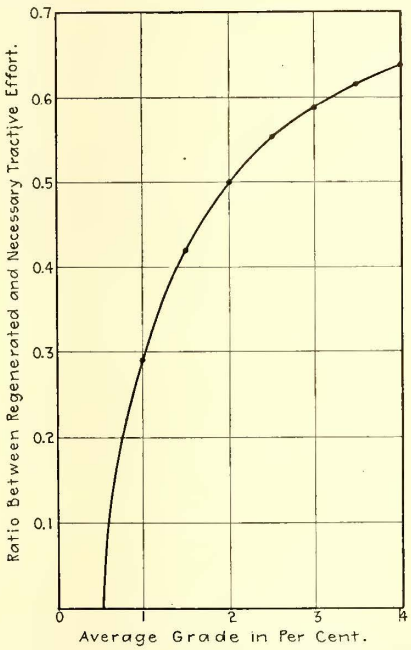



FIG. 2—PROPORTION OF REGENERATED TRACTIVE EFFORT ON DIFFERENT GRADES

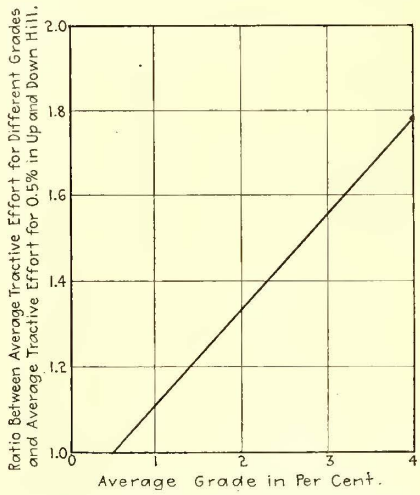



FIG. 3—AVERAGE TRACTIVE EFFORT COMPARED WITH THAT ON A HALF PER CENT GRADE

RESULTS OF CALCULATIONS OF RESULTS OF REGENERATIVE BRAKING IN MOUNTAIN ELECTRIFICATIONS

| Grade, per cent | 0.5 | 1 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 |
|---|---|---|---|---|---|---|---|---|
| (*a*) Train resistance, pounds per ton | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| (*b*) Grade resistance (up hill), pounds per ton | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| (*c*) Total tractive effort (up hill), pounds per ton | 18 | 28 | 38 | 48 | 58 | 68 | 78 | 88 |
| (*d*) Gross regenerative tractive effort (down hill), 80 per cent of (*b*) | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 |
| (*e*) Net regenerative tractive effort (down hill), (*d*)-(*a*) | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 |
| (*f*) Net tractive effort for up and down hill (*c*-*e*) | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 |
| (*g*) Ratio of regenerative input tractive effort $\frac{e}{c}$, per cent | 0 | 28.6 | 42.1 | 50 | 55.2 | 58.8 | 61.6 | 63.7 |
| (*h*) Tractive effort per grade unit $= \frac{c\text{-}e}{\text{per cent grade}}$ | 36 | 20 | 14.67 | 12 | 10.4 | 9.33 | 8.57 | 8.0 |
| (*i*) Ratio of tractive effort compared with 0.5 per cent grades, or ratio of the inverse lengths of grades to obtain the same total input as for 0.5 per cent grade $= \frac{(h) \text{ for any grade}}{(h) \text{ for 0.5 per cent grade}}$ | 1 | 1.11 | 1.22 | 1.33 | 1.44 | 1.56 | 1.67 | 1.78 |

cation described by Mr. Pontecorvo the amount of regenerated energy at the power house is only 14 per cent of the total under a given schedule, but it is also true that the Italian electrifications are on short sections of road, scattered in such a way as to render difficult the adoption of such schedules as will prevent the waste of regenerated energy in the power-house rheostats. This loss would be eliminated in a system with a sufficiently large and diversified load.

### CONCLUSION

All of the foregoing is intended not as a criticism of the plan of the Grand Trunk Pacific Railway in adopting a maximum grade of one-half of 1 per cent, but merely to emphasize the point that regenerative electric traction may offer means for the adoption of certain routes which, from the viewpoint of mountain steam railroading, would be condemned *a priori*. This is of importance in creating the new means of communication which the increased traffic demands, in spite of the fact that the best routes are already occupied.

It seems therefore advisable that, in studying new projects of mountain railroads, the alternative scheme of "electric traction from the start" be carefully considered, because it not only can offer all of the operating advantages of steam traction, but also can show new advantageous solutions and considerable savings in the construction of the road.

## Municipal Tramways Association Conference

The annual conference of the Municipal Tramways Association, which was held in London, England, on Sept. 23-24, was of a decidedly curtailed character owing to the war. There were no entertainments of any description. Two papers were presented, one of which, entitled "Tramways During War Times," was by James Dalrymple of the Glasgow Corporation Tramways. In this the author outlined the immediate effects of the war upon the working force of the railway, stating that it was impossible to obtain skilled workmen for the repair shops, and that the total working force had been very materially reduced in all departments. In regard to wages the majority of the shop employees had either received increases agreed upon between the masters and the men in each particular trade, or else had been paid a war bonus of 50 cents per week by the corporation.

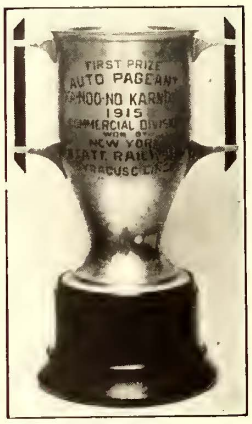
The reduction in force had been particularly marked in the platform men, and while the railway was still taking on as many men as could be employed, there were more than 800 women conductors in service and still more of them were being engaged. The regular course of training for the women extended over eight days and they had been found to be very quick in picking up their duties. The women received the same pay as the men and had the same working hours, duties and reliefs, no difference whatever being made between conditions under which each sex was working, except that women were not asked to learn to operate the cars and were very rarely asked to work seven days in one week. Women conductors, he said, were now working on all routes of the Glasgow system. Some routes were very much quieter and more respectable than others, but it was found that even on the toughest routes the influence of the women conductors was all for good. They appeared to be able to handle an unruly passenger quite as firmly and perhaps more successfully than a man.

Mr. Dalrymple's paper provoked an extended discussion in which practically every phase of the question of women conductors was considered. The consensus of opinion was that the experiment of employing women in this capacity had been quite a success. At the conclusion a resolution was passed to the effect that the Municipal Tramways Association urge the removal of any of the present restrictions as to the employment of women as street car conductors in the metropolitan area of London.

The second paper to be presented, entitled "Financial Problems," was read by Alfred Baker of the Birmingham Corporation Tramways. He cited experiences with an increase in fares during the later days of the war, these increases ranging from 25 per cent to 33 per cent with an abandonment of the workmen's reduced fares. The public expressed no objection to the change, which resulted in an increase in receipts from about 23 cents per car-mile to 26 cents per car-mile. In the discussion opinions of very divided character were expressed regarding the advisability of increased fares, a number of delegates believing that there was material danger of decreased gross receipts with general increases in the fares that were charged.

## State Railways Win Pageant Prize

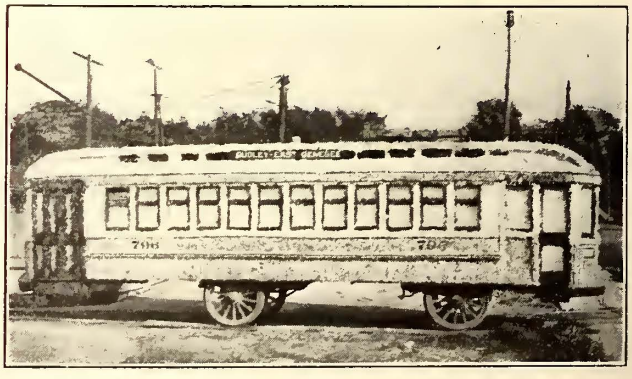
During the recent State fair week in Syracuse, N. Y., an automobile pageant was held and the New York State Railways received a silver cup for the most attractive float entered. The cup and float are illustrated herewith.




SYRACUSE PAGEANT CUP

The float was designed and constructed under the personal supervision of F. L. Hinman, master mechanic of the company. It was made exactly five-eighths of the size of the company's standard pay-as-you-enter car and reproduced this car to the minutest detail. It was illuminated exactly like an actual car and was provided with miniature coupler, trolley catcher, headlight, fenders, signs, trolley pole, etc. The car was covered with white, yellow and maroon paper flowers.

One feature of the float which was especially successful was the representation of the spark caused by the contact of the wheel with the trolley wire, by means of two small green lamps placed on the top of the trolley wheel. When these lamps were lighted they imitated the spark very successfully.



FLOAT SHOWN BY NEW YORK STATE RAILWAYS IN SYRACUSE STATE FAIR AUTO PAGEANT

The pageant in which this float was shown was viewed by approximately 60,000 people and the company received some very desirable advertising, especially in view of the fact that it succeeded in capturing the cup.

# Municipal Co-operation in Utility Management*

Four Theories of Municipal Co-operation in Private Utility Management are Described and Illustrated—Building of Extensions is Fertile Field for Co-operation—Diversion of Gross Earnings for Municipal Purposes is Unjust

BY P. J. KEALY, COMPANY MEMBER KANSAS CITY (MO.) RAILWAYS BOARD OF CONTROL

The franchises under which early public utilities were promoted, constructed and operated were generally granted on easy terms and contained many loose provisions, the chief interest of communities at that time being to make certain that the investment would be undertaken and the service furnished. Because of this viewpoint, competition and duplication were encouraged in every possible manner and franchises were indiscriminately granted to all comers. While in many of the Eastern states perpetual franchises were granted, in the majority of states these public utility grants were limited by statute to periods of from twenty to forty years. In recent years, therefore, owing to the expiration of a large number of these older franchises, the mutual relations existing between the public utility and the community have received deep consideration.

Within the last decade a clearer and better-defined understanding of the entire situation has been brought about. The owners of the utilities more than ever realize that it is necessary for them to accord the best service to the public, and that public confidence and satisfaction are the greatest assets of any public service company. On the other hand, careful and disinterested studies have proved that public utilities as a whole are not so profitable as the public has been led to believe was the case, and that municipalities must show liberal treatment to the private companies, that they may continue to attract the additional capital necessary to meet the increasing demands for service.

## Regulated Monopolies

Perhaps the foremost advancement in either state or municipal co-operation in public utility management is the recognition of the fact that competition within the same community generally results in an economic waste without improved service. The National Civic Federation's committee on public ownership in a report made some time ago stated: "Public utilities, whether under public or private ownership, are best conducted under a system of regulatory and legalized monopoly." This theory has been recognized in practically every state public utility law, most of which provide that before a competitive utility can be operated a certificate of convenience or necessity must be approved by the commission. In several of the states this even applies to the installation of municipal plants, and in many instances the desire of municipalities to enter into the public utility business has been refused by the state commission on the grounds that there already existed within the municipality a privately-owned utility of sufficient size to meet the existing demands for service.

The present tendency, as reflected in most of the more modern franchises, is toward recognizing that the interests of the community and the private company furnishing public service to that community are identical and that the interests of each can be best served by mutual and concerted action. No public service commission act yet passed, however, provides for as much detailed participation in or supervision of the affairs of a private company as is essential to the successful operation of a partnership management. Where the city is interested in other than the mere standard of service required, therefore, a closer participation in the company's business is necessary than that which public service commissions can generally exercise under their enabling acts.

*Abstract of a paper read before the American Institute of Electrical Engineers in St. Louis, Mo., on Oct. 19, 1915.

## Extent of Municipal Co-operation

There have been a number of important franchises granted within the last eight or nine years, in which the trend or extent of municipal co-operation is well illustrated. Several different theories, all purporting to reach the same end, have been used, the more important of which are as follows:

1. That the company be permitted a fixed return, if earned, upon an agreed valuation, all earnings above this to go to the city or to be used to reduce the rate for service.
2. That the company be permitted a fixed return on an agreed capitalization, the surplus over this to be divided between the public utility and the municipality.
3. That a certain percentage of the gross earnings be paid to the city, the city in addition to supervise and regulate the service.
4. That the sliding scale plan be used.

## Fixed Return with Variable Fare

An example of the first theory is that of the Cleveland traction ordinance, which permitted a return of 6 per cent on an agreed capital value and fixed a rate of fare for service under which it was estimated the earnings would return this per cent to the company. In addition, a reserve fund was created into which the surplus earnings above the amount paid to the company are deposited. When this reserve reaches a fixed maximum, fares are automatically decreased, and when the reserve is depleted to a certain minimum, the fares are automatically raised. In addition, the ordinance provides a fixed amount to be expended for operation as well as for maintenance. The weakness of this theory, as developed in the Cleveland situation, is twofold: (1) The evil exists in this contract that is inherent in any contract which limits the operating company to a fixed per cent of return, in that the incentive to the company toward providing efficient management is thereby utterly lacking; (2) the building of extensions tends to decrease the reserve and increase the rate of fare, for the reason that generally all extensions are development lines and unprofitable during the first few years of their operation.

The electric motor, by making available the cheaper outlying property at the same rates of fare, has done more to solve the question of improper housing conditions and slums than all of the sociological studies, investigations and corrective measures that have been undertaken in this country. Any ordinance provision which tends to limit or discourage extensions, either directly or indirectly, will permanently jeopardize and injure the best interests of the city, and will more than offset any of the meritorious provisions. The very life and vitality of every American city is concerned in developing the outlying property, making possible cheap

home sites and, by preventing a zone system of fares or rates, avoiding the slum conditions generally found in Europe where such a system is in effect.

### Fixed Return with City Participation

The second theory is one on which both the Chicago and Kansas City traction settlements were made. The Chicago traction ordinance provides that the company shall be permitted a 5 per cent return upon an agreed capital value and that the surplus earnings above this return shall be divided between the city and the company, 55 per cent to the former and 45 per cent to the latter. The city, through the Board of Supervising Engineers, participates actively in the management of the company, supervising and directing every phase of its operation, such as the routeing and scheduling of cars, the approving of all engineering work, the supervision of contracts and the approval of capital expenditures. The original Chicago ordinance, as passed in 1907, did not provide for the participation of the Board of Supervising Engineers in the operation of the company, its powers under the original ordinance being confined to the approval of capital-account charges and the supervision of all engineering features. The vital interest of the city in proper service was recognized by amending the 1907 ordinance in 1913, so that the board would supervise the routeing and scheduling of cars in addition to the features previously mentioned.

All of these methods of city co-operation were provided for in the Kansas City ordinance, passed in July, 1914. In addition, the Kansas City ordinance goes a step further and provides that not only will the city co-operate in the management through a board similar to the Chicago board, but it will also be represented on the board of directors of the company, five of the eleven directors being appointees of the Mayor. The city will thus not only have representation in the ordinary operating affairs of the company, but will be cognizant of all financial and corporate matters as well.

### City Supervision with Per Cent of Gross Earnings

The third method of municipal co-operation is, among others, the basis of the Chicago telephone and electric light franchises and of the St. Paul electric light franchise. The Chicago telephone ordinance provides that in addition to 3 per cent of the gross earnings being paid to the city, a telephone inspector is to be selected by the city (but paid for by the company), who will be responsible for supervision of the telephone service. He receives the various complaints and is charged with the responsibility of correcting these as far as he may be able. In addition, the rates are regulated every five years. Similarly, in the electric light franchise a fixed per cent of the gross is paid each year, the rates are regulated at stated intervals and the city electrician exercises supervision over the service at all times.

### Sliding Scale Plan

The fourth or sliding-scale method is illustrated in the Boston gas ordinance passed by the Legislature on May 26, 1906. Of all the ordinances passed within the last few years, this is one of the few in which the efficiency of management is recognized. The initial rate of gas was fixed at 90 cents per 1000 cu. ft., which rate permitted a return of 7 per cent on the par value of the capital stock. For each reduction of 1 cent per 1000 cu. ft. made to the consumer the company is allowed an extra dividend of one-fifth of 1 per cent. In other words, at 90 cents per 1000 cu. ft. the company's return is 7 per cent, whereas if it can sell gas at 85 cents the company is allowed an 8 per cent return. An itemized statement of the production, distribution and depreciation expense must be published annually. If the profit each year is more than 7 per cent and no reduction is made to the consumer, 1 per cent on the par value of the outstanding capital stock is set aside for contingencies or lean years. This reserve is never to exceed one-twentieth of the par value of the stock. In case the surplus in any year exceeds this 1 per cent (8 per cent on the capital stock), and the reserve is equal to one-twentieth of the par value of the stock and no reduction in the price of gas is made to the consumer, the surplus is to be paid to the various municipalities through which the company distributes gas, on the basis of the miles of mains installed in each community.

As to the practical working of this scheme, gas originally sold at 90 cents and then at 85 cents. It is now selling at 80 cents, so that the company is earning 9 per cent dividends. Thus the company has a direct financial incentive in reducing operating expenses in every way, and in providing the most efficient methods of gas production and distribution, since it shares directly with the public the profits of efficient management. According to Louis D. Brandeis, "Boston has reaped from the sliding-scale system far more than cheaper gas and higher security values. It has been proved that a public service corporation may be managed with political honesty and yet successfully and that its head may become a valuable public servant. * * * Gas properties which, throughout the greater part of twenty years, had been the subject of financial and political scandals developing ultimately bitter hostility on the part of the people, are now conducted in a manner so honorable as to deserve and secure the highest public commendation."

### Limitations on Extensions

Many of the franchises contain limitations on the extensions to be made from year to year. In St. Paul the electric light franchise, for example, provides that the lines need not be extended to power customers having a demand of less than 2 hp. per day for each 100 ft. of underground conduit extension or each 300 ft. of overhead extension. In the Philadelphia gas agreement, the extensions are likewise limited to the prospective business. Similarly, in the Chicago traction ordinance the construction of a definite number of miles per year was provided. In the Kansas City traction ordinance a minimum of 4 miles of track a year is set, with the added provision that any track which will pay 6 per cent on its cost above operating expenses shall be constructed, and that any trackage constructed and paid for by property owners or other individuals becomes the property of the city and must be operated by the traction company.

### Building of Extensions by Private Assessment

One of the most fertile fields for co-operation between city and utility is that of assistance in financing the unprofitable extensions (and as previously stated, most extensions are unprofitable), and this not only when privately owned but also when publicly owned. Generally all extensions to municipally-owned water plants are made out of earnings. This can only be possible when the rates to the consumer are too high, for if extensions were considered as a permanent investment and therefore made from borrowed funds instead of from earnings, the present rates could and should be reduced. Furthermore, the building of extensions, whether to a water system, street railway system, electric light system or gas system, has a decided bearing on property values within districts proposed to be served. For instance, the building of street railway extensions generally increases the price of outlying property from $3 to $10 a foot. In cases where rapid transportation is found, rents are invariably higher

than in sections of the city where such is not the case. In other words, extensions generally directly benefit the property owner and work to the disadvantage of the rate payer. Hence, if municipal co-operation in public utility management is to exist in the fullest sense and equity is to be shown to the three parties interested, *i.e.*, the operator, the municipality and the rate payer, some method should be devised whereby the cost of unprofitable extensions should be borne at least partly by the property owner who derives the major benefit therefrom. Recognizing this general principle, Cleveland is proposing to build certain track extensions by assessing their cost against the abutting property, while Philadelphia is planning to embark on a rapid transit program costing many millions of dollars, which property owners will pay for in proportion to the benefits received. Several of the larger municipal waterworks systems are considering this manner of providing for the increasing cost of extending their systems. A more general application of this theory would furnish a partial solution of the difficulties experienced by most public utilities in attracting the funds with which to satisfy the ever-increasing demand for service.

### Injustice of Diverting Gross Earnings to Municipal Purposes

Another development regarding the relations between the city and the privately-owned utility, which is constantly finding expression in the most unexpected sources, is the idea that it is unjust to pay any per cent of the gross earnings of a public utility into the municipal treasury. This was one of the provisions most frequently found in the early ordinances, and even in many of those passed within the last few years it has been rigidly insisted upon. It is now generally recognized that such a diversion is unfair to the consumer. The portion of the company's profits that goes into the municipality's coffers and thus is used for the benefit of all of the inhabitants, has been realized only from those citizens using the particular service, and it should, therefore, be expended in perfecting and increasing the service and not in reducing general taxes. "Better service" is the present-day slogan, but as long as a considerable portion of the income of the operating company is diverted to municipal purposes, better service is to that extent handicapped.

For instance, the city of Toronto now receives under an ordinance, passed in 1891, about 20 per cent of the gross earnings of the traction company, which sum amounts to from $900,000 to $1,000,000 per annum and forms a very large proportion of the total municipal receipts. Within the last few years the city has made numerous investigations and has tried in diverse ways to bring about a betterment of its street-car service. The amount of money, however, which the city derives from the traction company is secured from giving improper service. At least 50 per cent of the total received by the city from this source goes to reduce the taxes of five large corporations in that city. On the other hand, the additional fixed charges involved in any of the solutions of Toronto's traction problems, as worked out by various engineers, would annually cost not to exceed one-half the amount that is now paid to the city and diverted from the street railway business.

In Chicago a fund of approximately $15,000,000 has been built up out of the city's share of the traction earnings at the expense of the strap-hanger. The ordinance contemplated that this money should have been expended long since in subway construction and thus reduce the downtown congestion, but for reasons unknown it has not been done.

In promoting the future co-operation of the municipality in private management, therefore, all profit from the corporation going to the municipality should, as far as practicable, be devoted toward improving the service of the corporation from which it is derived.

### Kansas City Plan of Co-operation

Of all the contracts that have been passed within the last seven or eight years, perhaps the street railway ordinance adopted on July 7, 1914, in Kansas City provides for municipal co-operation in most detail. The manner in which the municipality will co-operate in the financial, corporate and detailed operation of the property is as follows:

The total agreed capital value is $30,000,000. On this fixed value it is provided that the company shall be entitled to a 6 per cent return "if and when earned." It is further agreed that before the company participates to any extent in the earnings above the fixed return of 6 per cent, all excess earnings shall be put back into the property until $7,500,000 of the total value shall have been made good with physical property and the capital account not increased thereby. When this is accomplished the company and the city will divide the surplus earnings above the 6 per cent return in the proportion of $2 to the city and $1 to the company. The city is to receive certificates of ownership for the values made good out of earnings. Should the city devote its portion of the surplus toward the purchase of the property, then when one-half of the capital value has been paid the city will take over the ownership of the entire system, subject to a mortgage indebtedness for the other half.

That all these various interests of the city may be properly safeguarded, the contract contains the following general partnership provisions:

1. The company is to be incorporated with a board of eleven directors, five of whom are to be nominated by the city.
2. Those features pertaining to the detailed operation of the road are delegated to a board of control, consisting of two members, one appointed by the company and one by the city, each of equal authority, with provision made for the selection of an arbitrator in case of dispute.
3. Whatever mortgages are placed upon the property must be drawn up in a manner satisfactory to the city counselor and approved by him in writing.
4. An independent audit shall be made annually by the city comptroller of all books, vouchers and expenditures of the company.

## Power-Supply Problem in Canada

A recent report issued by the United States Department of Commerce states that plans have been approved by the Hydro-Electric Power Commission of Ontario, and forwarded to the Provincial Government, which will make the commission independent of all private power developments and provide a power supply for many years to come. As outlined by Sir Adam Beck at London several months ago upon the opening of the first hydro-radial car line in the province, the plans called for an initial development of 100,000 hp. by utilizing the maximum head of power on the Niagara River. It is stated that the commission is now facing the end of the present sources of supply, and that the 100,000 hp. supply contracted for with the Ontario Power Company will soon be exhausted by the increasing demands of the municipalities, which even the big increase from the new plant at the Falls and those in the province will not meet. With the advent of rural car lines on an important scale the commission must be in a position to furnish practically unlimited power.

# Pennsylvania Railroad's Industrial Trucks

## Operating Data and Costs Are Given for Electrically Operated Trucks in Freight Houses, Baggage Rooms and Shops and for Tractor Service for Freight Cars in City Streets

In a paper by T. V. Buckwalter before the Electric Vehicle Association at its convention in Cleveland on Oct. 18-19, the results of the operation of electric trucks on the Pennsylvania Railroad were outlined. The author separated these trucks into three classes, namely, baggage and mail trucks for use in passenger stations, warehouse trucks for freight stations, and shop trucks for railroad shops and general industrial purposes, and in addition he took up the use of electric tractors for moving freight cars over street railway tracks.

Baggage trucks are characterized by a height of platform equal to about two-thirds the height of a baggage-car floor. This works out at about 30 in. The length is controlled generally by existing elevator sizes and ranges from 9 ft. to 12 ft. The width is generally 44 in. A modification of this type has a platform only 9 in. high for use in depressed-track stations where the car floor is but slightly higher than the station platform.

Warehouse trucks are characterized by a platform that is depressed at one end to facilitate loading, the delivery of the load being made from the end of the truck. The height of the platform is limited to about 10 in. and the width to about 40 in. The over-all length is less than 9 ft. to provide ease of handling.

Shop trucks are subject to a variety of conditions in regard to size and bulk of material handled and this has required a variety of dimensions. A distinct design has not, therefore, been developed, but adaptations have been made of the baggage and warehouse types.

All trucks have been constructed with double-end control, permitting operation with equal facility in either direction and reducing congestion to a minimum. An exception, of course, is made in the case of warehouse trucks, which must have a low frame at one end. Space required to turn is reduced by steering with four wheels instead of two, the operation being made exactly identical in either direction. This eliminates the dangerous practice of running two-wheel-steering trucks backward.

Sufficient traction for all ordinary work is available with a two-wheel drive. The motors are operated at

TABLE I.—MONTHLY OPERATING COSTS IN DOLLARS FOR ELECTRIC TRUCKS, PENNSYLVANIA RAILROAD

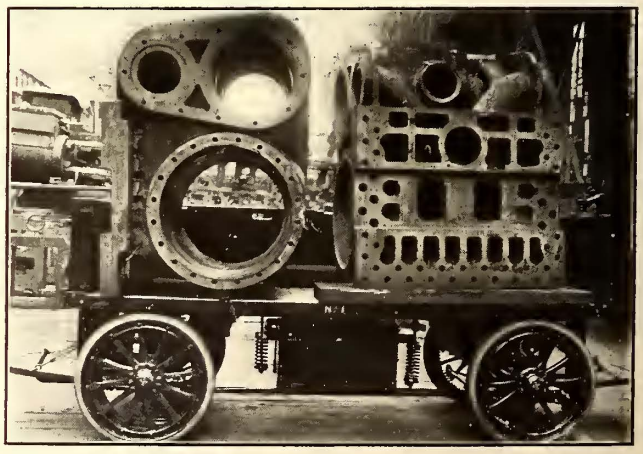
*Shop Trucks*

| Shop | AVERAGE MONTHLY DATA ALL TRUCKS | | | | | | | | | AVERAGES PER TRUCK MONTH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LABOR | | | MATERIAL | | | | | | | |
| | Number of Trucks | Driver | Repair Trucks | Battery Repairs and Charging | Truck | Battery | Tires | Kilowatt-Hours | Current Cost | Total Cost | Total Cost | Current Cost | Saving |
| Harrisburg | 1 | 48.98 | 2.62 | 1.76 | 1.89 | 4.40 | 5.39 | 209 | 5.43 | 70.47 | 70.47 | 5.43 | 154.80 |
| Verona | 1 | 59.96 | 5.30 | 2.74 | 1.55 | 1.09 | 3.48 | 587 | 8.81 | 82.94 | 82.94 | 8.81 | 154.65 |
| Trenton | 1 | 32.48 | 5.72 | 2.84 | 8.36 | 1.56 | 6.35 | 792 | 9.90 | 67.20 | 67.20 | 9.90 | 134.69 |
| Juniata | 2 | 76.64 | 13.23 | 11.82 | 5.36 | 11.42 | 1.73 | 1,426 | 11.14 | 131.33 | 65.66 | 5.57 | 109.15 |
| Altoona Car Shops | 3 | 116.96 | 12.52 | 18.26 | 21.96 | 12.54 | .. | 1,251 | 8.57 | 190.81 | 63.60 | 2.85 | 96.12 |
| Renovo | 2 | 92.95 | 2.84 | 12.35 | 1.63 | 8.28 | .. | 1,168 | 18.05 | 136.10 | 68.05 | 9.02 | 93.61 |
| Mount Carbon | 1 | 32.36 | 0.39 | 2.39 | 0.40 | 1.13 | .. | 272 | 8.80 | 45.47 | 45.47 | 8.80 | 93.22 |
| Altoona Machine Shops | 9 | 560.42 | 88.96 | 35.89 | 45.79 | 13.72 | 29.77 | 2,342 | 14.06 | 788.61 | 87.62 | 1.56 | 92.22 |
| Pitcairn | 4-5 | 168.46 | 44.48 | 30.24 | 22.07 | 22.64 | 20.81 | 789 | 4.05 | 312.75 | 67.99 | 0.88 | 89.64 |
| South Pittsburgh | 1 | 42.35 | 1.83 | 1.76 | 0.22 | 0.51 | .. | 392 | 4.60 | 51.27 | 51.27 | 4.60 | 64.04 |
| Meadows Shop | 1 | .. | 2.85 | 1.06 | 0.74 | 0.08 | .. | 734 | 29.40 | 34.13 | 34.13 | 29.40 | 21.75 |
| Sunnyside Yard | 10-14 | .. | 40.89 | 14.32 | 22.29 | 3.21 | 12.80 | 4,938 | 38.86 | 132.37 | 12.73 | 3.74 | ..... |
| West Philadelphia | 1 | 10.27 | 1.68 | 0.08 | 0.01 | 0.06 | .. | 208 | 1.44 | 13.54 | 13.54 | 1.44 | ..... |
| Jersey City, Pier L | 3-5 | | 30.10 | 30.93 | 22.18 | 35.05 | 9.38 | 1.340 | 45.77 | 173.42 | 51.00 | 13.46 | ..... |

*Baggage Trucks*

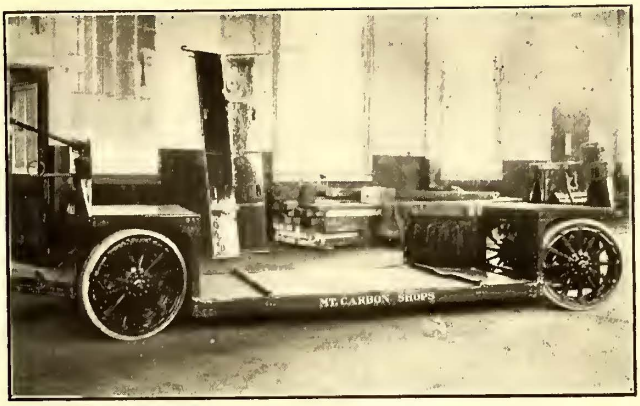
| Station | AVERAGE MONTHLY DATA ALL TRUCKS | | | | | | | AVERAGES PER TRUCK MONTH | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LABOR | | MATERIAL | | | | | | | |
| | Number of Trucks | Truck Repairs | Battery Repairs and Charging | Truck | Battery | Tire | Kilowatt-Hours | Current Cost | Total Cost | Total Cost | Current Cost |
| Baltimore | 2 | 6.54 | 6.02 | 1.30 | 0.62 | 1.53 | 953 | 11.50 | 27.50 | 13.75 | 5.75 |
| Philadelphia | 34-35 | 87.55 | 96.36 | 128.52 | 12.30 | 8.19 | 6,821 | 88.66 | 421.58 | 16.93 | 3.56 |
| Pittsburgh | 17-28 | 158.50 | 136.98 | 128.90 | 40.07 | 3.43 | 6,731 | 34.96 | 503.13 | 17.97 | 1.25 |
| New York | 64-66 | 198.11 | 172.03 | 248.73 | 475.38 | 23.64 | 5,016 | 66.63 | 1184.48 | 18.08 | 1.02 |
| North Philadelphia | 4-10 | 23.29 | 33.28 | 15.09 | 32.76 | 6.11 | 1,534 | 43.56 | 154.09 | 24.85 | 7.03 |
| Washington | 18 | 90.46 | 58.17 | 67.59 | 37.91 | 114.72 | 11,810 | 85.88 | 455.00 | 25.28 | 4.77 |
| Jersey City | 3-5 | 40.88 | 17.66 | 16.24 | 21.48 | .. | 956 | 19.12 | 115.38 | 29.58 | 4.90 |
| Harrisburg | 1 | 10.44 | 4.17 | 0.96 | 39.02 | .. | 588 | 12.01 | 66.60 | 66.60 | 12.01 |

PENNSYLVANIA ELECTRIC TRUCKS—WAREHOUSE TRUCK FOR COMMISSARY DEPARTMENT



PENNSYLVANIA ELECTRIC TRUCKS—SHOP TRUCK OF STRAIGHT-FRAME CLASS

PENNSYLVANIA ELECTRIC TRUCKS—DROP-FRAME BAGGAGE TRUCK WITH THREE TRAILERS




PENNSYLVANIA ELECTRIC TRUCKS—SHOP TRUCK WITH TRANSVERSE RAILS FOR HANDLING MOUNTED WHEELS

24 volts, this being the minimum at which efficient operation is obtainable. Low voltage for the battery provides distinct advantages, such as a minimum number of cells and a minimum number of connectors, reducing the possibility of connector breakage and reducing the cost and weight per unit of capacity. The capacity is limited to 4000 lb., this being the maximum that can readily and safely be handled within the narrow and congested inclosures at terminals, but a 50 per cent overload capacity has proved desirable.

High speed has been found to be of little or no value for the reason that speed is entirely a matter of condition of the runways and the amount of congestion thereon. The present standard is from 6 m.p.h. to 7 m.p.h. with an empty truck and from 5 m.p.h. to 6 m.p.h. with a load.

The operating data (Table I, page 864) show all charges for the year 1914 for 212 trucks. The table is arranged in two sections devoted to total charges for all trucks at each installation and averages per truck month for each installation. Naturally there is a wide variation in some of the charges, due to the difference in power cost which ranges from ½ cent to 10 cents per kilowatt-hour and to the number of trucks in the installation and character of work done. The figures for shop trucks include labor charges for drivers, but the baggage trucks do not include these charges for the reason that the trucks are driven by baggage porters. However, the figures do not represent the total savings, as the increased efficiency of the shop due to having material handled on a regular and prompt schedule does not admit of calculation.

The saving effected in baggage service is considerable but this is difficult of calculation as the character of the service has changed considerably since the introduction of electric trucks. The labor force has not, generally speaking, been decreased, but on the other hand the business has increased. Rush periods can now be handled without borrowing untrained men from other departments, and a better class of men continue in the service as compared with the rapidly changing force of the old days.

The operating department considers that the most important advantage of the electric baggage truck is the relief to terminal congestion and the prompt dispatch of trains resulting from avoidance of baggage delays. The fact that the saving effected is not stated on certain installations does not indicate absence of saving but rather that the figures were not available, as the installations in question would be near the top of the list. Under the heading "Number of Trucks" is indicated the number of trucks in service at the be-

TABLE II—DATA DERIVED FROM TWO AND ONE-HALF YEARS' OPERATION OF ELECTRIC TRACTOR

| | | |
|---|---|---|
| Cost of tractor | | $13,400 |
| Cost of maintenance and operation | $13,145 | |
| Interest at 6 per cent on $13,400 | 2,010 | |
| Depreciation, less tires and battery, $9,200, at 5 per cent | 1,150 | |
| Depreciation battery, $3,200, at 25 per cent | 2,000 | |
| | $18,205 | |
| Total cost of service | | $18,205 |
| Total number of cars (in and out) | | 22,639 |
| Total cost of service if horses had been used, 22,639 at $1.86 | | $42,108 |
| Saving by electric tractor | | $23,902 |
| Total saving over investment, per cent | | 178.4 |
| Annual return on investment, per cent | | 71.4 |
| Average cost of service per car | | $0.805 |
| Average weight per car, tons | | 33 |
| Cost of service per ton (in and out) | | $0.0243 |
| Total miles operated | | 8,804 |
| Total number of cars handled in internal movements | | 15,202 |
| Grand total cars (in, out and internal) | | 37,841 |
| Cost of maintenance and operation per car | | $0.347 |
| Cost of maintenance and operation per ton | | $0.0104 |
| Cost of maintenance and operation per mile | | $1.49 |
| Cost of service per working day by tractor | | $24.67 |
| Cost of service per working day by teams | | $57.06 |
| Saving per day | | $32.39 |

PENNSYLVANIA ELECTRIC TRUCKS—WAREHOUSE TRUCK WITH TYPICAL LOAD

PENNSYLVANIA ELECTRIC TRUCKS—BAGGAGE TRUCK OF STRAIGHT-FRAME CLASS

ginning and at the end of the year, but the averages are based on the actual truck months.

The electric tractor which was described in the Electric Railway Journal for April 26, 1913, had an average daily performance during the first six months of 1915 as follows: Hours on charge, 8.1; hours in service, 8.2; discharge in ampere-hours, 526.1; miles per day, 12.8; number of cars handled, 36.3; total movement per day, 25; total weight handled in tons per day, 1215.8. Since the tractor was placed in service the number of cars handled per month has increased from 690 to 920, and the cost per car has decreased from 83 cents to 58 cents.

Table II on page 865 shows cost data obtained from the operation of this machine. In this connection it is also interesting to note that in two and one-half years of service there has been a loss in time of only nine days due to failures of the machine. The return on the investment is 71.4 per cent, or a daily saving of $32.39. The cost of the service per ton, based on the cars moved in and out of the warehouses, is 2.4 cents, but the operating cost on all cars handled is only 1.04 cents per ton. Internal movements have reference to cars moved from point to point within the trackage operated by the tractor, these not being included in the total cost of the service.

## National Association of Railway Commissioners

The twenty-seventh annual convention of the National Association of Railway Commissioners was held in the Municipal Auditorium at San Francisco, Oct. 12 to 16 inclusive. Among the reports presented were those on grade crossings and trespassing on railroads; legislation; powers, duties and work of railroad commissioners; railroad taxes and plans for ascertaining fair value of railroad properties; rates and rate-making; railway capitalization; safety appliances; statistics and accounts of electric railways; rails and equipment, and physical valuation.

At a banquet tendered the association by the California Railroad Commission on Oct. 13 about 750 delegates and guests were present to hear the speakers. Max Thelen, president California Railroad Commission, acted as toastmaster. Clifford Thorne of the Iowa Railroad Commission, president of the association, spoke briefly on the topic, "Is Regulation Worth While?" Theodore N. Vail, president American Telephone & Telegraph Company, gave an address on "Some Observations on Modern Tendencies." Warren Sanford Stone, president Brotherhood of Locomotive Engineers, presented some statistics on the relations between railway earnings, railway financial practices and railway employees' pay. Judson C. Clements, member Interstate Commerce Commission, made an address on "Public Control of Railway Capitalization." Paul Shoup, president Pacific Electric Railway, Los Angeles, Cal., spoke on "The Railroads and the Public," and John M. Eshelman, former president California Railroad Commission, made an address on "The State and Public Utilities."

In the election of officers, Judge Robert R. Prentice, chairman Virginia Corporation Commission, was chosen president of the association, and Max Thelen was made first vice-president. E. C. Mills, New Hampshire State Commission, was elected second vice-president, and William M. Connolly, chief clerk of the division of valuation, Interstate Commerce Commission, was re-elected secretary of the association. Washington, D. C., was chosen for the next annual convention, which will meet on Nov. 14, 1916.

## Motor Cars on Railroad Systems Discussed by New York Railroad Club

At the meeting of the New York Railroad Club, held on Oct. 15, W. R. McKeen, consulting engineer Union Pacific Railroad, Omaha, Neb., presented a paper on "The Value of Motor Cars on Railroad Systems." He showed that on many steam railroad branch lines the use of the gasoline motor car would increase revenue by stimulating passenger travel and would decrease operating expenses so as to make passenger travel profitable. He stated that the financial success and universal popularity of the trolley car is not so absolutely the result of the fact that it operates on city streets and picks up passengers at street corners, for on the most successful interurban systems the passengers are taken aboard at stations as on steam railroads. The electric cars with frequent service can be scheduled as to leaving and arriving times to suit the convenience of the public, and in consequence they get the business. Mr. McKeen showed how the same purposes can be accomplished on branch steam railroad lines by means of the gasoline motor car. He stated that on some branch lines the average passengers per train will run below twenty, while even under favorable conditions the average will be only between thirty and forty, one-third of the train capacity. The motor car permits passenger and freight service to be separated and each can be furnished according to its own requirements.

Mr. McKeen's paper provoked very lively discussion, among those taking part being H. B. Emerson, consulting engineer; Arthur L. Jones, General Electric Company; E. B. Bailey, purchasing department Union Pacific Railroad, and Roger B. Williams, Jr., president Central New York Southern Railroad. While in the discussion attention was directed to the high cost of the gasoline motor car, its utility was especially emphasized. Mr. Williams, whose road is a short one connecting Ithaca and Auburn, N. Y., with an electric system in Ithaca, stated that the experience of his company with the motor cars was very satisfactory.

## Rust Protection in Steel-Car Design

The subject of steel-car design from a protection standpoint was discussed at some length at the recent Master Painters' Convention in Detroit, Mich. It was said that, in the construction of steel cars, the body should be made as plain as possible. No countersunk rivets or butt joints should be used. Open corners should be eliminated as far as possible, as they will hold dust and moisture, ultimately causing corrosion. Sharp corners should also be eliminated and the joints should be soldered inside and out. Better results are obtained where Gothic sash are eliminated and where the monitor decks are plain and without projections that will hold dust, cinders and moisture. Roofs also should be of the plain-arch type and should be constructed without standing seams, and where side and deck panels are used they should be bent in one piece. The arch type has preference over the monitor-deck roof on steel equipment for this reason. Better results will be obtained if the interior of the steel car is finished in wood, as expansion and contraction on a steel finish causes the paint to crack. In general the delegates expressed an opinion that was in favor of special smooth steel sheets for passenger cars, claiming that the extra first cost of these sheets will be fully warranted from the standpoint of painting and maintenance. Some roads were said also to have used aluminum doors with very great success, as it was very difficult to prevent the corrosion on the inside of steel doors.

## Record Reconstruction at Galveston

**A Mile-Long Trestle Was Built in Seven Days, Subsequent to the Great Gulf Storm of Two Months Ago, Serving to Re-establish Rail Communication with the Mainland**

The cyclonic storm of Aug. 16 and 17 at Galveston, Tex., which cut off the water supply and destroyed communication by rail between the island city and the mainland, involved extraordinary efforts in the work of reconstruction, according to E. B. Van de Greyn, consulting engineer, Houston, Tex. Every resource at the city's command was called upon, with the result that in seventeen hours after work was begun water was flowing across the bay through a hastily built pipe line laid on what was left of the causeway, and it took only seven days for an army of workers to construct a mile of timber trestle to restore railway connections across the bay.

Although Galveston, after the storm, had boat service which supplied food, it was imperative that rail connection with the mainland be restored as quickly as possible. A large force of men was at once put at work getting tracks in shape leading to the causeway, and the building of a single-track creosoted pile

GALVESTON RECONSTRUCTION—ERECTION OF POLE LINE ON TEMPORARY TRESTLE

trestle was commenced as soon as equipment and materials could be delivered. The Santa Fé Railway undertook the building of the 3700 ft. at the north end, and the Southern Pacific Railway handled the 1700 ft. at the south or island end. On the latter section a railroad pile-driver was used at the island end and a slip or skid driver was started from the southerly end of the arches. For the 3700-ft. section a railroad driver was started from the mainland end, a skid driver from the northerly end of the arches, and another skid driver started on cribbing at an intermediate point.

Materials were brought in on barges and floated to the drivers. A temporary track laid outside and to the east of the approach and extending out from the mainland was also used for handling supplies. Bents were 14 ft. on centers, four piles to a bent. Driving was carried on day and night with two twelve-hour shifts and in seven days 5400 ft. of pile trestle was built ready for train service.

Steam trains and the interurban cars from Houston are now operating over the pile trestle. The interurban cars are taken back and forth across the trestle by locomotive, but the Stone & Webster Company is now constructing a trolley pole line next to the trestle to enable cars to operate across it under their own power.

## First Annual Convention of Safety Federation

Adoption of a model ordinance to govern all street traffic which will be offered to cities all over the country as a basis for legislation was the big feature of the first annual convention of the Safety Federation of America, held in Detroit, Mich., on Oct. 18, 19 and 20. The model ordinance for cities which will form the vehicle for activity of federation members for some time to come was prepared by the street traffic committee of the federation, of which Police Commissioner Gillespie of Detroit is chairman. The report of the committee's deliberations fills a printed booklet of twenty pages and gives in detail the effort to establish a standard for traffic regulations in all cities of the United States.

While the federation ordinance aims particularly at the control of automobile traffic its provisions will be of vital interest to street railway operators because of the number of collisions between automobiles and street cars. It covers licenses, lights, brakes, warning signals, whistles, noise, smoke, accidents, the way vehicles are to be driven, speed, age of drivers, barring of intoxicated drivers, distance from street cars, rights of pedestrians and numerous other matters, giving the police full control of all traffic.

Standard police traffic signals, to be used in all cities, are among the especial provisions. One of the most important clauses is that every automobile driver must have a license from the police of his city. He must be sixteen years of age and must not have physical ailments that might affect the operation of the car. In addition to the model traffic ordinance the convention decided to issue a safety-first primer for children and distribute millions of copies all over the United States.

## Safety-First Meetings in Ohio

On Sept. 16 two meetings of employees of the Northern Ohio Traction & Light Company were held in Akron, Ohio, in the interest of the safety-first movement. More than 500 persons attended the afternoon meeting, and 1000 were present in the evening. Special cars on the northern division brought many of the employees to the city. For the past two years the company has been deeply interested in the safety-first movement, and its men have been organized to carry out the idea. As a result the reduction in the number of accidents has been more than 50 per cent. This record was made in spite of the fact that the number of car-miles operated was larger than ever before. The increase in the number of automobiles in use has also made the liability to accidents greater than in the past. The road has a safety committee of fifty members selected from the 1600 or 1700 employees, and the suggestions made by this committee are generally adopted.

## Company Rewards Employee for Good Service

Homer S. Martin, interurban conductor for the Southern Traction Company, Dallas, Tex., has been presented with a gold-headed umbrella engraved as follows: "Presented to Homer S. Martin by Southern Traction Company in Recognition of Good Judgment and Faithful Performance of Duty on Sept. 21, 1915." On the occasion referred to another car crashed into the interurban which Mr. Martin was running near Ennis. Although he had ample opportunity to escape, Mr. Martin stayed at his post and endeavored to get his car out of the way. The company also presented Mr. Martin with passes for himself and wife over all its lines.

DELEGATES AND GUESTS OF THE AMERICAN ASSOCIATION AND MANUFACTURERS' ASSOCIATION ASSEMBLED IN CONVEN

# American Association News

Chicago Selected for Mid-Winter Meeting—Successful "Red Special" Tour Ended in New York on Friday—Dr. E. B. Rosa Addressed Washington Section—Denver Tramway Section Enjoyed Fine Illustrated Lecture

## SAN DIEGO AND EASTWARD

Friday, Oct. 15, was Transportation Day at the Panama-California Exposition. The San Francisco convention delegates left the Coronado headquarters for the exposition grounds at 10 a. m., and were officially received in the president's reception room at 11. An address of welcome was delivered by George Burnham, vice-president of the exposition. This was responded to by William Clayton, vice-president and managing director of the Spreckles Companies, and by Charles L. Henry, president of the association. The party then divided to inspect the buildings and exhibits of the exposition and to attend the various features on the program arranged by the exposition authorities for Transportation Day. These included a "monkey drill" by the First Cavalry, U. S. Army, a concert by the band of the 13th Coast Artillery Corps, a special organ recital by Dr. J. Humphrey Stewart on the large outdoor organ, and a reception at the Women's Headquarters, California Building, tendered to the visitors by members of the Women's Boards.

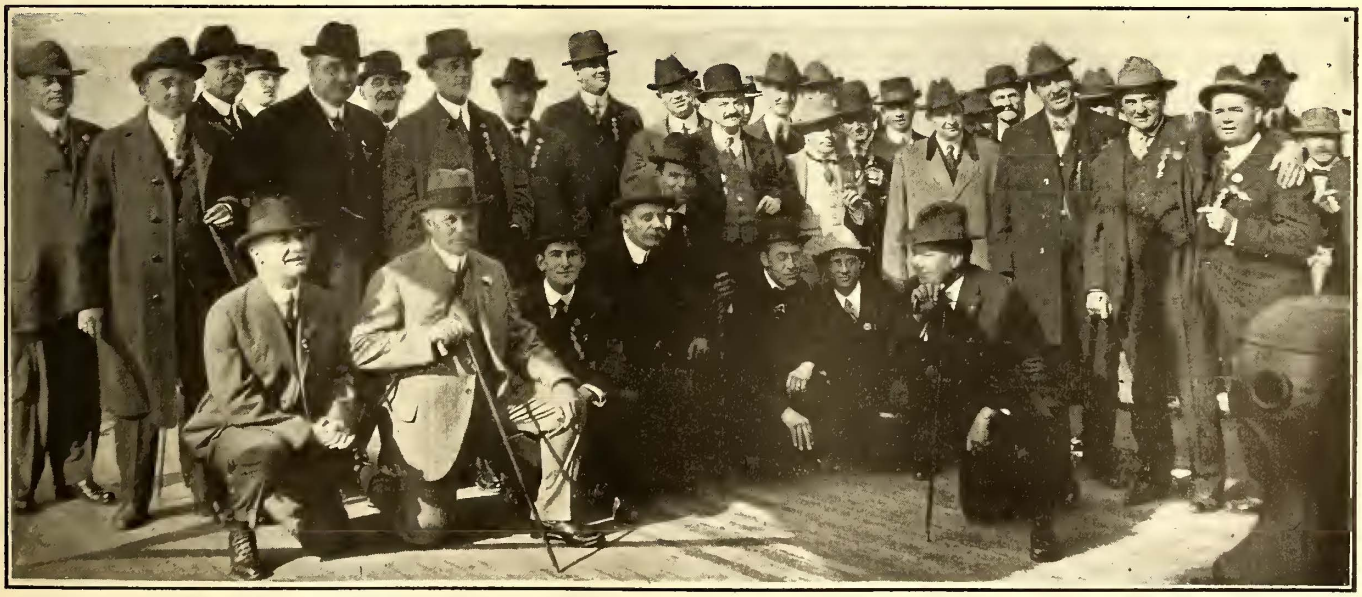
Saturday was Aviation Day at the exposition, but there was no flying on that day owing to the recent accidental death of one of the aviators. However, the visitors inspected the flying machines in the hangars, after which they returned to headquarters for luncheon. In the afternoon a special train on the San Diego & Southeastern Railway took the guests to Tia Juana, Mexico, the Monte Carlo of the Southwest, and returned them to the hotel in time for dinner. The Eastern journey was begun at midnight on Saturday, Riverside being reached early Sunday morning and several hours were spent there. Monday, Oct. 18, was spent in the Grand Canyon of Arizona, and on Tuesday afternoon a two-hour stop

CONVENTION PARTY IN THE OPEN-AIR GREEK THEATER AT THE UNIVERSITY OF CALIFORNIA DURING A VISIT TO OAKLAND AND BERKELEY ON OCT. 8

TION AT SAN FRANCISCO, CAL., OCT. 8, 1915. BUILDINGS OF THE PANAMA-PACIFIC EXPOSITION IN BACKGROUND

"LOOKING PLEASANT" ON THE CLAREMONT GANGPLANK DURING VISIT TO OAKLAND AND BERKELEY

ON THE SALOON DECK OF THE CLAREMONT DURING VISIT TO OAKLAND AND BERKELEY



THE EAST AND THE WEST MEET ON THE DECK OF THE STEAMER CLAREMONT, DURING VISIT TO OAKLAND AND BERKELEY ON OCT. 8

was made at Albuquerque, N. M., where the attention of the visitors was attracted to the new one-man cars recently put in operation on the local railway system. These cars were double-ended with small wheels and with "Wee" motors. They were reported by the management to be operating very satisfactorily.

The remainder of the journey was uneventful but it was enlivened by various guessing and other contests, and it ended successfully by the arrival in New York on Friday morning.

The illustrations on pages 868 and 869 will serve as a permanent souvenir of the "Red Special" tour. All of these views were taken on Oct. 8, the final day of the convention, and the one on which the exercises were held at the exposition grounds. For the views of the excursion later in the day to Oakland and Berkeley, this paper is indebted to W. R. Alberger, vice-president and general manager San Francisco-Oakland Terminal Railways.

In the telegraphic report last week of the presentation of testimonials to the managers of the Red Special train at Coronado Beach on Oct. 14, a line was omitted which caused an error in the case of two of the gifts. E. C. Cook, of the New York Central lines in charge of the train, received a traveling case, and the purse was given to Fred. C. J. Dell, assistant to Secretary McConnaughy, in recognition of his many courtesies to the delegates on the trip.

### CHICAGO SELECTED FOR MID-WINTER MEETING

At a meeting of the American Association executive committee held on Oct. 7 in San Francisco, Chicago was selected as the place for the mid-winter meeting. The appointment of a committee of three by the president to arrange for the meeting was authorized, this committee to confer with a similar one from the Manufacturers' Association.

### WASHINGTON COMPANY SECTION

The October meeting of the company section No. 4 was held on Oct. 11, with President George G. Whitney, chief clerk Washington Railway & Electric Company, in the chair. The attendance was about 125.

The feature of the evening was an address by Dr. E. B. Rosa, chief physicist of the United States Bureau of Standards, who explained to the section the work of the bureau, particularly that relating to the standardization of electrical appliances. He encouraged the members to secure copies of the publications of the bureau on subjects in which they are interested. After the address vocal selections were rendered by W. S. Madigan, accompanied by F. J. Allen of the commercial department of the Potomac Electric Power Company.

The president announced that a general business session would be held on Oct. 25, at which time it was hoped to greatly augment the present membership due to the operation of the new scale of dues. He also stated that Robert G. Wall would address the section on "The Science of Business Building." After the formal exercises a buffet luncheon was served.

### DENVER TRAMWAY SECTION

At the meeting of the Denver Tramway Company section held on Oct. 21 an illustrated lecture was delivered by Dr. George B. Vosburgh on "Transportation and the Modern City." More than 100 colored slides were used in illustrating the lecture. Some of the slides showed scenes from various departments of the tramway company, including electrical apparatus, tracks, buildings and club lights.

## COMMUNICATIONS

### Reminiscences of Early Days in the Street Railway Business

Board of Public Utilities
Los Angeles, Cal., Oct. 13, 1915.

To the Editors:

I spent yesterday at Universal City with those who had come down from the American Electric Railway Association convention in San Francisco. My mind was filled with thoughts of the early days of the American Street Railway Association, inaugurated by H. H. Littell, and of the wonderful changes that the years have brought about.

How many to-day appreciate the important assistance rendered the association in its infancy by the Street Railway Journal? Very few, I fear. My thoughts were full of C. A. Richards, Thomas Lowry, Charles Green, W. H. Hazzard, William White, William Richardson and his son, William J. Richardson, Charles B. Holmes, Julius S. Walsh, P. C. Maffitt and C. B. Fairchild. Why prolong the list? Most have found rest and a new generation is now bearing the burden. When the association was formed I was the only civil engineer employed by the year on a street railway in the United States. That was the reason that I was so active at the early meetings. My paper on the "Ventilation of Stables" had a wide circulation here and abroad. It was copied in the *Scientific American Supplement* and when it appeared again in its columns some time after I thought the fact had been overlooked and wrote for information. The editor replied that the demand for that paper had been so great that the issue was exhausted and hence it was published again. What a change in motive power since I reported to the St. Louis Convention "On the Progress of Electricity as a Motive Power." I think that this was in 1884. Some years past the secretary of the association wrote me that it possessed no copies of the first five meetings, and asked me to send mine. This I did, for while I valued my copies very highly I thought the association should have them.

At the Universal City gathering I did not meet one of the "old guard," but it seems fit that the present generation should be reminded of those who have gone before and from whose efforts the giant association of the day results.

Augustine W. Wright,
Commissioner.

### Cumulative Voting

Compañia Eléctrica y de Ferrocarriles de Chihuahua
Chihuahua, Mexico, Aug. 31, 1915.

To the Editors:

Referring to the editorial on cumulative voting in your issue of Aug. 14, we should like to be informed more in detail regarding this method of voting at corporation meetings.

E. R. Lozaño, Director General.

[For the benefit of Mr. Lozaño and others in the electric railway field who may desire some details in connection with the practice of cumulative voting, we are pleased to publish a few general facts and formulas.

When the voting at a corporation meeting is carried on under the cumulative plan, the result of the election is not determined alone by the number of shares voted. Each stockholder under such a condition is entitled to as many votes as shall equal the number of his shares of stock multiplied by the number of directors to be elected, and he may cast all of such votes for a single director or may distribute them among the entire num-

ber to be voted for, or any two or more of them, as he may see fit. The right to vote in such a manner is specifically guaranteed in some states by the fundamental law, in others by the corporation statutes, and in others by provisions in the corporate charter or by-laws. Cumulative voting, however, is not a common law right, and where it is not provided for by law or corporate rules, stockholders cannot insist upon resorting to such a method unless all consent to its adoption.

Various formulas have been devised to cover possible combinations that arise in connection with cumulative voting. The simplest case is where A desires to know the minimum number of shares necessary to elect a certain number of directors. This is shown by the following formula:

$$x = \frac{ac}{b+1} + 1$$

where $x$ represents the necessary minimum number of shares, $a$ the entire number of shares of capital stock, $b$ the whole number of directors to be elected and $c$ the number of directors sought to be elected by $x$ shares. A typical case of a corporation with $100,000 of capital stock (1000 shares, par $100), five directors to be elected and two to be chosen by A will show the working of the system. The minimum number of shares here needed by A is 334, giving him 1670 votes, as compared to the 3330 votes of B's remaining 666 shares. If A splits his vote between his two candidates, each receives 835. If B is to defeat A's desire to elect two directors, he himself must elect four out of the five. Hence B must divide his vote among four candidates, three receiving 832 and one 834 votes. None of these, however, will win over A's directors with 835 votes each. By using this formula B on his side would find that it would be impossible for him to elect four directors without a tie in the face of A's opposition unless he himself held 668 shares and A only 332.

The foregoing formula presupposes that the capital stock is divided between two factions, but in actual practice there are often more than two factions and also a large outstanding neutral or unallied body of stockholders. Thus if M is known to have a certain number of shares under his control, the number of unallied shares that N must acquire by purchase or proxy to elect a certain number of directors is shown by this formula:

$$y = \frac{cr + b + 1}{b - c + 1}$$

where $y$ represents the number of shares that N must procure, $r$ the number of shares held by M, $b$ the total number of directors to be elected, and $c$ the number to be elected by N. If a third party, O, enters the lists with a desire to elect only one director when M has $r$ shares and N has $y$ shares, he must control $z$ shares, where

$$z = \frac{y}{c} + \frac{1}{b}$$

Then N, in order to secure his $c$ directors against M and not give up one director to O, must secure $y'$ shares, where

$$y' = \frac{cr}{b - c} + 1$$

If O desires then to elect his one director, he must control enough shares to defeat one of M's candidates, or $z'$, where

$$z' = \frac{r}{b - c} + \frac{1}{b}$$

As previously intimated, while these formulas are designed primarily to show the very least number of shares necessary to accomplish different ends, they may be used to calculate mathematically, when the disposition of the capital stock is known, the number of directors it will be safe for any faction to try to elect so as not to lose any directorships by overreaching.—EDS.]

## Automatic Railway Substations

GENERAL ELECTRIC COMPANY
SCHENECTADY, N. Y., Oct. 11, 1915.

To the Editors:

The abstracts which you have recently published of the A.I.E.E. paper by Messrs. Allen and Taylor, and of my article in the *General Electric Review* on the subject of the automatic control of substations, will doubtless bring to the attention of many operating engineers the advantages which may be derived by such control. It is a little early to predict how far the automatic feature may be extended but it is possible at this time to note some of the applications and limitations of the scheme.

In proposing a system of control the design must be a compromise which will provide suitable protection against ordinary contingencies without introducing too many complications. There is almost no contingency which cannot be provided for if the equipment is made sufficiently complicated. With such a scheme as Messrs. Allen and Taylor described, many of the operations depend upon the proper functioning of various relays which cannot be considered as rugged pieces of apparatus. It is thus desirable to eliminate as many of these devices as is possible and experience alone will determine the minimum amount of protection that is necessary.

While the system described by Messrs. Allen and Taylor has been applied to synchronous converters it is evident that similar control is equally applicable to motor-generator sets.

The use of a load-limiting resistance is rather unique in its application here, but where the amount of energy to be controlled is large the size of these resistance units becomes formidable and cannot be neglected. It might appear at first sight that the energy wasted in the limiting resistance would be an item which would tend largely to offset in saving gained in no load losses by automatic operation, but when it is realized that the resistance is in circuit only on comparatively heavy overloads and that the overloads, particularly on a railway system, are of short duration, it can be seen that the energy loss is quite small. The overload relays are made adjustable to suit the conditions in each installation. Where automatic equipment is provided for lighting systems the losses, if a resistance were used, would undoubtedly be greater than those on a railway system owing to the fact that the overloads appear more gradually and persist for longer intervals. Thus, on lighting systems it might be preferable to provide some other means of load limitation.

As C. W. Place points out in his paper appearing in this month's issue of the A.I.E.E. *Proceedings*, a complete series of automatic stations may be employed on a system, or some of the substations may be automatically controlled and others manually controlled. It might even be feasible to have one or more of several machines in a substation automatically controlled and the rest manually controlled, one of the advantages in this last case being that a good load factor on the station is maintained under varying load conditions. It will be the local limitations on any one system which will determine what proportion of the equipment shall be automatic.

CASSIUS M. DAVIS,
Railway and Traction Engineering Department.

## Girder and High T-Rail Renewals

Montreal Tramways Company
Montreal, Canada, Oct. 16, 1915.

To the Editors:

In reference to the exhaustive article in the issue of the Electric Railway Journal for July 31 on "Girder and High T-Rail Renewals," the pertinent question "What is the life of rail?" is the one that has puzzled street railway engineers for all time. The rapid change in the types and sections of rail on account of the paving conditions, the evolution in weight, speed and traffic, density of rolling stock, changes in the chemical composition of rail, improvements in rolling-mill practice and demands of municipal authorities, make it impossible to answer with accuracy either theoretically or from experience. It is also very certain that a considerable amount of seemingly extravagant rail renewal on many systems during the past has been due not to absence of engineering ability to "make a dollar go farthest," but to other conditions which have become the controlling factors in the decision to lay new rails instead of relaying the old.

The desirability of arriving at some conclusion on which to base the life of rail is unquestionable, but thus far only a theoretical formula can be deduced and only a basis from which the subject may be discussed can be arrived at. The line of economical life cannot be based entirely on a formula but it may be possible to test financial operations with it.

In the first place, it is necessary that we decide what should be considered the reducible head area; whether in the case of plain girder rail it is that portion of the head above a line drawn horizontally between the top of the fillets, or bottom if you please, or where the vertical sides of the head intersect the lines defining the under side, or whether it is that area above the lines of the underside of the head intersecting at the center of the web. The latter is probably the more definite and should be considered 100 per cent.

In the case of grooved girder and tram girder rail the practical reducible area is much more difficult to fix. Certainly it is not where the tram or groove becomes flange-ridden. However, when this stage of wear is reached the effect on wheel flanges becomes a factor. Frequently some of the most prosperous properties are seen with grooved girder rail worn to the point where the lip or tram has been entirely sheared off without seriously affecting the track's operable condition, but probably subjecting it to rather unusual maintenance charges for both the track and paving.

When the reducible head area is found or agreed upon (this should be considered separately as regards the type of rail and whether it is to be used on tangent track or on curves) and the ultimate wear limit is considered, it is found that the percentage of allowable head wear depends as much on the manner in which the head is worn as on the section of the rail itself, and many vary from one extreme of 20 per cent to the other extreme of 60 per cent to 70 per cent of total head area. In my opinion a reduction of 35 per cent of the area is a fair average wear limit, and I believe that my conclusion is borne out by many engineers of experience.

To determine the economical phase of rail renewals during reconstruction it is necessary to know the tonnage or wheel movements carried by the old rail from the time of installation, and also the prospective moving loads, from which the approximate life of the rail in years may be estimated. It will be found that the results will vary with different types and weights of rail and classes of construction.

In a certain reconstruction work caused by tie and foundation failure (which, by the way, was solid concrete) it was observed that 1,760,000 tons had been moved per 1/64 in. of vertical wear. The total wearing value was assumed at 40 per cent of the head area or about 5/8 in. of vertical wear. This was found to work out to a fifteen-year total life for the rail. With this as a basis and assuming the probable future traffic and wear, it was found to be economical to make a complete renewal of the entire track construction unless the rail had at least seven years of remaining life. Naturally, years only enter into calculations of this nature when finances are involved and not economical physical values where percentages only should apply.

From the noted wear of 1/64 in. per 1,760,000 tons movement it might be suggested that an assumption be made that the ultimate economical life of a rail is reached when it has carried 70,000,000 tons, corresponding to a total vertical wear of 5/8 in. or 40 per cent of total head area of this particular section. In a recently written work treating on this subject, published in Europe, a figure of 40,000,000 tons was given for eight years of past life and the remaining life put at eight years, thus making a total of 80,000,000 tons as the ultimate tonnage which the rail would carry. This is near the figure arrived at by my own observations. This might mean a rail life of fifteen years under a heavy car and vehicular traffic, twenty years or thirty years in smaller communities, or, under correspondingly less traffic, even fifty years.

Other observations, well over 100, indicate that the average vertical reduction per year on a certain section of plain girder rail on a large property was 0.021 in., giving a wearing life of eighteen years. On another property some fifty scribings gave a wearing value of fourteen years. Both of these calculations were based on a 35 per cent reduction of the head area of plain girder rail. These may be easily reduced to terms of tonnage or car movement, whichever is considered most convenient.

Causes necessitating track reconstruction, such as paving conditions; worn, corroded, corrugated, or surface bent rails; tie, joint or foundation failures; municipal demands, etc., are so numerous that a large percentage of these causes preclude the application of any definite formula in considering the question of rail renewals, except under what might be termed ideal conditions. Even when ideal conditions exist and a rail-wear limit has been fixed, it is still questionable if any formula such as was suggested in the article could be applied.

Such conditions, when they present themselves, would undoubtedly be worked out along the lines suggested, though perhaps not reduced to a formula. The final decision would be made not entirely on the result of the calculations, but according to the engineer's knowledge and experience of the local conditions and the time, labor, materials and finances available for the work. Even granting that all these were at the engineer's disposal, local considerations, such as relaying partly-worn rail in some less-traveled section of the system, might become the governing factor in the final decision.

Each system, and in fact each street, has its concluding factors in determining when the rail is ready for renewal, and these can only be determined definitely by examination, experience and knowledge of past and future demands. The joint is not such an important factor as it has been the custom to believe. With the advent of the several joints of the welded type which can be readily applied by skilled labor, the improvements in mechanical joints and the devices for building up and grinding off worn or cupped joints, it is pos-

sible to keep them in good condition even when the rail itself is made useless by corrugation, brake applications or rolling of the metal.

One instance has come to my attention where ¼ in. was added to the height of the head of a plain girder rail in order to prolong its life. Actual experience with this rail was that before even the additional ¼ in. was worn off the municipal authorities demanded a rail of the grooved girder type. Accordingly the plain girder rail was removed with probably the same wearing value as the section originally had before the ¼ in. was added.

Summing up the rail renewal question it seems to me that:

1. To determine a fixed percentage of head area to be used generally as the ultimate rail wear limit is impossible, as it is bound to vary with the head area, the weight and type of rail and the manner in which it is worn.

2. Each section of rail and in fact each local situation will have a wear value of its own which should be determined accordingly from the observed rate and manner of wear.

3. The rate of rail wear and the ultimate wear limit should be known or considered in terms of wheel or tonnage movements, and the future wear value in years determined from this.

4. A definite formula as a guide in determining rail renewals during track reconstruction can only be used when the question can be determined solely from an economical standpoint.

5. Considering the innumerable factors entering into the renewal of rail the actual economical life is not the most important one.

6. The conditions governing each piece of track renewal are usually purely local, even as compared with other sections of the same property, and the question of rail renewal must be governed by these conditions.

These conclusions apply generally to all types of rail, but more particularly to plain girder rail. Grooved and tram girder rails involve many different considerations, and I am not prepared to make any definite statements regarding them owing to the usual lack of information.

These comments also apply only to the problem of rail renewals as it confronts the street railway engineer in his daily practice. When considered in connection with the appraisal of a system of track work, and the percentage of depreciation is to be determined, the question must be looked at from a different standpoint since the appraisal of any system is more or less in the nature of a general one.

No definite standard seems to have been established in approaching the various phases of the question of track appraisal. As a basis to determine rail depreciation it seems quite reasonable that a general fixed wear limit might be established, even though it may not have any appreciable effect on a total valuation. The average value of depreciated rail is a comparatively small item in the appraisal of track construction; the substructure presents a much more expensive and complicated problem.

In conclusion I would say that it seems scarcely logical that track depreciation should be considered on an assumed basis of a certain percentage per annum. The more scientific way, it seems to me, would be to consider it in recognition of traffic carried, or in terms of ton or wheel movements per square inch of area worn, thus securing a common base or standard which may be applied generally to all properties notwithstanding their wide variation in traffic density.

W. F. GRAVES, Chief Engineer.

BROOKLYN RAPID TRANSIT SYSTEM

BROOKLYN, N. Y., Oct. 6, 1915.

To the Editors:

The article on "Girder and High T-Rail Renewals" which appeared in the issue of the ELECTRIC RAILWAY JOURNAL for July 31, 1915, is a very broad treatment of a subject which is of much importance to maintenance engineers at the present time because their efforts are largely directed toward reconstruction of existing lines. Many properties are forced by present financial conditions to consider track renewals with the view of economizing in all possible ways. Hence such studies of rail life and the economies of the renewal problem have great value, especially when covered in such an exhaustive way.

There are a number of conclusions presented in the article and the following comments on them appear appropriate: Experience seems to warrant the correctness of conclusion No. 1. There is some doubt as to just how much value there may be in the "betterment" of chemical composition of rail mentioned in conclusion No. 2. Improvements in the method of manufacture are much more important and there is still room for advancement along this line. The statement made in the article that "apparently corrugation has been eliminated or at least greatly delayed by the titanium treatment" is questionable. The writer has found instances where corrugation developed rapidly, although the rails were so treated.

There can be no disagreement with conclusion No. 3. In addition to joint failures, corrugation, especially on rather old rail, should be included in conclusion No. 4 as an important factor in limiting rail life. It is often impossible to grind them out without removing the last wear value. Conclusions No. 5 and No. 6 seem to be true as a general observation. Concerning conclusion No. 7, the wheels will bear more study with respect to their influence on rail wear. This is especially true of the maintenance of correct wheel contours. In connection with conclusion No. 8, it might be stated that the more recent girder-rail designs appear to have wear areas more nearly equal to plain girder T-rail sections.

Arbitrary headwear limits as a basis for rail renewals, mentioned in conclusion No. 9, have not, in the writer's belief, been very much used by street railway engineers. The writer fails to see the use in attempting to set arbitrary wear limit values for American Electric Railway Association's rail sections as suggested in conclusion No. 10. They would have to cover too many types of wheel flanges and treads. The wear limits given in conclusions Nos. 11, 12 and 13 seem reasonable. Conclusions No. 14 and No. 15 are the most important and contain the essence of the whole rail-renewal and wear problem.

R. C. CRAM,
Assistant Engineer Way and Structure Department.

## Modification of Tunnel Permit Sought

The Public Service Commission for the First District of New York has applied to the Secretary of War for a modification of the permit granted by the government for the construction of the proposed tunnel under the East River from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn. This permit makes the city responsible for all damages which may occur in the prosecution of the work. The commission fears that such a condition would make the city liable for all damage, even such as may be beyond its control. A similar provision was eliminated by the government in the permit for the new tunnels under the Harlem River, and the commission requests that it be omitted from the permit for the Fourteenth Street tunnel.

# 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.)*

## Speedy and Inexpensive Pole Moving in San Francisco

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

The accompanying illustration shows how iron poles with their concrete settings are raised, lowered or moved in San Francisco. The California pioneers laid out sidewalks that have proved in modern times to be too generous and when 19-ft. sidewalks are reduced to 15 ft., or 15-ft. ones to 12 ft., the trolley poles have to go back. In the past twenty years several thousand such involuntary pole-moving jobs have arisen, and the illustrated appliance as originally devised has proved so far to have no superior for speed and economy.

The pole is clamped between two 1-in. x 7-in. x 6-ft. wrought-iron plates by four 1-in. machine bolts and a $^3/_4$-in. cupped set-screw. These rest at each end on

POLE-MOVING APPLIANCE USED IN SAN FRANCISCO

heavy house-raisers' screw-jacks which stand on 3-in. x 12-in. x 8-ft. planks resting on $3^1/_2$-in. diameter iron pipe rollers. When the pole and concrete setting has been cleared from the adjacent earth and hoisted slightly from the ground the whole load and appliance is rolled back by crowbars on 5-in. x 12-in. x 16-ft. way-planks.

Laborers do all the work. If there were enough of these jobs to make it pay, faster-operated lifting jacks would reduce the cost. The simple house-raising jacks, however, are foolproof and more suitable for laborers and the sandy soil in which the tools are often thrown about.

The appliance is used also for raising poles and their settings where grades are raised, or for lowering them when the grade of the walk is dropped.

On very long moves the trenching may cost more than the expense of setting a new pole and digging out the old one but on moves of 4 ft. or 5 ft. the use of this appliance results in the move being made for about half the cost of the pole substitution plan. There is approximately the same amount of digging in both cases but, whereas with the appliance there is no concrete work, with the pole-substitution plan the new pole must be set in concrete and the old pole must be chopped out of the hard old adhering concrete before it can be removed. Furthermore, there is surplus excavated material to be hauled away under the latter procedure and none in the former.

No guys are usually needed in this work as, on account of the mass of concrete about the lower part of the pole, the center of gravity of the whole is below the point of attachment of the clamping plates and the pole moves back erect and perfectly safe. The span wire is cast off temporarily until the pole has been located in its new position and the excavated soil back-filled and tamped or flooded-in, according to its character.

The photograph shows the appliance in place in an unusually difficult situation. This iron pole and its 2-ft. x 2-ft. x 6-ft. concrete setting had to be raised 5 ft. and moved back 6 ft. in a treacherous, new, dry, sand fill.

## Watch Standards

BY A. J. BOARDMAN, DIVISION SUPERINTENDENT TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

Along with the standardization of equipment, overhead material, roadway, details of electric lines, will eventually come the minimum standard of watches in the train service of interurban lines. Comparatively little has been said on this subject, although reference has been made in the ELECTRIC RAILWAY JOURNAL on Sept. 27, 1913, to the excellent systems of watch inspection on the Illinois Traction System, Aurora, Elgin & Chicago Railroad and Chicago & Milwaukee Electric Railroad. In the past it has been found, in spite of strict methods of inspection, that trainmen have substituted watches for inspection and carry inferior grade watches. This has led to the numbered inspection card, which has to be returned whether the watch is rejected or accepted, and the frequent and additional check of watches on the road to see if trainmen are carrying the watches which they had inspected.

On the Terre Haute, Indianapolis & Eastern Traction lines watch statistics show a predominance of Hamilton watches, ninety-three being used. Other makes include Waltham, thirty-nine; Hampden, twenty-seven; Illinois, twenty-seven; Elgin, ten; Ball, five; Rockford, one, and South Bend, one. The minimum standard size is No. 16.

The watch inspector of the Terre Haute, Indianapolis & Eastern Traction Company at Indianapolis, serves without pay and keeps record of all watches inspected twice a year in addition to frequent examinations that he is called upon to make. A watch inspector for the Terre Haute Division is located at Terre Haute. The rules governing the method of comparing time, registering, variation and use of standard clocks are the A. E. R. A. standard. The instructions to watch inspectors, which follow, are similar to those in use by several

steam roads and are worthy of careful consideration by all interurban lines.

### INSTRUCTIONS TO WATCH INSPECTORS

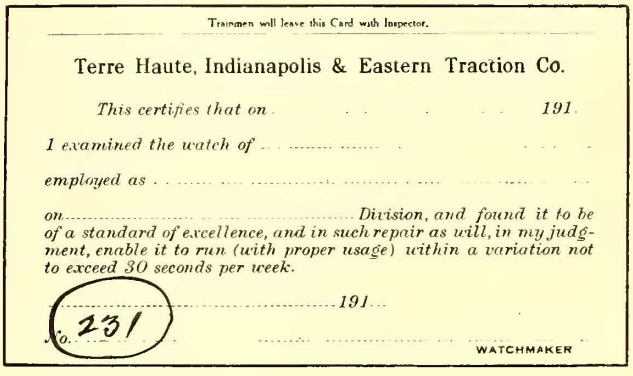
When watches are presented for inspection, care should be exercised not to impose any hardship on the employees, and in case of any doubt to give the employee the benefit, if it can be done with safety to the service, but safety and reliability must be first considered. There must be no discrimination of any kind on account of trade preference. The inspector of watches must act for the company, not as an individual working for personal ends. Orders for inspection should be presented to the inspector on whom they are drawn. Watches that have been rejected by one inspector must not be passed by another, except upon an order from the superintendent.

The minimum standard of excellence for old watches now in service shall be of a grade equal to what is known among American movements as the "fifteen-jeweled, Brequet hair spring, patent regulator, adjusted" in such repair as will enable them to run within a variation of not to exceed thirty seconds per week. This quality of movement is represented by the Waltham "Crescent Street," the Elgin "Raymond" and other makes of equal grade adjustments. Their general finish should be such as to enable them to keep time as close as the average of the standard named. Inspectors should satisfy themselves that the watches are capable of giving reliable service, and in this there should be more than the average degree of certainty, for old watches, like old machinery, are apt to be more or less unreliable. All watches put up in open face cases must wind at the figure twelve, except such open face watches as have heretofore passed inspection.

The standard schedule for new watches includes twenty-one and twenty-three jewel watches. However, it has been demonstrated by experience that such high-jeweled watches are impracticable and short lived for railroad service. Their complicated and delicate construction renders them liable to get out of order easily and repairs are expensive. It is recommended, therefore, that employees, when purchasing new watches for railroad service, shall select seventeen and nineteen-jewel grades which have steel escape wheels, sapphire pallets, double roller escapements, Brequet hair springs, patent regulators, adjusted to temperature, isochronism, and five positions. Besides the regular standard (seventeen-jewels) the nineteen-jewel watches must have two bearings jeweled in the going parts of the main spring barrel, to fill all requirements.

In the care of the watch the following points are important, especially in railroad service: The movement must be clean and the oil fresh. If the oil becomes sticky or gummy from any cause, it must be removed and fresh oil put in. Frequently fine watches, after being put in order and regulated, will begin to change their rate at the end of six or eight months, caused by the chemical changes taking place in the oil. It should be noted that none of the pivots are running dry, especially in the balance pivots, which require careful attention, as their running dry causes irregular rating and injury to the pivots by their cutting from lack of oil. The hair spring is a very important item; it must be true, not warped or bent. The regulator pins should be straight, so that the hair spring will strike flat and true. The pins should be just close enough to allow a slight vibration of the hair spring between them, this vibration should allow a clear space to be visible, by the aid of the glass, between the hair spring and the pins, and the vibration must be equal between the two pins. The regulator should stand as near the center of the index as practicable. The balance wheel must be true and perfectly poised. This should have constant attention, as the severe usage of railroad service may jar the balance out of poise or spring the pivots slightly, especially the heavy balances. The main spring should be taken out every time the watch is cleaned and tested to see if it fits the barrel properly, and if its movement is perfectly free and its strength fully developed to the end that the motion of the balance will not fall off during the first half of the day. The main spring must be free from gummy oil or rust spots, and slightly fresh oiled, but if found lacking in any of the above points, must be replaced by one of the best quality, as the finest watch will not keep correct time, if it has a cheap, poor mainspring.

The dial wheels should be free. Care should be taken that they do not come in contact with the dial. The second hand may be set too close to the dial without being noticed. There must be no friction between the minute and the hour hand, and the hour hand must not come in contact with the dial at the hub. The stem wind must be free and easily worked—not binding or grinding at any point. Lever-set watches are considered safer and are recommended for railroad service. The condition of the case should be an item for inspection—one with loose joints, gaping open, will admit dust and dirt and would not be a safe covering for a reliable movement. Every watch must be carefully tested for



Trainmen will leave this Card with Inspector.

Terre Haute, Indianapolis & Eastern Traction Co.

*This certifies that on* . . . . . *191*

*I examined the watch of* . . . . . .

*employed as* . . . . . .

*on* . . . . . *Division, and found it to be of a standard of excellence, and in such repair as will, in my judgment, enable it to run (with proper usage) within a variation not to exceed 30 seconds per week.*

. . . . . *191*

No. 231

. . . . . WATCHMAKER

NUMBERED INSPECTION CARD RETURNED BY WATCH INSPECTOR TO SUPERINTENDENT

magnetism, and if it is charged to more than its normal degree, must be demagnetized.

When employees leave their watches with inspectors for cleaning, "standard loaner" watches must be furnished free of charge by the inspector for temporary use. "Standard loaner" watches must have the same careful attention as the watches of employees, and must be fully up to the standard for new watches, as their correct rating fills a most important requirement of the time service.

The watch certificate, marked O. K., must be turned in at the company's office while the owner's watch is being repaired. Two inspections will be made yearly, during April and October.

Watch inspection certificates are to be given out at the general superintendent's office. These certificates are numbered so that they can all be accounted for, and should the inspector reject a watch, the first slip must be turned in and another one issued so that an O. K. can be given on the "loaner" watch. Then when the owner's watch has been repaired, he must apply to the office for another certificate so that an O. K. on the rejected watch can be given.

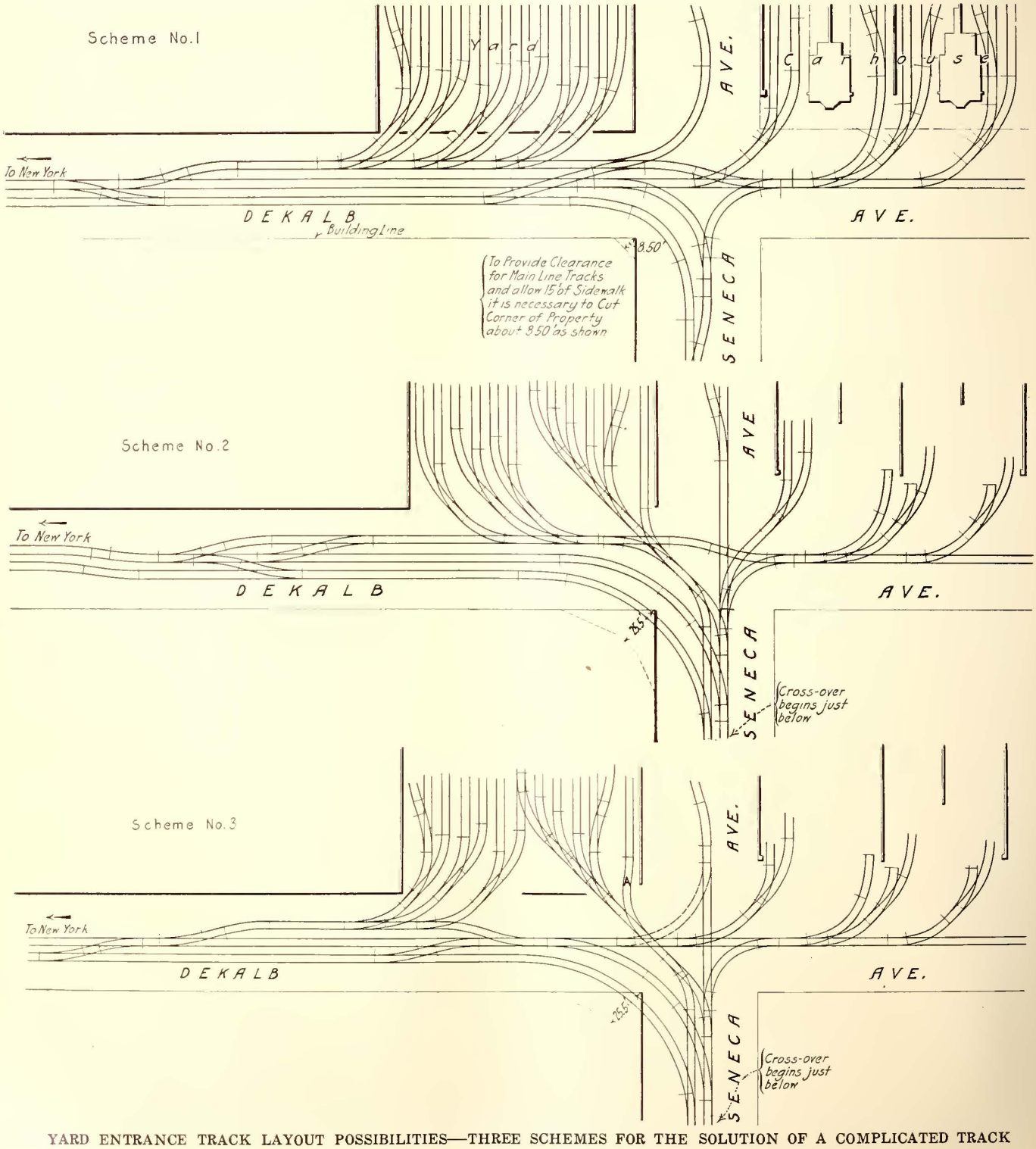
## Yard Entrance Track Layout Possibilities

BY S. STRIEZHEFF, WAY AND STRUCTURE DEPARTMENT
BROOKLYN RAPID TRANSIT SYSTEM

The accompanying illustrations show the possibilities of variations in yard entrance layouts; not only theoretical variations as to angles and radii which may satisfy the whims and fancies of the cloistered draftsmen, but practical variations to conform with different requirements of construction and maintenance, and with the needs of transportation.

Confronted with the problem of laying out the special work for the entrance into a proposed car storage yard on the Brooklyn Rapid Transit system, the writer originally designed scheme No. 1. The purpose of this was to allow cars ending their runs at this point in the system to enter the yard and the adjoining carhouse directly, with as little shifting and changing of trolley poles as possible, and to permit those cars going down Seneca Avenue to the end of the line to come back and enter the last three bays of the carhouse directly. If these cars had entered the yard there would have been involved a considerable holding up of traffic and changing of trolley poles.

At the suggestion of the transportation department the second scheme was prepared, with a view to having all branchoffs right-hand instead of left-hand. This involved the turning round of the yard-entering special




YARD ENTRANCE TRACK LAYOUT POSSIBILITIES—THREE SCHEMES FOR THE SOLUTION OF A COMPLICATED TRACK LAYOUT IN BROOKLYN, N. Y., IN ORDER OF DEVELOPMENT—THE THIRD SCHEME IS THE PREFERRED ONE FOR THE CONDITIONS SHOWN

work. However, as all yard tracks were to discharge into Seneca Avenue, or into DeKalb Avenue ahead of the curves leading into Seneca Avenue, it was found physically impossible to follow this suggestion for mere lack of room unless the right-hand half of the yard were to discharge onto a skew ladder, as shown. Furthermore, it would be necessary for such a ladder to connect with the main line directly on the curves leading into Seneca Avenue. This would require the placing of a switch on a rather sharp curve, a practice held to be very undesirable. After a conference of interested persons, this undesirable feature was eliminated by the suggestion of a skew ladder converging into a single track and then branching into tracks tangent to the main line east-bound and west-bound tracks on Seneca Avenue, the latter tracks turning into DeKalb Avenue on long radius curves with allowance for car clearance. It was possible to provide such curves by taking a corner off the property shown in the illustrations, which is owned by the company.

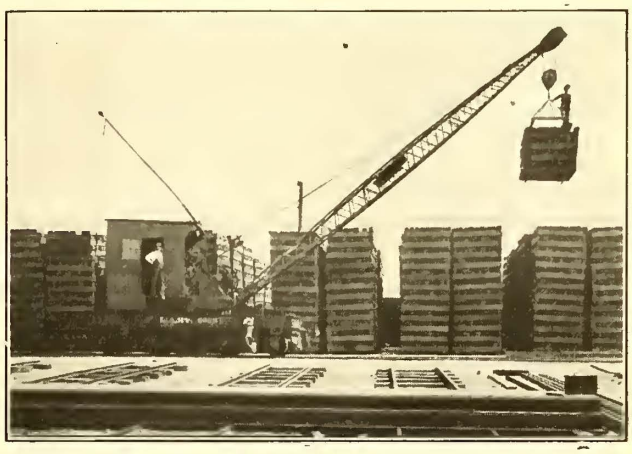
The next step in the development was the idea that it would be more convenient to have the left side of the yard provided with special work as shown in Scheme 1. The arrangement shown in Scheme 3 was therefore evolved and this is possibly the best arrangement under the circumstances. With this layout it is possible to have cars come into the yard and carhouse, and leave, in two directions, so as to accommodate short-line service and full-trip service. This is accomplished so effectually that there is practically no unnecessary shifting of cars and no running against traffic, with the exception that cars coming out of the carhouse down Seneca Avenue would have to run against traffic for some 80 ft. This layout also cuts down the fire hazard by half because, with tracks discharging in two directions, it is possible, in case of fire, to empty the yard in one-half the time required with a different track layout. Then again, the life of the yard-entering special work is practically doubled because only one-half of this special work is used by cars coming into, or out of either half of the yard. The position of track A represents another feature of convenience as it allows a more gradual down grade for this track which leads to a proposed lower-level transfer table and shop-track layout.

[NOTE—It would be interesting to have the ideas of other track-layout experts on this problem.—EDS.]

## Uses of the Locomotive Crane in Electric Railway Work

BY G. J. KUHRTS, CHIEF ENGINEER LOS ANGELES RAILWAY

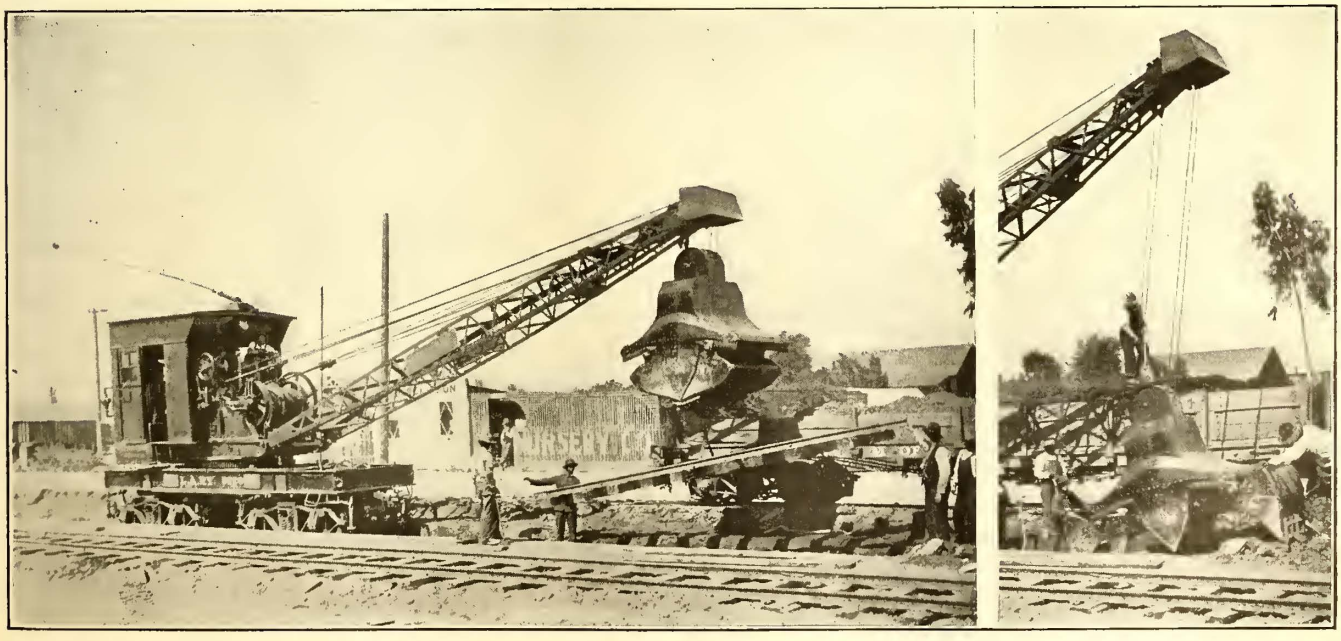
During the year 1914 the Los Angeles Railway purchased a 15-ton electrically-operated "Brown Hoist" locomotive crane. This crane has a 75-hp. motor to operate the hoisting and turning mechanism, and four 50-hp. Westinghouse motors for the operation of the car. It is also equipped with a single K-35-G-2 controller, a Westinghouse D-3-E-G compressor with straight and automatic air brakes, and weighs when ballasted about 60 tons. For convenience in operation in loading and unloading material we secured two lengths of boom,



PILING TIES WITH LOCOMOTIVE CRANE

one 50 ft. and the other 30 ft. long, the shorter boom being sufficiently short to permit operation beneath our overhead construction.

We have recently been engaged in the reconstruction and paving of tracks in the southwest part of the city and have been able to effect a considerable saving by excavating the trench with the crane, using a 2-yd. grab bucket and loading directly onto cars on a side track. In cuttings from 14 in. to 5 ft. deep in sandy soil we have been able to save between 50 per cent and 75 per cent of the cost of ordinary shoveling, depending upon the depth of cut. The accompanying illustrations show the machine in the operations of loading and



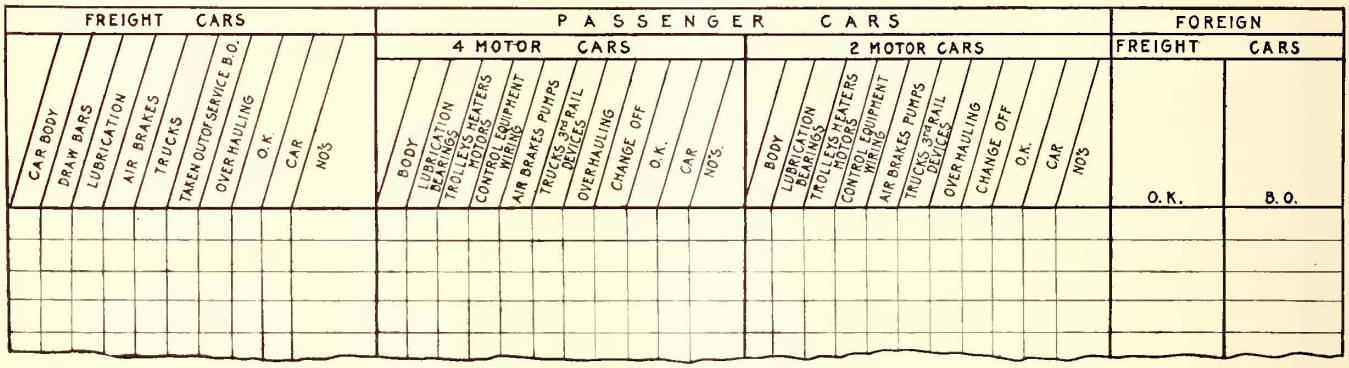
LAYING TEMPORARY TRACK SECTIONS FOR DITCHING, AND DITCHING WITH THE GRAB BUCKET

dumping. They also show the method of placing the track sections in position. These sections are four or five in number and about 18 ft. long. Under favorable conditions we have been able to handle as much as 60 cu. yd. per hour. The machine requires three men to properly operate it, but it is customary to place shovelers directly behind the shovel to trim up the bottom and sides of the trench so as to leave a completed job.

The greatest saving, however, in the use of machines of this class is in the material yards where materials of all kinds are handled and much valuable space is conserved. As an example, it may be stated that we unload from gondola cars 60-ft. girder rails weighing 2320 lb. each, turning and piling them to any desired height, with three men, a saving over ordinary hand methods of twenty-seven men, and we do it in less time.

## Car Record and Trouble Board Combined

Simplicity and facility have been attained in the new combined rolling-stock record and trouble board recently put in service by the mechanical department of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill. As shown in the chart headings reproduced herewith, all cars are divided into three general classes, namely, freight, passenger and foreign cars, and the passenger equipment is classified into four-motor and two-motor cars. Under these general headings are listed in the vertical columns, the car numbers of each class and the various parts of the car equipment which may be undergoing repairs, defective or renewed. In the horizontal




TROUBLE AND EQUIPMENT RECORD COMBINED

which has been repaired but is reported back for the same trouble, and the black one, which indicates that a car has been taken out of service because the equipment is defective.

From the foregoing it will be seen that this board indicates at a glance the number of cars in bad order and the renewals and repairs to the different parts of the equipment. It also checks up poor work done by the men on the different parts of the equipment, since this is evident at once from the number of blue and black tags on the board. The board is also a check on repacking journals. Motor-axle bearings are repacked every 15,000 miles and armature bearings are repacked every 25,000 miles. All tests are also recorded on the board under the different classes of equipment shown. On the tag for special work all cars painted, overhauled or reinforced are recorded. This board was devised by J. W. Bowman, master mechanic, and J. P. Ganyon, general foreman of the repair shops.

## Report on Special Steels by W. C. Cushing

The use of special steel for track generally and in particular for track appliances such as switch points and crossings is discussed at length by W. C. Cushing, chief engineer maintenance of way, Pennsylvania Lines, in the report to the International Railway Congress which was to have held its ninth session in Berlin, 1915. The report is published by the American Railway Engineering Association. It is a compilation of results obtained from practices and tests made on American railways, and, in addition, describes some practices rather minutely in order to clear up some misapprehensions on the part of foreign engineers. Under the subject of special steels Mr. Cushing divides them into special alloy steels and special process steels. With special alloy steels he includes manganese, nickel, nickel-chromium, high carbon and high silicon steels. Under special process steels he includes all steel products derived from special heat treatment, or by the addition of metalloids which do not appear in the test analyses of the resulting product. Such steels include titanium-treated, aluminum, electric process and heat-treated steels.

As a result of a careful analysis of the information collected for this report, which contains 193 pages, Mr. Cushing has drawn the following conclusions regarding the merits of special steels in rails and various other track appliances:

1. Cast manganese steel has been proved by long experience, under exacting conditions, to be a satisfactory and safe metal for frogs and switchpoints.

2. The trials of rolled manganese steel for rails and for the manufacture of frogs and switches have not been so extensive as with the cast product, but have been continued to a sufficient degree to enable us to conclude that it will ultimately be entirely suitable for

line under these various headings and on the same lines with the car numbers, hooks are provided on which the various car record tags are hung. It is contemplated that the board will hold one year's trouble record of all parts of the equipment. At the end of each month the total number of defects of each class are recorded on tags which are hung at the bottom of the board.

Tags of several colors are used in the vertical columns to show at a glance the progress of the repairs at any time. A yellow tag indicates that repairs of any class are to be made on equipment, shows the date and is marked with the initials "B.O.," meaning bad order. When a job is completed the card is reversed, the date is recorded and the initials "O.K." are stamped on it in large type. A red tag indicates that a car has been reported in bad order and has been taken out of service, but that the character of the defect is unknown. A red tag with the word "Hold" indicates that the car is being held in the shop for special repairs which have not been classified. A green tag on this hook, dated and containing the initials "O.K.," indicates that the special repairs have been made. A white tag indicates that special work is being done on equipment which is not classified. Two tags which the mechanical department tries to keep off of the board are the blue one representing a defect

those uses at locations where great strength, toughness and a maximum abrasive resistance are desirable.

3. The experiments with nickel and with nickel and chromium in certain proportions in rail steel have not, up to the present time, been entirely satisfactory; but the accepted employment of nickel steel in bridge construction, and the trials of nickel and chromium in other proportions in rail steel, especially when incorporated as two of the natural elements of the iron ore, justify continued use.

4. The use of high carbon (over 0.80 per cent) in rails weighing 85 lb. per yard, in combination with 0.92 to 1 per cent of nickel, and 0.24 to 0.29 per cent of chromium, has not been satisfactory. The conditions with rail sections of greater weight might be entirely different.

5. Further study of the qualities possessed by high silicon rails, that is, steel with over 0.30 per cent of silicon, is advisable.

6. The value of the use of ferro-titanium in rail steel manufacture as a "physic" for improving the condition of solidity of the metal is conceded, but at the same time steps should be taken to overcome its injurious effect in deepening the "pipe" in the ingot.

7. Heat-treated rails and those manufactured with the assistance of the electric process are at present in experimental use only, but the possibility of future value is promising, and the study should be continued.

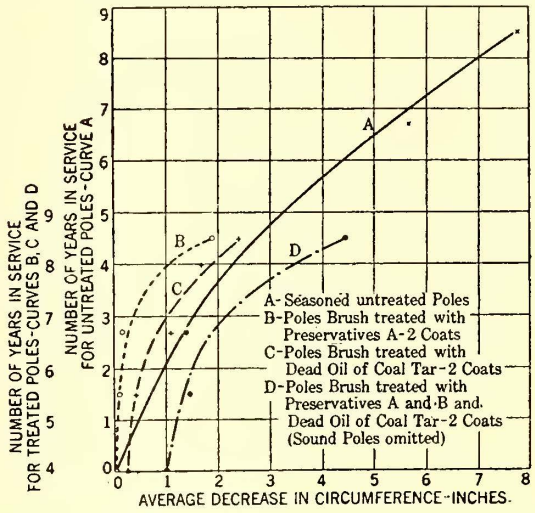
## Effect of Preservatives on Wood Poles

At the St. Louis meeting of the American Institute or Electrical Engineers, held on Oct. 19, F. L. Rhodes and R. F. Hosford presented an exhaustive report on the effects of preservative treatment on wood poles. The report covered large numbers of poles treated by several methods and the observation extended over a considerable term of years, some treatments dating back to 1897. The report included pole-length treatment, and treatment by the brush and the open-tank processes.

While it was stated that, because of the present incomplete state of our experience with the different types of treatment described, conclusions can be reached for only a part of the problems whose solution was sought, several important conclusions were reached. One of these is that the seasoning of poles affords at best only moderate advantages in the way of increased life, its greatest value being as a preparation for the successful application of preservatives. Another is that the practice of applying to poles a preservative high in antiseptic power and insoluble in water has been shown to yield increased life, the amount of preservative applied and the depth to which it is made to penetrate appearing to exercise controlling influences upon the results obtained. Again, mechanical failure of the treated layer is indicated as the principal limit to the effectiveness of the application of a preservative.

Among the deductions from the observations of poles treated for their whole length the following are significant: The principal cause of deterioration in the top section appeared to be the cutting off of the top, hence all timber should be completely framed before treatment. The bleached and other lighter colored poles yielded a percentage of decayed specimen considerably above the average for all poles inspected. As the lighter colored poles are presumably those which retain the lesser amounts of preservative it follows that the life will increase with the amount of preservative applied. Poles which were located at high altitudes showed more than the normal amount of decay, while the lowest proportion of decayed poles were located in muck. On one line 50 per cent of the poles showing no tar were decayed, as against 39 per cent decayed among poles showing streaks of tar near the ground line, and 18 per cent decayed for poles streaked with tar throughout their length. The data from this line show that the conditions to which the top of the pole is exposed favor the more rapid removal of the volatile constituents of the preservative than occurs in the butt section. The poles suffered losses in the proportion of the low boiling constituents in the preservative, the data indicating that no appreciable loss by evaporation occurs in the case of constituents of the oil distilling above 270 deg. C.

The study showed that success with the brush treatment could only be expected when it was applied to seasoned poles, it being desirable that the part of the surface to be protected by the preservative should be dry and thoroughly cleaned. The preservative, preferably heated to 150 to 200 deg. Fahr., was applied to the cleaned surface by means of a brush, preferably one with a long handle, and the application was most conveniently carried out when the pole was placed so that it could be rotated while the preservative was applied




RATE OF DECAY OF CHESTNUT POLES COLLECTED AT MOUNT PISGAH, N. C., AND INSTALLED IN GEORGIA

to the upper segment of its surface. The best results were obtained by applying a second coat of preservative after the first had had time to work its way into the wood. There was no clear evidence of any advantage derived from applying a third coat. For the usual case of heavy decay concentrated at the ground-line section, a treatment extending from 1 ft. above the ground line to 2 ft. below it should be sufficient.

The open-tank treatment caused a substantially greater penetration of the preservative into the wood than did the brush treatment. The penetration was from ¼ in. to ½ in. as compared with from 1/16 in. to ¼ in. for the brush treatment.

Treatment with coal tar was found to be ineffective in preventing decay, as the tar formed a superficial coating, tar-coated poles deteriorating practically to the same extent as untreated poles.

There was no indication that decay will proceed more rapidly on treated poles, once it starts, than it does on untreated poles. The indications were, therefore, that any gain due to the retardation of the beginning of decay through treatment will be retained. The tests indicated a greater addition to the life of poles through treatment for a Northern location as compared with a Southern one.

Regarding the effect of treatment upon insect activity it appeared that, as the insects follow decay, the retardation of decay is accompanied by retardation of insect activity.

## Alternating Current Signaling

A really comprehensive treatise covering the installation and operation of equipment for a.c. signals has just been published by the Union Switch & Signal Company of Swissvale, Pa., under the title of "Alternating Current Signaling." The book is no perfunctory description of a manufacturer's line of merchandise, but constitutes, rather, a notable addition to existing literature on a very important subject that is hardly understood by anyone aside from the experts who devote their entire time to this one phase of signal operation. In fact, the new book, which is made up in convenient pocket size and bound with leather, will unquestionably serve both as a reference work for signal engineers and as a text-book for those who feel the necessity for learning about the details of this relatively new and rapidly-growing feature of the railway industry.

In the historical sketch, which precedes the technical material, the authors have pointed out that it is due to the requirements of electric railways that alternating current signals first came into being some twelve years ago, and although their use was confined to electric railways for several subsequent years, they have now been installed upon thousands of miles of steam railroad, bidding fair eventually to displace the older d.c. signals altogether. Their general introduction, which has been due not only to their improved economy but also to a vastly increased reliability, has as a matter of fact, eliminated so many of the weaknesses to which d.c. signaling is subject that the art is actually in process of revolution and the electric railways are in an excellent position to play a leading rôle in the changes in practice that are bound to come with more reliable apparatus. Indeed, the possibility of false clear signal indications has largely dominated the viewpoint of the steam railroads because of experience with d.c. signaling in the past. That their outlook is changing is now manifest, and the fact that electric railways have been instrumental in bringing this about, through the demand for alternating current signaling, lends special interest to that subject and makes the new book especially timely.

To make the work comprehensible to readers who are unfamiliar with the fundamentals of either alternating current or alternating-current track circuits, two of the first chapters have been devoted to an elementary exposition of their subjects. They are followed by a remarkably clear and thorough description of the various types of relays that are commonly used, including explanations of the features that are peculiar to each and their special uses, together with a very interesting set of curves showing voltages, currents and power factors to be expected with various lengths of block. A separate chapter is devoted also to track currents on electric railways owing to the complications involved by the propulsion current in the rails.

A chapter on signals, which covers the mechanical and electrical details of semaphore operation, submits an interesting comparison of series and induction motors and discusses existing practice in signal lighting. This includes a very complete section that is devoted to light signals of both the colored-light and beam-light types, these being accorded a visibility range of from 2500 ft. to 4000 ft. and being considered by the authors perfectly satisfactory for high-speed service.

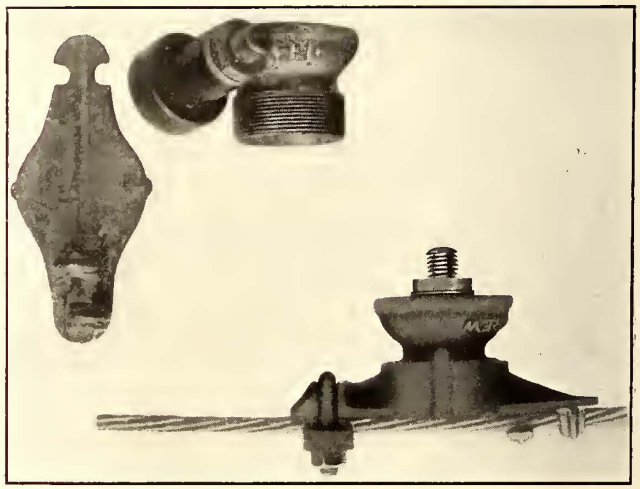
The subject of transmission systems and power house equipment is covered by a highly technical chapter in which are discussed such matters as voltage and line-wire size, frequency, practical calculations of resistance, reactance and impedance drops and the like, this being of distinct value to the signal engineer, as the problem of transmitting the small amounts of power involved in signal operation can find no parallel in the ordinary conditions that are considered in text-books on electrical distribution. This section is liberally interspaced with tables of general data and is throughout a thoroughly practical discussion for the benefit of those who have actually to install and operate the equipment.

Owing to its wide introduction for interurban signaling, the T. D. B. system is discussed in a separate chapter, and in this is published for the first time a circuit scheme for the arrangement. Other chapters cover a.c. interlocking and accessories, and the book concludes with an analysis of track-current calculations and a series of tables and data covering information that is useful to the signal engineer and maintainer.

## A Straight-Line Hanger That Stays On

The Drew Electric & Manufacturing Company, Indianapolis, Ind., announces a new galvanized straight-line hanger type, No. 1039, known as the "Sta-on." As this name implies the hanger cannot be shaken off the span. This feature is obtained by fitting the top of the hanger with one pair of sister hooks at one end and a U-bolt at the other end. It is a simple matter to slip the hanger on the wire by means of the sister hooks and then to fasten it by screwing upward the two bolts of the U. It is clear also that these bolts also permit easy removal of the hanger. The top of the hanger is grooved slightly to bed the span wire.

The features of this hanger may be summarized as



STRAIGHT-LINE HANGER AND DETAILS

follows: It cannot accidently come off the wire, either on bracket or span construction; in span construction, no matter how slack the wire, it will stay in an upright position; where span wire is slack in special work, the hanger will not drift out of line or turn sideways; it does not injure or strain the span or eye-bolts; it can be installed loose on new work, thus allowing the wire to be lined up.

This hanger eliminates all trouble in lining up trolley, as it does not have to be forced on or off the span a number of times to get the trolley in line. This advantage is very useful on curves. In general, adjustments can be made merely by loosening the bolts a little and veering the hanger around as much as may be necessary.

R. L. Weber, author of the article on "Kansas City's New Cars" appearing on page 771 of the issue of the Electric Railway Journal for Oct. 9, calls attention to the fact that the name of Robert P. Woods, member of the Kansas City board of control representing the city, was incorrectly given therein.

# News of Electric Railways

## TRANSIT ISSUES IN THE COMING ELECTIONS

### Voters in Detroit, Toledo, New York State, Des Moines, Philadelphia and Cleveland All Have Important Matters Before Them

The elections to be held in November will be unusually significant to the electric railway industry. In Detroit on Nov. 2 there will be submitted to the voters for their approval the purchase by the city of the lines of the Detroit United Railway within the city under terms agreed upon by the Detroit Street Railway Commission and the officers of the company. On the same day in Toledo the new street railway franchise to the Toledo Railways & Light Company will go before the electorate. In New York State on Nov. 2 the voters will have before them the question of acceptance of the new State constitution, with its significant provision making the Public Service Commissions constitutional bodies. Later in the month the new franchise for the Des Moines City Railway will go before the voters. The election in that city will be a special one and will be held on Nov. 20. In Philadelphia the successful carrying out of the transit program prepared by the Blankenburg administration hinges apparently on the election to the Councils of that city on Nov. 2 of candidates pledged to the support of the plan. In Cleveland subway and rapid transit franchises to the Cleveland & Youngstown Railroad and the Cleveland, Akron & Canton Terminal Railroad will come up for approval on Nov. 2.

Ten days before the Detroit purchase plan election finds a very definite alignment of interests on the question. Mayor Marx, the Street Railway Commission, and all the forces of the administration are backing the proposed purchase arrangement. Against the plan are the Federation of Labor, the Municipal Ownership League and the local union of the street railway employees. As previously stated, the labor people have taken the position that the proposed plan would be injurious to organized labor. The Municipal Ownership League is opposing the purchase on the ground that the unknown price will be so high as to prevent successful municipal operation. As for the Detroit United Railway it has lived up to its announced intention of not participating in any discussion concerning the municipal ownership proposal. In its last public utterance, made in August, the company did, however, protest against pending propaganda picturing the company as sort of a "foreign devil."

The Wayne County circuit judges have refused to enjoin the submission of the Detroit purchase proposition at the election on Nov. 2. At the same time the court refused to pass on any of the legal questions raised in the petition for an injunction to prevent the election, specifically reserving jurisdiction over all questions except as to the vote. The court ruled that the right of the people to vote on a matter like this is partly legislative and partly ministerial and, except in cases of imperative necessity, should not meet interference at the hands of the judges. The bill of complaint, upon which the injunction was asked, is likely to be revived in the Circuit Court if the purchase plan is adopted by the electors, inasmuch as it raises a number of questions as to the constitutionality of the contract entered into between the city and the railway whereby, if carried, the price of the property is to be fixed by the Circuit Court.

The work of Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, in the interest of an extension of the franchise of that company seems likely to bear fruit. The special franchise committee of the Council in that city, after preparing a tentative draft of an extension ordinance for presentation to the Council, insisted at first on putting the matter before that body without any recommendation. Mr. Doherty contended that the work done in preparing the draft would amount to nothing unless the Council accepted or rejected the proposal. The committee still demurred. At this point the Toledo Franchise Association took the matter up and began the circulation of petitions for the initiation of the franchise. On Sept. 13 the Council by a vote of twelve to six decided to receive the report of the committee. Before Oct. 2 petitions containing 22,135 signatures urging the submission of the franchise to a referendum vote at the November election had been filed with the city auditor. These signatures equalled the entire vote at the recent primary election, and most of those who signed were said to have expressed themselves in favor of the franchise.

If the revised constitution is ratified by the voters of the State of New York, the short ballot will be inaugurated in New York State at the beginning of 1917. The new constitution retains the Governor, Lieutenant-Governor, Comptroller and Attorney-General as elective officers, but the successors of the Secretary of State, the State Engineer and the State Treasurer are to be appointed by the Governor. The department of the State engineer in fact will be supplanted by a department of public works, with the head to have supervision of the construction, care, maintenance and operation of all the public works of the State, including canals, highways and public buildings, and this department will plan all the engineering, architectural and construction work required by the State department. If the voters approve the revised constitution the State budget will in the future be submitted to the Legislature by the Governor instead of being initiated in the Legislature and subject only to a limited veto power by the chief executive. The Governor's appointments are freed from the requirement of confirmation by the Senate, except in the case of members of the Industrial, Public Service, Conservation and Civil Service Commissions, which are regarded as quasi-judicial bodies. The Public Service Commissions are made constitutional bodies. So are the Tax Commission, the Industrial Commission and the Civil Service Commission.

In Des Moines litigation involving the validity of the franchise of the Des Moines City Railway was begun by the city in 1900. This long fight now seems likely to end with a franchise practically the same as the one under which the company then was operating. The new grant was drawn up by a committee representing the Des Moines Chamber of Commerce. It has bene adopted unanimously by the City Council. Sentiment in the city appears to be overwhelmingly in favor of a final settlement of the franchise question on the basis now offered. The new franchise will provide six fares for a quarter, half-fare for school children, a guarantee of service as good as the best in any city of the nation the same size as Des Moines, and a valuation of $5,000,000 as of the present time if the city decides to buy the property within twenty-five years, which is the term of the franchise. No valuation is fixed for the purpose of determining profits. The company guarantees the service and takes its chances on the profits.

In Philadelphia the success of the rapid transit plan advanced by Director of City Transit Taylor seems to hinge on the election to the Councils of representatives pledged to the transit program. The Philadelphia *Ledger* says that George D. Porter, until recently Director of Public Safety of the city under Mayor Blankenburg and now candidate of the Franklin party to succeed the Mayor, "wants the agreement made between the Department of City Transit and the Philadelphia Rapid Transit Company put into effect." This agreement provides in short for the immediate construction of the Broad Street subway, the Frankford elevated, the Woodland Avenue elevated and other lines at a cost of $55,000,000, a universal 5-cent fare and abolition of the present exchange tickets. The *Ledger* said on Oct. 16: "There is nothing that stands between the people and the achievement of their desires except a group of selfish politicians. The Philadelphia Rapid Transit Company is on record as favoring the transit plan. There is none to object except a few 'leaders,' who do not wish this situation to pass without their getting something out of it. It is a simple thing for the people of Philadelphia to take matters into their own hands and decide this great issue now and for all time. All that they have to do is vote for candidates who favor rapid transit and against candidates who do not favor it."

The Cleveland & Youngstown Railroad ordinance, which will be submitted to the voters of Cleveland at the election on Nov. 2, is intended to permit the establishment of a high level freight terminal in connection with the rapid transit line. The franchise of the Cleveland, Akron & Canton Terminal Railroad, to be voted upon at the same time, gives the company the right to build a subway under East Fifty-fifth Street, Cleveland, from the lake front to Morgan Run on the south side of the city. This will open to a number of railroads entering the city from the south a strip of lake front of about 3800 ft. The companies now have no means of reaching the lake and all their freight must be transferred. It is the purpose of O. C. Barber, who is at the head of this movement, to erect an immense grain elevator and large coal docks and loading machines on the lake front, in order that the roads using the subway may have direct connection with the lake shipping facilities. The subway is to be operated by electricity, but will be used by steam railroads.

## STRIKE AT WILKES-BARRE AGAIN

Traffic in the Wyoming Valley of Pennsylvania is tied up for the second time within six months by a strike of the employees of the Wilkes-Barre Railway. The trouble dates from last April, when arbitrators chosen by the company and by the employees awarded a sliding scale rate of wages after a comprehensive series of hearings in which both sides were heard. The employees filed objections to the award recently, alleging that when arbitration was agreed to by them it was on the condition that a flat wage rate be fixed. A majority of the board of arbitrators was called together, Samuel D. Warriner, representative of the company, refusing to attend. Thomas D. Shea, representing the men, and Dr. John Price Jackson, the umpire, repudiated the sliding scale award as noted in the Electric Railway Journal of Oct. 16, page 839. Since the first award of the arbitrators was reversed by themselves, the carmen demanded 27 cents an hour. T. A. Wright, general manager, refused to pay the rate, and as a result the strike was declared.

The company has taken advantage of the opportunity to make needed repairs to its lines, work and service cars being the only ones operated. These were not molested by the striking motormen and conductors. A statement given out by Mr. Wright made it evident that no change in the situation would take place until after a meeting of the board of directors. Mr. Wright holds that the men have broken faith by not accepting the original award of the arbitrators, and in his statement says that the question is now one of principle and resolves itself into which one is right, the company or the men.

An effort to mediate in the strike is being made by the State authorities. Patrick Gilady, mediator of the State Department of Labor and Industry, and James A. Steese, chief clerk to Commissioner John Price Jackson of the same department, arrived in Wilkes-Barre and held informal talks with several of the officers of the trolleymen's union, and hoped to be able to arrange a conference with the officials of the company.

Holding that the original award of the arbitrators in the wage dispute between the Wilkes-Barre Railway and its employees is binding and without appeal, the directors of that company, in a statement covering a page of the local newspapers, set forth the position plainly that it will not agree to any suggestion made by two of the arbitrators who have repudiated their award. The only ray of hope to be found in the statement which might pave the way for an early settlement of the trouble is in the expressed willingness of the company to submit to the courts of Luzerne County the question of whether or not the two arbitrators had any right to repudiate the award.

A reasonable time will be allowed by the company for the men who are out on strike to return to their positions on the wage basis fixed in the original award of the arbitrators. The company desires to reopen its lines with all the men back in their places, but if at the end of a reasonable time, not definitely fixed by the company as yet, there are not enough employees back for duty, steps will be taken to fill vacancies with new and competent men. Union leaders refuse to comment upon the company's statement.

## GOVERNMENT'S CASE AGAINST NEW HAVEN OUTLINED

R. L. Batts, one of the special counsel appointed by the government to prosecute past and present directors of the New York, New Haven & Hartford Railroad on a charge of conspiring to monopolize the transportation facilities of New England, spent the entire session on Oct. 18 in the Federal District Court at New York in explaining to the jury the intricacies of New Haven finance. Mr. Batts told the jury that the government did not hold all combinations illegal and laid it down as a principle that the test of the legality of a combination was whether it was such as would be developed naturally in the normal way of business. Moreover, Mr. Batts told the jury they need consider not only what was done but what was intended to be done and that they should convict if they found an intent to monopolize.

In speaking of the acquisition of the electric railways of New England, which began in 1905, Mr. Batts said it involved the policy of spending however much money might be necessary to acquire a monopoly. He suggested the price paid for a property might be taken as another test by the jury of the legitimacy of the expansion it produced, and he instanced the purchase of the Rhode Island electric railway system from Senator Aldrich and his associates.

## BUS FRANCHISE RECOMMENDED IN NEW YORK

The franchise committee of the Board of Estimate of New York City, composed of Mayor Mitchel, Aldermanic President McAneny and President Mathewson of the Bronx, recommended on Oct. 15 that a franchise be granted to the New York Motorbus Company to operate double-deck, side-entrance cars over 31 miles of streets in the Borough of Manhattan from Union Square on the south to Fort George on the north. The committee recommended rejection of the application of the Fifth Avenue Coach Company, which operates the only buses now running in Manhattan, for a franchise for new lines and extensions totaling, according to the committee's figures, 21 miles. It also rejected offers from Grindley & Brunner. Other competitors dropped out several months ago.

Two main north and south routes are laid out in the proposed contract. Starting at Union Square a West Side route would extend to Fort George by way of Seventh Avenue, Broadway, Amsterdam Avenue, Eighty-sixth Street, West End Avenue, Broadway and St. Nicholas Avenue. The East Side route would extend from Union Square to Ninety-sixth Street through Irving Place, Lexington Avenue, Twenty-third Street, Madison Avenue, Thirty-ninth and Fortieth Streets and Park Avenue. From 110th Street there would be a bus line to 168th Street by way of Manhattan Avenue, Morningside Park East, Convent Avenue and Broadway. The fare on these lines would be 10 cents. The 5-cent lines include three crossing Central Park on the transverse roads, others through Thirty-first, Thirty-third, Thirty-ninth, Fortieth, Forty-sixth and Forty-seventh streets, and two lines from Union Square to the Pennsylvania Station, all short cross-town lines. From each of the 5-cent cross-town lines a person could transfer to a 10-cent line by paying another nickel. According to the committee's report, the Fifth Avenue company offered the city a guarantee of from $35,000 to $65,000 a year, or a total of $750,000 for the term of the contract, which is fifteen years, with ten years renewal privilege. The Motorbus company offered from $30,000 to $60,000 a year, or $735,000 for the fifteen years. The Fifth Avenue company insisted, as the Motorbus company did not, that its payments to the city be deducted from any franchise tax that migh be levied in the future. The most important feature of the Motorbus company's offer, according to the franchise committee, is that it agrees to extend its lines or to operate new ones whenever the city shall direct. It is also provided that if there is a deficit on the new lines thus ordered the city shall pay it, but if the deficit amounts to 75 per cent of the company's payment to the city under the franchise, routes will be abandoned as the city directs.

The New York Motorbus Company has deposited with the city a certified check for $60,000 to guarantee performance if it gets the franchise. Its president is Howard Conklin

of 1 Wall Street. Other directors are Stanley M. Conklin and Harold B. Weaver, the company's consulting engineer, who is vice-president of the Manhattan & Queens Traction Corporation. The company agrees to have 100 buses running within eight months.

## HOLYOKE ARBITRATION BEGUN

Arbitration proceedings in the Holyoke (Mass.) Street Railway's disagreement with local division No. 537 of the Amalgamated Association were opened on Oct. 19 at the Holyoke City Hall. The board of arbitration consists of Attorney James E. Cotter of Boston, appointed by Governor Walsh; Attorney William H. Brooks of Holyoke, representing the company, and former Mayor John J. White of Holyoke, representing the employees. James H. Vahey, Boston, is acting as counsel for the union, assisted by John H. Reardon, Worcester. T. D. O'Brien, Holyoke, appeared as counsel for the company. About 250 men are organized in the local union, and the company operates in Holyoke, Amherst and Sunderland, serving 75,000 people.

The opening session was mainly devoted to a review of the subjects to be arbitrated. The present scale of wages is: first six months, $2.30 a day; second six months, $2.45; second year, $2.60; third year, $2.70; fourth year, $2.85 a day. The questions to be arbitrated are: (1) Shall the present scale be continued to June 1, 1916? (2) Will the company make its schedules in accordance with the so-called nine-in-eleven-hour law of 1913, and shall the company pay for all runs in excess of nine hours and not in excess of 9.25 hours, an extra half-hour's time; and for all runs between 9.25 and 9.5 hours one hour's extra time, at the exact rate of an hour divided by 9, viz.: First six months, 25⅝ cents an hour; second six months, 27⅞ cents; second year, 28⅝ cents; third year, 30 cents; fourth year and thereafter, 31⅔ cents an hour? (3) Will the company pay for overtime work done by motormen and conductors on other than regular runs at the exact hourly rate quoted above (from section 2 of the agreement)? (4) Will the company establish a nine-hour day for employees of carhouses, shops and miscellaneous departments for week-days, to be completed within ten consecutive hours, and for Sundays and holidays an eight-hour day to be completed within nine consecutive hours, at the present day rate? (5) When any conductor or motorman is ordered to report at any other than the regular reporting or relieving time, shall he be paid for all time between his regular reporting or relieving time and the time he is ordered to report? (6) Where men are compelled to dead-head to and from runs, will they be paid at their regular hourly rate? (7) In the computation of time, except as otherwise provided, shall fractions of hours be considered as full hours, and paid for as such? (8) Shall tower cars be operated at all times by motormen holding rating in the passenger service, and shall such cars be subject to the rules of seniority bidding? (9) Shall all runs of nine hours or less be considered as full days and paid for as such? It is also for the board to decide whether its decision shall continue until June 1, 1916.

## FIXING THE BLAME IN CLEVELAND

The Cleveland (Ohio) Railway has been dragged into politics. Peter Witt, street railway commissioner, points to his record in that office and claims credit for maintaining the fare at 3 cents, although the people are now paying for transfers.

Harry L. Davis, another candidate, has expressed opposition to municipal ownership of either the street railway or the light plant and refers to the amount of money already spent on the municipal light plant, which is benefiting only a comparatively few people at the present time.

Charles P. Salen pledges aid to the street railway employees in securing a change in the operating schedules. He says the present schedules, arranged by Mr. Witt and the company, make swing runs the rule.

B. F. Mills, candidate for Mayor of Lakewood, is opposed to the pending franchise renewal there, and Frank G. Carpenter, candidate for Mayor of East Cleveland, is criticising the present administration because it did not force the company to move its tracks in Euclid Avenue while a sewer is being installed.

## OHIO SUPREME COURT ON STARK COUNTY FRANCHISE

The Ohio Supreme Court, in a decision rendered on Oct. 19, holds that the franchise of the Northern Ohio Traction & Light Company in Stark County, which the company contended was perpetual because no specific time had been set for its termination, may be terminated by either party at any time. This suit was brought by Stark County in an endeavor to force the company to reduce the fare between Canton and Massillon from 15 to 10 cents. The lower courts held in favor of the company. It is believed that a suit will now be instituted to nullify the company's light franchise in Barberton. The conditions are much the same as those that apply to the railroad franchise in the county. The case may be carried to the United States Supreme Court.

**Appeal in Toronto Extension Case.**—The City Council of Toronto, Ont., has decided to appeal to the Privy Council against the order of the Ontario Railway Board and the decision of the Appellate Court confirming the order requiring the Toronto Railway to extend its tracks from the Canadian Pacific Railway crossing on Yonge Street to Farnham Avenue.

**Marginal Railroad for Providence.**—Construction and ownership by the city of a marginal railroad along the new city sea wall at Field's Point, together with tracks across city-owned land to connect with the Southern New England and New Haven lines beyond Allen's Avenue, will be recommended to the City Council of Providence, R. I., by the committee on harbor.

**Ordinance Introduced for Extension of San Francisco Municipal Line** —Supervisor Charles Nelson has introduced before the Board of Supervisors of San Francisco, Cal., an ordinance providing for a bond issue of $5,000,000 for the extension of the lines of the Municipal Railway. The extensions are to be into the North Beach, Sunset and Potrero districts and through Twin Peaks tunnel. The ordinance has been referred to the committee on public utilities.

**Completing the St. Paul Southern to Rochester.**—Directors of the St. Paul (Minn.) Southern Railway are considering a proposition to lease 25 miles of track of the Great Western or Northwestern Railway from Zumbrota to Rochester. The line is now operating between St. Paul and Hastings, and work is being pushed on the 34-mile stretch between Hastings and Zumbrota. Grading through to Rochester, if the lease is not consummated, is expected to be finished by May 1 and operation begun by Dec. 1, 1916.

**Municipal Railway Employees Seek Wage Increase.**—Representatives of the platform men employed on the San Francisco (Cal.) Municipal Railway have presented to the Board of Public Works demands for one day off each week and an increase in pay, which would aggregate about $12,800 a year. The men are now receiving $3 a day for an eight-hour day, this amounting to about $78 a month. Under the present system they receive no pay for days they do not work. They are now asking for $90 a month, with one day off each week.

**Twelfth Year for Railway Technical School.**—The twelfth annual winter session of the British Columbia Electric Technical School, which was established in January, 1904, has opened and throughout the coming winter employees of the British Columbia Electric Railway, Vancouver, B. C., who are interested in technical subjects will meet weekly to hear lectures and to discuss matters connected with the electrical field. J. G. Lister, a graduate of the Imperial College of Technology, London, England, has acted as instructor of the technical school since its organization. In order to encourage faithful work the company has this year decided to issue certificates to the men based on attendance and attention. In addition Goeffrey Porter, assistant chief engineer of the company, has offered prizes for the best kept sets of notes on the lectures.

**Cincinnati Sues Cincinnati Traction Company for Franchise Tax on Income of Roads Using Its Tracks.**—On Oct. 16 the city of Cincinnati brought suit in Common Pleas Court to recover from the Cincinnati Traction Company and the Cincinnati Street Railway $20,810, claimed to be due as franchise tax, with interest, under its contract with

the roads. Two other roads use certain tracks belonging to these companies and pay 3 cents per passenger for their use. The Cincinnati Traction Company and the Cincinnati Street Railway have paid the city taxes on the amounts represented by the portion of the fares they receive, but the city now demands the tax on the amounts the leasing companies received, also. It is said that the suit was brought partially for the purpose of safeguarding the city in the adjustment of the rate of fare in 1916, the year that the adjustment is to take place under the contract between the city and the company.

**Chicago Elevated Differences Being Settled in Conference.**—The date for beginning the arbitration hearings in the settlement of the differences between the employees and the elevated railroads of Chicago was set for early in October. Since the decision to arbitrate was made in July the employees and the management decided that they could settle their differences without resorting to arbitration. Accordingly at a regular meeting of the elevated employees on Oct. 9, it was voted to take up the differences with the management direct. This was agreeable to the company, and such satisfactory progress has been made in disposing of the various questions in controversy that it is expected an agreement will be reached between the committee of the employees and the management during the week ended Oct. 23. The terms of settlement will then be published in the *Union Leader*, the official organ of the employees. After six days the agreement will be submitted to the men for approval.

**Arbitration Declined at Oakland.**—The directors of the San Francisco-Oakland Terminal Railways, Oakland, Cal., have declined to submit to arbitration the proposition from the representatives of its employees as to whether the agreement dated Oakland, Oct. 29, 1908, includes employees other than the track oilers and the platform men. G. K. Weeks, president of the company, said in a communication to the men: "What you propose to arbitrate is in no sense a grievance. It is a demand which contemplates an extension of the authority of your union far beyond the limits of the present contract. Your demand is not for an interpretation of the existing agreement, but for a new agreement that shall include under its terms all classes of employees. This matter is of such far-reaching consequence that the officers of the company cannot consent to abdicate their authority in favor of any outside arbitration committee, or anyone else not familiar with the property and the problems connected with its management." On Oct. 10 the report of the grievance committee representing the employees that "the time was not opportune for a strike" was adopted by an overwhelming vote.

**Contract Award for Philadelphia Elevated Railroad Sections.**—Director A. Merritt Taylor, of the Department of City Transit of Philadelphia, Pa., on the afternoon of Oct. 19 awarded to the McClintic-Marshall Company, Pittsburgh, Pa., the contract for the manufacture and erection of the steel superstructure of three of the four sections of the Frankford elevated line in Philadelphia, extending from Girard Avenue north to Unity Street, Frankford. The company's bid was $1,455,000. The McClintic-Marshall Company also was the lowest bidder for the fourth section, from Girard Avenue south to Callowhill Street, with $249,000, and an alternate bid of $261,400. It is expected that this contract will be awarded in the next few days, after a decision is handed down on the removal of Reading Railway grade crossings on Front Street. This will make the company's total bid for the superstructure of the entire line, $1,176,400. The contract provides for beginning the work on April 1, 1916, and completing it the following Oct. 31. The construction of the concrete track floor and the station buildings is not included in the contract.

## PROGRAM OF ASSOCIATION MEETING

### Illinois Electric Railway Association

The Illinois Electric Railway Association will meet on Oct. 29 at the La Salle Hotel, Chicago. The presentation of committee reports and a business session make up the program. The question of amalgamating the Illinois Electric Railway Association, Illinois State Electric Association and the Illinois Gas Association is to be considered.

# Financial and Corporate

## PARIS SUBWAY IN WAR TIME

### Report for 1914 Shows Effect of Outbreak of War Upon Number of Employees, Service and Receipts

The report for 1914 of the Metropolitan Railway, which operates the subway system in Paris, France, is of exceptional interest as showing the fluctuations in the number of employees, service and receipts caused by the outbreak of the European war on Aug. 1, 1914. The year 1914 opened well and for the first seven months the results compared favorably with those of the same period of the two previous years, and the prospects were excellent when war broke out.

The subsequent general mobilization naturally depleted the staff and limited the service. By Aug. 5 2817 male employees, or 56 per cent, had been called to service, and by Sept. 1 this number was increased to 3831 or 75 per cent. Many of the services were suspended, the length of line worked being reduced from 77 km. to 41 km. and the number of stations kept open from 169 to 63. By the employment of women, the sons of men mobilized, very old and very young men, etc., however, the stations and some of the lines were gradually reopened, and by Dec. 1 the last station was in service and all lines were running from 7 a. m. to 10 p. m. With allowance made for the partial interruptions to service caused by the mobilization, the average length of line operated for the entire year was 73 km. At the end of December, 1914, the number of employees was only 3658 as compared to 5478 at the end of 1913.

The beginning of hostilities, of course, affected the receipts adversely. On Aug. 1, after the mobilization order appeared, the receipts increased to $38,981, or 57 per cent, over the corresponding day in 1913, but on Aug. 3, with the stoppage of part of the lines, fewer trains and general paralysis of Paris life, the drop began and reached 15 per cent, as compared to this date in 1913. On Aug. 4 it was 43 per cent, on Aug. 5 50 per cent and on Aug. 9 53 per cent, the total receipts falling to $19,592. On Aug. 15 the low points was reached with receipts of only $7,729, a drop of 58 per cent. The gradual return to working, however, influenced the receipts, and after Aug. 20 they sensibly improved. After Aug. 30 they went up to more than $18,111, but dropped afresh to $10,080 until Parisians began to return in large numbers after the victory of the Marne. In September the daily average receipts were $12,610, in October $16,047, in November $20,026, and in December $22,617, as compared to $33,860 in December, 1913.

An analysis of the results by lines and by categories of passengers showed that the class most seriously affected was the working people, who use the outside lines most in normal times. The great decrease was in the return tickets issued before 9 a. m. and used in returning mostly between 6 and 8 p. m. For instance, on Aug. 3 the number of first and second-class tickets issued was higher than for the corresponding day of 1913, but the return tickets fell off more than 50 per cent.

## UTILITY DEVELOPMENT IN CALIFORNIA

The California Railroad Commission recently published a report outlining the public utility development work carried on in that State from March, 1912, when the commission assumed jurisdiction over stocks and bonds, up to September, 1915, a period of approximately three and one-half years. During this period stocks, bonds, notes and certificates amounting to $466,000,000 were authorized. Of this amount $175,000,000 was authorized for the payment of maturing debts; $248,000,000 for new construction, additional development of existing utilities and new ventures, and the balance for miscellaneous purposes. The authorization for new improvements was distributed as follows: Steam railroads (including $25,000,000 for expenditures outside of California), $102,800,000; electric railways, $32,500,000; gas and electric companies, $80,000,000; water companies, $18,500,000; telephone and telegraph companies, $2,500,000; warehouses, $1,600,000, and pipe lines, $10,000,000. Approximately $200,000,000 of the foregoing has already been expended or is in the process of expenditure.

## ANNUAL REPORT

### New York Railways

The comparative statement of income, profit and loss of the New York (N. Y.) Railways for the fiscal years ended June 30, 1914 and 1915, follows:

| | 1915 | *1914 | Change |
|---|---|---|---|
| Gross operating revenue | $13,399,767 | $13,860,837 | —$461,070 |
| Operating expenses | 8,551,432 | 8,775,620 | — 224,188 |
| Net operating revenue | $4,848,335 | $5,085,217 | —$236,882 |
| Taxes | 1,042,859 | 1,092,105 | — 49,246 |
| Income from operation | $3,805,476 | $3,993,112 | —$187,636 |
| Non-operating income | 527,242 | 460,476 | + 66,766 |
| Gross income | $4,332,718 | $4,453,588 | —$120,870 |
| Income deductions: | | | |
| Interest on underlying bonds, rents, etc. | $2,741,015 | $2,710,384 | + $30,630 |
| Interest on New York Railways first real estate and refunding mortgage 4 per cent bonds | 691,538 | 651,838 | + 39,700 |
| Total | $3,432,553 | $3,362,222 | + $70,330 |
| Balance | $900,165 | $1,091,366 | —$191,200 |
| Add: | | | |
| Surplus at beginning of year as adjusted $232 | | | |
| Addition during the year—net 61,048 | | | |
| | 61,280 | 21,544 | + 39,735 |
| Net income—surplus available for interest on adjustment mortgage 5 per cent bonds | $961,445 | $1,112,910 | —$151,465 |
| Deduct: | | | |
| Interest on adjustment mortgage income bonds. | 961,381 | 1,112,678 | — 151,297 |
| Surplus | $64 | $232 | — $168 |

*The figures for the year ended June 30, 1914, including the surplus at the beginning and end of the 1914 period, are adjusted to accord with changes in classification made during the year ended June 30, 1915, so that a proper comparison may be obtained.

The gross passenger revenue for the year was $13,010,933, a decrease of $410,748 or 3.06 per cent. This abnormal falling off may be attributed to the general business depression prevailing throughout the year, and to the interference with traffic resulting from subway construction. The statistics of the operating department show that the delays from causes of the latter character were 100 per cent greater than in 1914. There was also a great deal of interference by trucks and other vehicles unnecessarily blocking and using the company's tracks. With proper regulation of this traffic, street railway traffic could be facilitated by at least 10 per cent. Other street railway operating revenue was $388,834, a decrease of $50,323 or 11.46 per cent. This is accounted for principally by a reduction in the receipts from advertising and the sale of power.

The operating expenses totaled $8,551,432, a decrease of $224,188 or 2.55 per cent. The total charge to maintenance accounts for the year, including the reserve for maintenance and depreciation (equal to 20 per cent of the total operating revenue), was $2,679,953, a decrease of $92,214. This decrease resulted from the falling off in the total operating revenue. The amount applied to the reserve account was $757,976, an increase of $433,204 as compared with last year. There was actually expended during the year for the maintenance of way and structures $1,008,579, and for the maintenance of equipment $913,398, the total maintenance expenditures showing a decrease of $525,418, caused in part by the necessity of deferring certain repair work until the streets approach normal conditions. The transportation expenses were $4,344,661, a decrease of $81,222, of which $38,505 applied to the power supply accounts and $42,717 to operation of cars.

During the year there was charged to operating expenses for injuries to persons and property the sum of $975,820, which is equal to 7½ per cent of the gross passenger revenue, a decrease of $65,687 as compared with the preceding year. This decrease was caused by the falling off in the gross passenger receipts during 1915 and the fact that the accruals for the first six months of the preceding year were based on the rate of 8 per cent and the second six months 7½ per cent of the gross passenger revenue. The actual expenditures made during the current year amounted to $929,386, an increase of $124,252 or 15.43 per cent over last year, while the remainder reserved was $46,434, a decrease of $189,939 or 80.36 per cent.

The actual disbursements for the current year and those arising out of the operations during the receivership and liquidated during this year equaled 7.2 per cent of the gross passenger revenue, compared with 6.4 per cent last year and 6.6 per cent the year before. The increase was largely caused by the liquidation of a greater volume of the accumulated liability. The experience of the company so far seems to indicate that an allowance of between 7 per cent and 8 per cent for injuries is necessary under present conditions. During the years prior to the receivership the expenditures were between 10 per cent and 11 per cent a year—a reduction of more than $400,000 a year. Claimants succeeded in only 25 per cent of the cases during the year, as compared with 34 per cent last year. The company voluntarily settled 3594 claims for $270,000 before suit was brought and compromised 1514 actions before trial for $296,928, leaving as the result of contested suits 185 judgments paid to the amount of $62,877.

The taxes assignable to street railway operations amounted to $1,042,859, a decrease of $49,246 or 4.51 per cent, the greater portion thereof applying to the special franchise taxes by reason of a reduction in the assessed valuation. This reduction may be attributed to the favorable results obtained in the litigation of the special franchise tax cases of the Metropolitan Street Railway decided in favor of the company in December, 1914. This year the State Board of Tax Commissioners gave full consideration to the decision in these cases, and the aggregate assessment of $31,799,950 is considered fair. The current year is the first since 1899 in which no proceedings have been necessary to review the assessments.

During the year the company issued $1,751,000 of first real estate and refunding mortgage 4 per cent bonds and $4,950 of convertible 4 per cent scrip for the acquisition of 5017 of the 6000 outstanding shares of the Twenty-third Street Railway. This transaction has resulted in a net saving per annum of approximately $13,014. The company also acquired by purchase at auction the $2,473,400 of 4 per cent first consolidated bonds of the Central Crosstown Railroad, which were held as collateral for the latter's 5 per cent notes amounting to $1,882,987 owned by the New York Railways.

The following table shows some of the comparative operating statistics for the years ended June 30, 1914 and 1915:

| | 1915 | 1914 | Change |
|---|---|---|---|
| Rates per car mile: | | | |
| Total revenue from operations | 38.40c. | 40.10c. | —1.70c. |
| Maintenance of way and structures: | | | |
| Expended | 2.89c. | 4.67c. | —1.78c. |
| Reserved | 1.64 | .06 | +1.58 |
| Maintenance of equipment: | | | |
| Expended | 2.62 | 2.41 | + .21 |
| Reserved | .53 | .88 | — .35 |
| Operation of power plant | 2.66 | 2.80 | — .14 |
| Operation of cars | 9.70 | 10.01 | — .22 |
| Injuries and damages: | | | |
| Expended | 2.67 | 2.33 | + .34 |
| Reserved | .13 | .69 | — .56 |
| General and miscellaneous expenses | 1.58 | 1.55 | + .03 |
| Total operating expenses | 24.51c. | 25.40c. | — .89c. |
| Number of passengers carried: | | | |
| Cash fares | 251,264,521 | 261,762,151 | —10,497,630 |
| Revenue transfers | 15,062,586 | 11,230,492 | + 3,832,094 |
| Free transfers | 109,943,330 | 110,607,435 | — 664,105 |
| Total | 376,270,437 | 383,600,078 | — 7,329,641 |
| Ratio of free transfer passengers to revenue passengers, per cent | 41.28 | 40.52 | + .76 |
| Average fare per passenger: | | | |
| Per passenger (including transfers) | 3.458c. | 3.499c. | — .041c. |
| Per revenue passenger | 4.885 | 4.916 | — .031 |
| Operating expenses per passenger: | | | |
| Per passenger (including transfers) | 2.273c. | 2.288c. | — .015c. |
| Per revenue passenger | 3.211 | 3.215 | — .004 |
| Average number of cars operated daily | 1,165 | 1,183 | — 18 |
| Car miles | 34,891,203 | 34,564,090 | +327,113 |

## NORTHERN ELECTRIC PLAN COMPLETED

### Full Details of Reorganization Plan That Has Been Approved by Representatives of Parties in Interest

The reorganization plan for the Northern Electric Railway, Chico, Col., and its allied corporations, which, as announced in the Electric Railway Journal of Oct. 2, has been signed by creditors' representatives, by protective committees for stockholders and bondholders, by the Sloss trustees and certain San Francisco banks, has now reached its final stages. Deposit of securities, etc., is being urged, and the plan will now be submitted to the California Railroad Commission for its approval. As stated in last week's issue, the time for owner or pledgees of stock and creditors to assent to the agreement is limited to Nov. 15.

The main feature of the reorganization plan, which was described as to preliminary details in the issue of July 10, is that the rights of the bondholders and creditors of the railway companies are substantially preserved in effect for a period of at least five years from July 1, 1915, during which time it is hoped that increase in population and improved business conditions throughout the territory covered will materially increase the revenues and give the roads a chance to work out the payment of all claims. This extension of time is secured without the creditors being called upon to make any advances of money.

A new corporation is to be formed with a capital stock of $2,000,000 to take over, after foreclosure of the various mortgages, all the properties of the Northern Electric Railway, Northern Electric Company, Sacramento & Woodland Railroad and the Northern Electric Railway—Marysville & Colusa Branch. There will be an issue of $500,000 of first mortgage twenty-year bonds, which will be used only for the purpose of discharging prior or superior liens, repairs to or re-construction of the roadbed, purchase of rolling stock and other equipment, compensation of receiver and his attorneys, expenses of reorganization, etc. In addition the new company will have an issue of $5,300,000 of general mortgage 5 per cent thirty-year bonds, interest for first five years payable annually and only from the net earnings and to the extent of such net earnings, at a rate not exceeding 5 per cent per annum non-cumulative. These bonds will be exchanged, bond for bond, for bonds held by the owners or pledgees of the bonds of the Northern Electric Company, Sacramento & Woodland Railroad, Marysville & Colusa Branch and Chico Electric Railway. Another issue of $7,000,000 of 5 per cent thirty-year income bonds, interest payable annually only from the net earnings and after the payment of interest on the outstanding prior bonds, will be exchanged, bond for bond, for first consolidated mortgage 5 per cent ten-year gold bonds of the Northern Electric Railway. Abut $450,000 of these bonds will be pledged to secure the debts of the unsecured floating debt creditors.

The new corporation will assume and agree to pay each and all of the admitted debts of the Northern Electric Railway and its affiliated companies. Creditors may, if they wish, after the new company is incorporated, exchange their present notes for new notes of the new corporation. W. P. Hammon, E. J. de Sabla, Jr. and E. R. Lilienthal will agree to be bound the same as they now are for notes made, endorsed or guaranteed by them and will waive the right to plead the statute of limitations for the period of six years.

The Sloss Corporation and Sloss Securities Company will transfer $500,000 in cash or securities to the new corporation. This will constitute a fund to be used during the first five years to pay to the holders of promissory notes made or endorsed by Leon Sloss or Louis Sloss and secured, under the plan, by general mortgage bonds, interest upon such bonds to the extent of the deficiency, if any, between the interest which the new corporation may pay out of its income and the full 5 per cent interest provided for by the bonds; also to pay the interest upon the promissory notes due and unpaid on July 1, 1915. At the end of five years any remainder of this fund will be used for the retirement of outstanding first mortgage bonds and the balance, if any, will be distributed pro rata to the other creditors holding notes made or endorsed by Leon Sloss or Louis Sloss. Sloss Securities Company will cancel and discharge promissory notes and other claims and demands which that company holds against the railway companies to the extent of about $1,700,000.

In consideration of the $500,000 to be so paid over to the new corporation and the cancellation of such claims and demands, all of the railway creditors will release the Sloss interests from further liability to them, except that the present unsecured floating debt creditors will retain their rights against the Slosses as stockholders of the present companies. W. P. Hammon, E. J. de Sabla, Jr. and E. R. Lilienthal will each be offered the privilege, for a period of three years, which the new corporation may extend for another year, of being likewise released from all liability upon notes made, endorsed or guaranteed by them, upon the payment of $500,000. In the event of such payment one-half of the amount so paid will be used for the purpose of redeeming any outstanding first mortgage bonds, and the other half will be divided among creditors other than underlying bondholders as security for claims.

All of the stock of the new corporation will be placed in trust with the Union Trust Company, San Francisco, for five years, with the power of selling the same for not less than $2,000,000. In case of such sale the money will be distributed pro rata among the creditors other than those whose claims are secured by the underlying bonds. The new corporation will have a board of fourteen directors, four of whom will be selected by the owners of the general mortgage bonds, four by the pledgees of general mortgage bonds, four by owners and pledgees of income bonds, one by the unsecured creditors, and the remaining one by the note endorsers. While the stock is so held in trust, the trust company will vote the same in accordance with the instructions of the bondholders and creditors. If the stock shall not be sold during the period of five years, it shall then be sold at public auction and the net proceeds distributed among the creditors, or it shall be otherwise disposed of as a majority of the creditors may then determine. If no sale or other distribution is made, the stock itself will be distributed among the creditors, other than those holding underlying bonds as security, and the creditors will then own and operate the road.

## THIRD AVENUE PAYS DIVIDEND

### Quarterly Dividend of 1 Per Cent Is First Since 1907 on Stock of Reorganized Company

The directors of the Third Avenue Railway, New York, N. Y., on Oct. 15 declared a quarterly dividend of 1 per cent, payable on Jan. 1 to stockholders of record on Dec. 15. According to reports, it is the intention of the directors to continue the dividends regularly and thus put the road on a 4 per cent basis.

The present dividend is the first paid on the stock of the reorganized Third Avenue Railway. The old Third Avenue Railroad, prior to 1889, paid dividends for a long time at the rate of 7 per cent. When the road was leased to the Metropolitan Street Railway dividends continued at the rate of 5 per cent until October, 1907, when they were suspended by the receiver for the Metropolitan company. F. W. Whitridge, president of the new company, maintained that there should be no dividends until the property had been thoroughly built up and until a proper surplus had been laid aside for the future welfare of the road.

Ever since the new management went into office on Jan. 1, 1907, there has been a clamor among stockholders for dividends. President Whitridge always reasserted his intention to reconstruct the road and put every cent back into the property in order to perfect the operating conditions. Early this year a committee of stockholders appointed by President Whitridge at the latest annual meeting made an investigation which resulted in a recommendation for a quarterly dividend of 1 per cent. Later a sub-committee of the board of directors was appointed to consider the future policy of the company as regards dividends and outlays for improvements, but this sub-committee on July 14 announced that the dividend question would be left for the full board of directors to decide in the autumn. The present declaration is now the outcome.

It was announced after the directors' meeting that the $2,020,000 of 4 per cent Third Avenue Railway bonds re-

cently authorized by the Public Service Commission for the First District of New York had been sold to the Central Trust Company at 80. The company reserves the right to repurchase the bonds at any time at the same price and accrued interest.

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**Albuquerque (N. Mex.) Traction Company.**—The holdings of the Albuquerque Traction Company were purchased on Oct. 1 at foreclosure sale by H. A. Jastro for $50,000. The following day the holdings were taken over by the newly-organized City Electric Company, of which George Roslington, the receiver of the old company, is president. Mr. Jastro, who was the former president of the old company, is a bondholder but not a stockholder in the new company. The new company has purchased seven pay-as-you-enter cars from the St. Louis Car Company, and it is reported that various other improvements are to be made. On Oct. 3 Mr. Roslington's final report as receiver was approved by the court. This showed receipts of $13,831 since May 8 and disbursements of $17,379. The property, however, was more than self-supporting until a carhouse fire put all but two cars out of operation.

**Brooklyn (N. Y.) Rapid Transit Company.**—The Brooklyn Rapid Transit Company through one of its subsidiaries, the South Brooklyn Railway, has applied to the Public Service Commission for the First District of New York for permission to purchase the majority stock of the Prospect Park road at $200 a share for 1768½ shares, or $353,700 in all. This stock is held by the Long Island Railroad, which has been leasing the right-of-way to the rapid transit company for $45,000 a year. The application is opposed by minority stockholders, who state that this rental is the company's only source of revenue and insist that the commission should require the Brooklyn Rapid Transit Company to purchase all the stock at a uniform price.

**Denver (Col.) Tramway.**—The recent suspension of the quarterly dividend of the Denver & Northwestern Railway, announced in the ELECTRIC RAILWAY JOURNAL of Oct. 2, was the result of a similar suspension by the Denver Tramway, the operating subsidiary of the former company. According to a statement sent out by the board of directors to the stockholders of the two companies, there was during the three months ended Sept. 30, 1915, a decrease of $57,211 in tramway gross earnings, a decrease of $19,835 in operating expenses, and a decrease of $34,623 in net income applicable to dividends and sinking fund requirements as compared with the corresponding period of last year. It has been necessary to expend a considerable sum of money in new construction and proper maintenance of the company's property, and owing to world-wide unfavorable financial conditions the directors deemed it not advisable to sell at a sacrifice any of the bonds in the treasury to replace these funds taken from the working capital. The board of directors therefore decided that the interests of the operating company, as well as its bondholders and stockholders, would be better conserved by discontinuing, for the present, any dividends, thereby strengthening the company's cash position. Under these circumstances the Denver & Northwestern Railway could not declare its quarterly dividend.

**Fort Wayne & Springfield Railway, Decatur, Ind.**—Fannie R. Armstrong et al. have filed a suit with Judge Anderson of the Federal Court, asking that a judgment of $4,750 be rendered for conversion of bonds, with interest from June 4, 1911, that the judgment be declared a prior and preferential claim against all the property of the Fort Wayne & Springfield Railway, and that the court resume jurisdiction over the line and appoint a new receiver to take charge of the property and offer it for sale to satisfy claims of the plaintiffs. As noted in the ELECTRIC RAILWAY JOURNAL of Aug. 28, this property was sold at foreclosure sale on Aug. 12. Latest advices, however, are to the effect that the company will be resold at a private sale on Oct. 25, under an order issued by Special Judge Hartford, Portland. The court refused the petition of Lizette Dirkson and Emma Gerke, who purchased the road at the Aug. 12 sale, to extend for thirty days the time for making the final payment of $78,000. Their initial deposit of $5,000 was forfeited. It is again reported that attorneys representing Fred A. Dolph of Chicago, who recently announced his intention to electrify the purchased steam road between Huntington and Bluffton, Ind., intend to bid in the electric line at the new sale.

**Gary & Interurban Railroad, Gary, Ind.**—Suit was recently filed in the Federal Court of Indianapolis, Ind., by the Central Trust Company, Chicago, to foreclose on the first refunding $10,000,000 mortgage of the Gary & Interurban Railroad. Defaulted interest on $1,000,000 of this is said to be the direct cause of foreclosure. The company's receipts were affected by jitney bus competition, beginning when the large industries in the Gary district resumed full operation after the recent business depression. The court appointed Charles D. Davidson of Gary as receiver.

**Havana Electric Railway, Light & Power Company, Havana, Cuba.**—A semi-annual dividend of 3 per cent has been declared on the $15,000,000 of common stock of the Havana Electric Railway, Light & Power Company, payable on Nov. 13 to holders of record on Oct. 23. This compares with 2½ per cent paid last May and 5 per cent during the calendar year 1914. A dividend of 3 per cent this year was also declared on the preferred stock.

**New York (N. Y.) Railways.**—The committee of Frank L. Hall, Charles P. Howland and George B. Leighton, representing the holders of the adjustment income 5 per cent bonds of the New York Railways, has, in connection with its call for proxies for the annual meeting on Dec. 6, noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9, issued a circular stating that counsel have been engaged in the preparation of suit for the recovery of the $1,500,000 shortage from the full interest on the bonds up to and including the coupons of April 1, 1915, and that the suit is now in shape to be actively pressed at the coming fall term of the courts. In the meantime the committee has been conducting an investigation of the company's affairs, which has convinced it that the system of accounting adopted by the company is not in accordance with the terms of the deed of trust, and that if the accounts were properly kept the bonds would be assured of their full interest.

**New York (N. Y.) Municipal Railway Corporation.**—The New York Municipal Railway Corporation, the operating subsidiary of the Brooklyn Rapid Transit Company's new subway lines, has applied to the Public Service Commission for the First District of New York for permission to issue $20,000,000 of 5 per cent sinking-fund gold bonds under its first mortgage dated July 1, 1912. These bonds, with $40,000,000 previously authorized, will form part of the collateral for the issue of $60,000,000 of Brooklyn Rapid Transit Company's six-year 5 per cent secured gold notes, the final $20,000,000 of which were recently sold, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 9 and Oct. 16. The proceeds of the latter are to be applied as follows: In the discharge of obligations already incurred under the dual subway system, $3,457,520; cost of equipment of rapid transit systems, $7,680,000; cost of reconstruction and extension of lines of New York Consolidated Railway, $4,030,620; toward the cost of plant construction and equipment of elevated tracks, $2,620,000; for the extension of present lines, $1,611,860, and for discount, $600,000 (to be amortized out of earnings).

**San Francisco-Oakland Terminal Railways, Oakland, Cal.**—The San Francisco-Oakland Terminal Railways is now paying, through its regular agencies, the interest on San Francisco, Oakland & San José Railway first mortgage 5 per cent bonds, which came due on July 2 but was deferred for lack of funds. Some time ago the company announced that interest on the bonds of its constitutent corporations, coming due between July 1 and Dec. 31, 1915, would be paid as sufficient funds could be accumulated from current earnings, payment to be made in the order of seniority of the bond issues. Other payments previously made in accordance with this policy were noted in the ELECTRIC RAILWAY JOURNAL of Sept. 11.

**Tri-State Railway & Electric Company, East Liverpool, Ohio.**—The ELECTRIC RAILWAY JOURNAL has secured official information discountenancing the recent report in financial circles that the properties owned by the Tri-State Railway & Electric Company were bid in by the bondholders' committee at a postponed foreclosure sale on May 27 and subsequently sold to the Duquesne Light Company, Pittsburgh, Pa., or interests identified with it. The facts

are that during July, 1915, the Virginia & Ohio Securities Corporation acquired the capital stocks of all the companies formerly owned by the Tri-State Railway & Electric Company and purchased at foreclosure sale by the bondholders' committee of that company. The line in Steubenville was deeded to the Steubenville Railway, all the stock of which is owned by the Virginia & Ohio Securities Corporation. These changes were noted at the time in the Electric Railway Journal of July 24 and Aug. 21. None of the properties were sold to the Duquesne Light Company, and the control of the Virginia & Ohio Securities Corporation does not lie with any of the Pittsburgh companies. The Virginia & Ohio Securities Corporation has no bonds outstanding, but has issued and outstanding $1,250,000 par value of common stock and $1,000,000 par value of 7 per cent cumulative preferred stock. The properties owned or controlled by this company are as follows: Steubenville, Wellsburg & Weirton Railway, Wellsburg Electric Light, Heat & Power Company, Hancock County Electric Company, Steubenville Railway, Steubenville Bridge Company, Beaver County Light Company and Midland Electric Light & Power Company.

## DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred Series B; quarterly, 1¼ per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Cumberland County Power & Light Company, Portland, Me., quarterly, 1½ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 3 per cent, common.

Jacksonville (Fla.) Traction Company, quarterly, 75 cents, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Third Avenue Railway, New York, N. Y., 1 per cent.

## ELECTRIC RAILWAY MONTHLY EARNINGS

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

| Period | | | Operating Revenues | Operating Expenses | Operating Income | Fixed Charges | Net Income |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '15 | $1,181,948 | *$649,007 | $532,941 | $372,679 | $160,262 |
| 12 " | " | '15 | 14,088,122 | *7,552,322 | 6,535,800 | 4,346,834 | 2,188,966 |
| 1 " | " | '14 | 1,166,345 | *$661,823 | 504,522 | 353,469 | 151,053 |
| 12 " | " | '14 | 14,033,070 | *7,717,431 | 6,315,639 | 4,093,067 | 2,222,572 |

CONNECTICUT COMPANY, NEW HAVEN, CONN.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '15 | $796,221 | *$506,579 | $289,642 | $98,145 | ‡$214,122 |
| 1 " | " | '14 | 802,417 | *571,018 | 231,399 | 98,889 | ‡153,789 |
| 2 " | " | '15 | 1,602,703 | *981,568 | 621,135 | 196,410 | ‡470,532 |
| 2 " | " | '14 | 1,601,184 | *1,142,759 | 458,425 | 196,219 | ‡305,371 |

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '15 | $343,543 | $201,845 | $141,698 | $51,136 | $90,562 |
| 1 " | " | '14 | 360,055 | 214,559 | 145,596 | 53,319 | 92,177 |
| 8 " | " | '15 | 2,416,902 | 1,467,650 | 949,252 | 403,820 | 545,432 |
| 8 " | " | '14 | 2,488,442 | 1,535,909 | 952,533 | 413,588 | 538,945 |

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Sept., | '15 | $2,009,979 | $1,115,491 | $894,488 | $815,611 | $78,877 |
| 1 " | " | '14 | 1,949,440 | 1,113,964 | 835,476 | 807,970 | 27,506 |
| 3 " | " | '15 | 5,847,648 | 3,297,930 | 2,549,718 | 2,448,149 | 101,569 |
| 3 " | " | '14 | 5,813,676 | 3,362,683 | 2,450,993 | 2,426,099 | 24,894 |

REPUBLIC RAILWAY & LIGHT COMPANY, NEW YORK, N. Y.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '15 | $260,792 | *$158,298 | $102,494 | $58,560 | ‡$44,078 |
| 1 " | " | '14 | 255,488 | *155,057 | 100,431 | 57,063 | ‡43,456 |
| 8 " | " | '15 | 1,968,619 | *1,218,592 | 750,027 | 459,648 | ‡291,451 |
| 8 " | " | '14 | 2,003,459 | *1,231,906 | 771,553 | 450,111 | ‡322,677 |

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '15 | $511,492 | *$349,743 | $161,749 | $120,284 | ‡$42,852 |
| 1 " | " | '14 | 535,817 | *351,133 | 184,684 | 121,035 | ‡65,691 |
| 2 " | " | '15 | 983,640 | *669,158 | 314,482 | 240,568 | ‡76,601 |
| 2 " | " | '14 | 1,071,395 | *705,234 | 366,161 | 237,299 | ‡133,299 |

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1m., | Aug., | '15 | $24,718 | *$22,182 | $2,536 | $1,598 | ‡$970 |
| 1 " | " | '14 | 27,733 | *23,849 | 3,884 | 1,198 | ‡2,698 |
| 2 " | " | '15 | 50,734 | *44,900 | 5,834 | 3,188 | ‡2,708 |
| 2 " | " | '14 | 54,932 | *47,305 | 7,627 | 2,397 | ‡5,253 |

*Includes taxes. ‡Includes non-operating income.

# Traffic and Transportation

## JITNEY JOTTINGS

### The Railroad Commission of California Has No Jurisdiction Over Motor Bus—First Jitney Application Passed Upon by New York Commission

The Railroad Commission of California has issued an order declaring that it could not exercise jurisdiction over motor-bus and auto-stage lines. The same decision was rendered in the case of the Western Association of Short Line Railroads against the Wichita Transportation Company and the case of the United Railroads, San Francisco, against the Peninsula Rapid Transit Company. The first of these cases dealt with the auto stages running from San Diego, Cal., to Imperial Valley points, and the second with the auto-bus lines operating between San Francisco and San Mateo. The decision draws particular attention to the fact that "every common carrier" is declared to be a public utility and points out that "it is unquestionably true that the company is a common carrier at common law, and that the constitution has declared that the common carrier is a public utility, but it is equally true that this section of the constitution distinctly declares that corporations and persons declared to be public utilities shall be subject only to such control and regulation by the Railroad Commission 'as may be provided by the Legislature.' It is distinctly provided that the Railroad Commission shall have and exercise 'such power and jurisdiction' to supervise and regulate public utilities 'as shall be conferred upon them by the Legislature.'" It is the opinion of the Railroad Commission that the Legislature did not confer this jurisdiction.

In an opinion rendered on Oct. 22 by Commissioner William Temple Emmet, the Public Service Commission for the Second District of New York has decided the first application for a certificate of convenience and necessity for a jitney bus line under the law passed by the last Legislature. Commissioner Emmet's opinion lays down in broad lines the principles which govern the commission in this and future applications, though declaring expressly that each case will be decided on its merits. The present application, however, that of William B. Gray for authorization of six routes in New Rochelle, is characterized as one so typical as to afford most favorable opportunity for discussion of the problem in general. Commissioner Emmet's opinion is of some length, he says, in order that future applicants may be guided by the principles there set down. The commission grants certificates to four of the six routes provided for in the franchise from the municipality on which the application is based and refuses two others. The four routes authorized run on the same streets with existing electric railway lines only for the short distances necessary to reach the New Haven Railroad station, whereas the routes for which certificates were refused were for the most part on the same streets with the existing trolley lines.

The Pennsylvania Public Service Commission has now actively started hearings on the status of the jitneys in that State. Argument is being heard before the commission in the case begun by the Scranton Traction Company against three proprietors of jitneys running between Scranton and Carbondale, upon the decision of which rests the fate of the jitney business in Pennsylvania. The company alleges that the jitney owners should be taxed the same as any other corporation and should obtain a certificate of public convenience similar to other public service corporations. C. L. S. Tingley, vice-president of the American Railways, of which the Scranton system is a part, and H. B. Gill, Philadelphia, counsel of the company, are arguing the case for the company.

Jitney operators of Rochester, N. Y., have presented to the Common Council a petition to do business in the streets of the city, according to the requirements of the jitney law, which compels them to file such a petition and then to make application to the Public Service Commission for a certificate of necessity and convenience.

The City Council of Atchison, Kan., has passed an ordinance regulating jitneys. It provides for the examination of drivers, a license of $10 a year and bond of $1,000.

## FARE INCREASE ASKED IN MILWAUKEE

### Company Outlines Conditions That Make Increase in Fares Imperative

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has entered a plea for an increase in fares. In "Plain Talks to Our Patrons," the first of a series of advertisements in the daily newspapers published on Oct. 16, the public is urged to aid in obtaining a higher rate of fare and in removing burdensome restrictions. Ten months ago the company hoped to be able to do certain things, or most of them, out of its earnings at existing rates. It now finds that it can not do these things. Conditions affecting the business have changed. New factors have appeared that cut earnings and bid fair to cut them for a long time to come far below the point at which the company can do what it wished to do. The company said in part:

"If we are to do these things, or any of them, we must earn more or spend less. If we earn more, we can do all of them. If we merely spend less, we can do only one of them. That one is, the payment of a fair return on the capital invested in the business. THIS IS THE FIRST NECESSITY OF ANY BIG BUSINESS THAT HAS TO BORROW MONEY TO MAKE EXTENSIONS OR LARGE-SCALE BETTERMENTS OF ANY KIND. IF IT DOESN'T PAY A FAIR RETURN ON CAPITAL ALREADY ENLISTED, IT CAN'T GET ADDITIONAL CAPITAL WHEN IT NEEDS MORE.

"Our alternatives appear to be:

"1. To reduce the service; or,

"2. To ask the Wisconsin Railroad Commission to: (a) let us stop selling car tickets at six for 25 cents and 25 for $1 and charge a flat 5-cent cash fare in the city; or (b) let us charge 1 cent for a transfer and draw in the city one-fare zone to create one more suburban 2-cent zone, or,

"3. To ask the proper authorities to relieve us of heavy and unfair charges for paving, cleaning and sprinkling streets; or,

"4. To keep on operating our lines for a return which each year is smaller, which is away below the 'fair return' State regulation entitles us to, and which in the fiscal year 1915 has come very near the vanishing point.

"NOBODY WANTS TO SEE SERVICE REDUCED. The whole tendency of public service is toward more liberal standards of loading and headway of cars. This costs money and most of the public is entirely willing to pay for it. Milwaukee is growing and needs not less but more street railway service.

"So, if any relief is to be had, it must come from higher rates and lower taxes. Here are the main facts we face to-day:

"1—DURING THE PAST FOUR YEARS MILWAUKEE'S STREET RAILWAYS HAVE EARNED NET $494,797.15 LESS THAN A FAIR RETURN OF 7½ PER CENT ON THE RAILROAD COMMISSION'S LOW RATE VALUATION.

"2—DURING THOSE FOUR YEARS THEY HAVE EARNED NET $1,672,053.67 LESS THAN A FAIR RETURN ON THEIR ACTUAL CASH INVESTMENT.

"3—THAT HUGE DEFICIT IN NET EARNINGS, WORSE EACH YEAR, MENACES THE COMPANY'S CREDIT AND PREVENTS ANY FURTHER EXTENSIONS OR BETTERMENTS AT OUR COST.

"What we want, then, is relief from losing rates, unfair taxes and public burdens foreign to street railway business. And we want our patrons, if you feel that our request is a fair one, to back us up in getting this relief. We are going to give you facts and figures proving we are entitled to it; that it is as much in yours and Milwaukee's interest as in our own.

"We are public servants chartered to do a public service. You are the State. Through your State government, you fix a top limit to what we can earn in any one year. You don't let ours, like other businesses chartered by the State, earn a big profit one year to offset little or no profit—or a net loss—in dull years.

"WHEN YOU DO THAT YOU BIND YOURSELVES MORALLY TO LET US ADAPT OUR RATES TO CHANGING CONDITIONS, SO THAT EACH YEAR WE SHALL EARN THE 7½ PER CENT YOUR RAILROAD COMMISSION AND YOUR COURTS HAVE AGREED IS NECESSARY TO GIVE GOOD SERVICE AND MAINTAIN THE COMPANY'S CREDIT.

"OUR CITY AND SUBURBAN LINES HAVE NOT EARNED THAT 'FAIR RETURN' FOR FOUR YEARS PAST. THEIR NET RETURN HAS BEEN STEADILY FALLING. THERE IS NOT A CHANCE THAT THEY CAN EARN IT HEREAFTER, UNDER EXISTING RATES, TAXES, INCREASING WAGES AND OTHER BURDENS.

"You have said, by your public agencies, that we are entitled to earn it, and must earn it in order to give good service. We are now asking you to help us get changes that will let us earn it."

## HEARING IN WISCONSIN ON OPERATING RULES

The Railroad Commission of Wisconsin set Oct. 21 as the day for a formal hearing on the subject of operating rules and other regulations affecting service and safety on all electric railways, both city and interurban, in Wisconsin. The standard code of rules for interurban operation and the standard code of rules for city operation adopted by the American Electric Railway Association have been suggested by the commission as the basis of the discussion. Particular attention will be directed to that portion of the rules in regard to flagging at railroad crossings, the display of signals and markers, operation of interurban trains by written order, etc. Other matters to be taken up at the hearing will be the use of spring switches and switch targets on interurban lines, height of car steps, width of doors and aisles, use of one-man cars, use of pilots or fenders for interurban cars and use of fenders or life guards for city cars, and the type of gates and fences along private right-of-way.

## MOTOR BUS FEEDER FOR SEATTLE MUNICIPAL RAILWAY

Plans for an auto-bus feeder line for the Seattle Municipal Railway, recently authorized by the City Council despite the Mayor's veto, were outlined briefly in the ELECTRIC RAILWAY JOURNAL for Oct. 2, 1915, and further details are now available. The contract will allow the operator of the auto-bus line 3 cents on every transfer from the railway. The length of haul on the bus line is 1.3 miles, this covering a ride from the north terminus of Division "A" of the Municipal Railway to Ballard, a suburb of Seattle. The bus receipts, therefore, will approximate 2.3 cents per passenger mile. The remaining 2 cents of the 5-cent fare that will be charged on the Municipal Railway for transfer passengers will cover an average haul on the railway of 2.75 miles, giving receipts of only 0.73 cents per passenger mile.

The present standard fare on the Seattle Municipal Railway approximates 4 cents, tickets being sold six for 25 cents and twenty-five for $1, the same rate that is charged by the Puget Sound Traction, Light & Power Company. This rate will be maintained after bus operation commences, but the 4-cent tickets will not carry the transfer privilege. The maximum length of haul for the railway is 4 miles, although the average haul is 2.75 miles.

The fare on the buses will be 5 cents either for transfer passengers or for those who do not wish to transfer. Apparently, but one bus is to be installed, as the headway is to be twenty minutes, the round trip distance being 2.6 miles. Bus service is to be discontinued daily at 7 p. m. The contract between the bus line and the city of Seattle will extend for a period of one year and can be terminated upon thirty days' notice by either party. The bus operator will be required to file with the city a $10,000 bond to indemnify passengers on the bus who may sustain injuries. Tickets and transfers used in conection with the joint operation will be provided by the bus operator for the bus line and by the city for its railway line, an accounting being made once a month. The city is to refrain from making agreements with any other bus company during the life of the present contract, which has had its details practically decided by the Board of Public Works of Seattle, although at the present time the contract has not been formally executed.

In view of the relatively favorable terms of the contract from the standpoint of the bus operator, these having been attained at the expense of the railway, the question arises as to why the city does not install a bus line of its own. In answer to this it is reported that the city has neither the funds nor the authorization to engage in the operation of a bus line as a feeder for the municipal railway line, the voters refusing at an election on March 2, 1915, to sanction propositions which called for the improvement and extension of the municipal railway service. These propositions were: The purchase of auto buses to connect Divisions "A" and "C" of the municipal line, involving an expense of not more than $50,000; and as an alternative, a proposition to extend Division "A" of the municipal railway, involving an expense not to exceed $100,000. It may be said that the jitney-bus lines now in operation in Seattle do not compete with the present municipal line as the territory served by the latter is unpaved and is not considered profitable territory by bus-operators.

## CHICAGO OPERATING ORDER QUESTIONED

The local transportation committee of the Chicago City Council has directed the corporation counsel to institute court proceedings to test the right of the Public Utilities Commission of Illinois relative to the "seats for all" order and trailers, reviewed in the Electric Railway Journal of Oct. 9, page 775. To determine just what the rights of the Chicago Surface Lines are under the 1907 ordinances, L. A. Busby, president of the company, has sent the following letter to the local transportation committee of the City Council:

"We hand you herewith a copy of the opinion and order of the State Public Utilities Commission, dated Sept. 29, 1915, with reference to the Chicago Surface Lines. In transmitting a copy of this opinion and order we wish to call your attention to the fact that the order is not only in direct conflict with important provisions of the traction ordinances, but purports to assume jurisdiction of the commission over the street railways to the exclusion of control by the city. We regard the traction ordinances of 1907 as constituting valid and binding contracts between the city and the companies. The conflict of authority occasioned by this order presents some serious problems with reference to which we should be advised as to the city's views and position."

W. W. Gurley, legal adviser of the Chicago Surface Lines, is reported to have said:

"We expect to comply with the 1907 ordinance obligations. We consider the ordinances to be a contract. Trailers are prohibited by the ordinances and we are not going to put on trailers."

**Head-on Collision at Adrian, Mich.**—Eighteen persons were injured in a head-on collision between two cars on the Toledo & Western Railroad near Adrian, Mich., on the night of Oct. 14.

**Increase in Syracuse Suburban Fare Postponed.**—The Public Service Commission for the Second District of New York has suspended the proposed increases in fare on the Syracuse & Suburban Railroad until Dec. 1. A date for a hearing will be set at a time convenient to all the parties concerned.

**Fares Discussed by Massachusetts Street Railway Association.**—R. W. Perkins, president of the Shore Line Electric Railway, Norwich, Conn., addressed the Massachusetts Street Railway Association on "Zone Systems of Fare Collection" at the regular monthly meeting at Young's Hotel, Boston, on Oct. 13. President D. A. Belden occupied the chair.

**First Aid Courses in British Columbia.**—Organization for first aid work among the employees of the British Columbia Electric Railway, Vancouver, B. C., is being effected. Last year ninety men were enrolled in the three first aid classes, a large number of whom completed the course and received their St. John ambulance certificate. The first aid movement has been made to include all of the employees of the company.

**Score Hurt on Staten Island.**—A car of the Staten Island Midland Railway, New York, N. Y., bound for St. George, became unmanageable on Oct. 13 on the steep grade of Wright Street, Stapleton, backed down the hill with increasing momentum, and crashed into another crowded car which was rounding the curve from Canal Street. The impact drove the second car into a third which was following it. More than twenty people were injured.

**Rear-end Collision in Brooklyn.**—Two trains of the Brooklyn (N. Y.) Rapid Transit Company collided in the rush hour on the evening of Oct. 18 in the tunnel on the Manhattan side of the Woodruff Avenue Station in Flatbush. Twenty-five persons were injured. The first train had been brought to a sudden stop just before the crash through the application of the emergency brakes by a passenger whose identity the police are seeking to establish.

**Reduction in Fare Asked.**—Application has been made to the Public Service Commission of Missouri asking for an order requiring the Metropolitan Street Railway, Kansas City, to put in a 5-cent fare between the western limits of Independence and Fifteenth Street and Grand Avenue, Kansas City. This involves a trip of 12 miles, according to the petition. It is contended that the company now gives transfers for 20-mile trips between Kansas City points.

**Experience Ordinance Passed in Cincinnati.**—The City Council of Cincinnati, Ohio, on Sept. 28, passed an ordinance which requires that all new motormen and conductors shall have at least ten days' instruction on cars in Cincinnati before they are allowed to take charge of city or interurban cars. This experience must be had immediately preceding the date of employment and under a conductor or motorman who shall have had at least three years' experience on street cars of Cincinnati, one year of which shall have been immediately preceding the date of giving such instruction.

**Trenton Fare Hearing Oct. 25.**—The Trenton & Mercer County Traction Corporation, Trenton, N. J., appeared before the Board of Public Utility Commissioners of New Jersey on Oct. 19 to defend the proceedings in which it is sought to make the temporary order of suspension in the fare case permanent. It was decided to begin the hearing on Oct. 25. The United States District Court recently decided to recognize the jurisdiction of the Board of Public Utility Commissioners in suspending the proposed increase of rates in Trenton by the elimination by the Trenton & Mercer County Traction Corporation of its six-for-a-quarter tickets.

**Reduction in Fare Granted in One Case, Refused in Another.**—A reduction of 5 cents in the one-way cash fare from Jefferson Street station in Portland to Garden Home over the Oregon Electric Railway has been ordered by the Public Service Commission of Oregon. The fare now will be 15 cents. From Capitol Hill to Garden Home the one-way cash fare was cut from 15 cents to 10 cents, while the fare from Portland to Greenburg was lowered from 30 cents to 25 cents. The commission has dismissed the complaint for a cut in rates from Jefferson Street station to Tualatin, Metzger and Beaverton, and to these stations from Capitol Hill. It found the present fare reasonable in this instance. Estimating the cost of reproducing new the Oregon Electric system, the commission found, would involve an expenditure of $12,667,001.

**Washington Company Plans Fifteenth Christmas Entertainment.**—Through President Clarence P. King of the Washington Railway & Electric Company, Washington, D. C., and subsidiaries, including the Potomac Electric Company, it is announced that at a meeting of the board of directors it was decided to again offer the children of employees of all interested companies the annual Christmas entertainment, making the fifteenth year of the event without interruption. The performance will take place a few days after Christmas Day at the New National Theater. As in the past, special cars will be provided to transport the youngsters to and from the theater free and at the conclusion of the entertainment suitable holiday gifts will be distributed. The purchasing committee will make all purchases of gifts from the local merchants. It is expected that more than 1800 children will be in attendance.

**Bay State Street Railway Opens Fare Publicity Campaign.**—In connection with the forthcoming hearings before the Massachusetts Public Service Commission relative to the proposed fare increase on the Bay State Street Railway the company has begun a publicity campaign in the Boston dailies, in dailies printed in important cities on its lines, and in selected weeklies, to set forth the fundamental necessity of a rate revision. The first statement, printed on Oct. 14, shows in tabular form the increased cost of food, clothing, coal, house furnishings and building materials in the past twenty years, the average being 45 per cent above prices in effect in 1895. All prices are shown on a 5-cent basis, and attention is called to the fact that the company's fare has remained stationary throughout the entire period, although the road is subject to these increased expenditures, even if indirectly, in certain cases.

**New Downtown Loops Proposed for St. Louis.**—The Board of Public Service of St. Louis announced recently that following a series of conferences with officials of the United Railways three street railway lines will be eliminated and tied to other lines, the dangerous curve of the Hodiamont line at Thirteenth and Locust Streets will be abolished, and a system of new loops, costing $125,000, in the downtown district, will be constructed by the United Railways, at its own expense. The report of Charles S. Butts, chief assistant engineer under Director of Public Utilities Hooke, declares that officials of the United Railways have worked in harmony with the Department of Public Utilities in bringing about these betterments, and that further conferences will be held to consider extensions to outlying districts, the straightening out of some of the present lines, and the elimination of tracks now considered unnecessary and useless for adequate service.

**Educational Addresses Started in New Albany.**—In connection with the safety-first work of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, New Albany, Ind., a course of educational addresses has been arranged by Robert Hutchens, who is looking after this work for the companies. Heads of departments of the companies appear at the regular meetings and discuss matters which are under their control. At the last meeting, held recently, Robert G. Gordon, attorney in Louisville for the companies, addressed the members of the organization in New Albany on the legal status of the electric railroads and their employees. He went into detail as to the responsibilities and the liabilities of the company and its employees and discussed the question of what was expected of the men in cases of accidents and when they were summoned to court. The purpose of this series of addresses is to give the trainmen of the two companies a comprehensive grasp of the whole enterprise so that they will be able more readily to appreciate their individual relations to the whole.

**Transfer on a Transfer Denied in Albany.**—On the opinion of Seymour Van Santvoord, chairman, the Public Service Commission for the Second District of New York has again decided that it cannot compel the United Traction Company, Albany, to give a "transfer upon a transfer" on a trip between Albany and Troy, where a passenger requires the use of a line in each city as well as the interurban line. He points out that while the present transfer rules on the Troy-Albany line, as they enable a passenger to ride approximately 20 miles for 15 cents, are not unjust, there should be some provision for a limited use of transfers within restricted zones so that passengers might make use of lines in both cities for short distances without the payment of an extra 5-cent fare after paying the 10-cent fare between the two. The decision now rendered comes from the reopening of the old complaint of William S. Lodge and others and the consolidation of all the cases connected with the Troy Road transfer situation. The opinion says that this reopening was not the result of change in the personnel of the commission, but that it was due to possible changes in the circumstances of the case since Commissioner Decker decided it five years ago. The commission finds, however, that Mr. Decker's opinion then rendered still holds good, but in rendering its present decision expressly reserves the privilege of reopening the case again should circumstances again seem to demand it.

# Personal Mention

**Mr. George McAneny**, president of the Board of Aldermen of New York and formerly borough president of Manhattan, is to retire on Jan. 1 to become associated with the New York *Times*. It was as head of the transit committee of the Board of Estimate that Mr. McAneny did his most notable public work, co-operating with the Public Service Commission for the First District of New York in the successful effort to secure the dual subway system now under construction and involving an expenditure of more than $350,000,000 by the Interborough Rapid Transit Company, the Brooklyn Rapid Transit System and the city.

**Mr. A. J. Purinton**, formerly general superintendent of the East St. Louis & Suburban Railway, East St. Louis, Ill., has been appointed general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J., to succeed Mr. George F. Faher, resigned. In 1910 Mr. Purinton resigned as manager of the Toledo & Chicago Interurban Railway, now the Fort Wayne & Northwestern Railway, to become general superintendent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., where he remained until 1912, when he was appointed general superintendent of the East St. Louis & Suburban Railway Company, operating more than 190 miles of electric railway in East St. Louis, opposite St. Louis, Mo., and elsewhere in southern Illinois.

**Mr. George F. Faber** has resigned as general superintendent of the Atlantic City & Shore Railroad, Atlantic City, N. J. Mr. Faber began his railroad career with the Pennsylvania Railroad as a clerk in the superintendent's office, where he served from 1890 to 1892. He next became connected with the accounting department of the East Cleveland Railroad. From 1894 to 1901 he was associated with the Warner & Swasey Company, Cleveland, Ohio, but resigned from this company to re-enter the electric railway field with the so-called Appleyard lines in Ohio. Mr. Faber next accepted the position of superintendent of the Elgin-Belvidere Electric Railway, then under construction. He subsequently became general superintendent of the Western Ohio Railway, Lima, Ohio. Early in 1909 he accepted the position of traffic manager of the Chicago, Lake Shore & South Bend Railway, and in August, 1910, was appointed superintendent of transportation of the Michigan United Railway, now the Michigan United Traction Company. He has been connected with the Atlantic City & Shore Railroad since April, 1913.

## OBITUARY

**William Henry Nix**, roadmaster of the Toronto (Ont.) Railway, died on Oct. 13. Mr. Nix was born in England, and settled in Toronto when he was thirty years of age. He became connected with the Toronto Railway as a driver of horse cars. His organizing power secured rapid advancement for him through various positions to the post of roadmaster.

**Edward D. White**, for more than a quarter of a century with the Brooklyn City Railroad, now included in the system of the Brooklyn (N. Y.) Rapid Transit Company, is dead. Mr. White was born in Brooklyn ninety-four years ago. He retired from the board of directors of the Brooklyn City Railroad early this year. During his long association with the road he was a director for twenty-seven years, a member of its executive committee for twenty-six years, and vice-president for nineteen years.

**Andrew Radel** died suddenly on Oct. 15 at his home in Bridgeport, Conn. Mr. Radel was born in Newark, N. J., fifty-three years ago. He moved to Bridgeport from Newark twenty years ago. Before that time he was interested in the development of a number of electric railways now included in the system of the Public Service Corporation of New Jersey. After going to Bridgeport, he assisted in building several electric railways there, which are now controlled by the Connecticut Railway & Lighting Company. At the time of his death, Mr. Radel was a director in the Newark & South Orange Traction Company and vice-president of the New Brunswick Traction Company. He was also president of the Seaview Railroad and Narragansett Pier Railroad, both of which are operated under lease by the Rhode Island Company, Providence, R. I.

# Construction News

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

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

## RECENT INCORPORATIONS

*South Mountain Street Railway, Kleinfeltersville, Pa.—Application will be made for a charter to construct an electric railway between Kleinfeltersville and Womelsdorf. Incorporators: Ralph L. Eberly, Clifford Strauss and Elmer A. Reist.

Pottsville & St. Clair Electric Railway, Pottsville, Pa.—Incorporated in Pennsylvania to construct a line from Pottsville to St. Clair. Capital stock, $13,200. Incorporators: W. B. Rockwell, president; Van Dusen Rickert, Ira G. Walborn, C. F. Crane and Otto E. Farquhar, all of Pottsville. Mr. Rockwell, president of this company, is manager of the Eastern Pennsylvania Railway. [Aug. 14, '15.]

*Central Power Company, Chattanooga, Tenn.—Application for a charter has been made by this company in Tennessee to construct an interurban line from Chattanooga to Cleveland. Capital stock, $50,000. Incorporators: G. B. Adams, M. N. Whittaker, Sam Whittaker and Lon Foust.

## FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has received a permit from the harbor commission to operate the municipal terminal railway at the harbor. The company will also handle the cars of any other railroad which may connect with the city's tracks. The permit gives the city trackage rights over 2 miles of the Pacific Electric Railway Company's line, including the drawbridge between pier A, Wilmington, and municipal dock No. 1 in the outer harbor.

San José, Cal.—The San José Railroad has received a franchise from the Council for the construction of an extension on Alum Rock Avenue. The company bid $150 for this franchise.

Lisbon, Me.—The Lewiston, Augusta & Waterville Street Railway has asked the Council for a franchise to relocate its tracks on 131 ft. of pile trestle and 35 ft. of steel girder bridge across the Sabattus River and 434 ft. of track on fill.

Lawrence, Mass.—The Bay State Street Railway has asked the Council for a franchise to build a double-track extension on the State Highway and on Water Street from the Lawrence-Methuen line to Ames Street.

Cincinnati, Ohio.—The West End Rapid Transit Company has asked the Council for a franchise to construct an electric railway from Anderson's Ferry to Third and Sycamore Streets. [Sept. 11, '15.]

Cleveland, Ohio.—The Cleveland Railway has received a franchise from the Council to construct a line through Parma township to Bean Road. The franchise extends to May 1, 1934.

Columbus, Ohio.—Supplementary franchises were granted to the East Linden Electric Railway by the Council of Columbus on Oct. 18 for two proposed routes, one from the Leonard Avenue viaduct to East Linden and the other through Shepard. The new ordinance authorizes lines on Hayes and Champion Avenues to Long Street and from East Linden west on Hudson Street to Neil Avenue.

Tacoma, Wash.—The Puget Sound Traction, Light & Power Company has asked the Council for a franchise to construct pole and power lines along the county roads in the districts of Puyallup, Burnett, Alderton, McMillin and Sumner. The franchise asks for three years in which to construct the lines.

Janesville, Wis.—The Janesville Traction Company has filed a surrender of its franchise with the Wisconsin Railroad Commission and has applied for an indeterminate permit, which will be granted by the commission.

## TRACK AND ROADWAY

Alabama City, Gadsden & Attalla Railway, Gadsden, Ala.—Material has been ordered by this company for the reconstruction of its tracks on Gardner Street between Ninth Street and Twelfth Street and work will be begun as soon as the material arrives. The tracks will be lowered according to the grade established by the city.

Fort Smith Light & Traction Company, Fort Smith, Ark.—The Fort Smith Light & Traction Company has been ordered by the Fort Smith-Van Buren Bridge Commission to remove all its property and equipment, including tracks and feed wires from the Fort Smith-Van Buren Bridge. Subsidiary companies of the company were also ordered to remove their property. This action is the result of the traction company and the bridge commission failing to agree upon a contract for the use of the bridge.

Pacific Electric Railway, Los Angeles, Cal.—A new line has been begun by the Pacific Electric Railway, which will serve El Segundo, Hawthorne, Lawndale, Farmington and Belvedere districts, as well as provide a new outlet from Los Angeles to Redondo Beach. The new line will leave the present Gardena line at Ionia Avenue and will directly connect at Hawthorne with the El Segundo line, already completed, as well as the Belvedere line to Redondo. Representing that the lines were being operated at a dead loss the company has made application to the city commission for the abandonment of service on the West Seventh Street and municipal dock local lines in Long Beach.

Municipal Railways of San Francisco, San Francisco, Cal.—The extension of the Geary Street Municipal Railway across Golden Gate Park from Tenth Avenue and Fulton Street to Fourteenth Avenue and Lincoln Way and thence to Judah Street is to be begun at once and it is expected that the line will be completed before Jan. 1. The supervisors have ordered the extension and are now making formal publication of this order preliminary to starting active construction.

Tampa (Fla.) Electric Company.—This company has completed the laying of double track from the Tampa Bay gates to the Boulevard, thus affording better service on the Union Station line.

*Moline, Ill.—Moline capitalists are considering plans to construct a line from Moline to Coal Valley, with a possible extension to Galva and Cambridge.

Bloomington, Pontiac & Joliet Railway, Pontiac, Ill.—Work of changing the route of this road out of Pontiac to the north is progressing. The poles are set and the overhead work nearly completed. The necessary work for connecting the new track laid on Main Street with the old one on Wabash Avenue has been finished and it is expected that the track will be laid within a few days north to the crossing of the Illinois Central Railroad.

Union Railway, Gas & Electric Company, Rockford, Ill.—At a recent meeting of the Rockford Real Estate Board, held in Rockford, it was decided to appoint a committee to act with other civic organizations to urge the Council and the Union Railway, Gas & Electric Company to extend the franchise of the company and to secure needed extensions to various parts of the city.

Lafayette & Northwestern Traction Company, Lafayette, Ind.—Financial arrangements have been made for the construction of the first half of this company's line and the right-of-way is now being secured. The route has been changed from West Lafayette through Octagon and this change will shorten the route 3 miles. The M. A. Talbert Company has the contract for building the line from Lafayette to Kankakee, Ill. [Aug. 14, '15.]

Des Moines (Iowa) City Railway.—This company plans to extend its line over the Seventh Street bridge and rebuild about 20 miles of track in Des Moines.

Louisville (Ky.) Railway.—This company's Chestnut Street extension to Shawnee Park, via Twenty-seventh and Madison Streets, is nearly completed and it is stated that in all probability service will be begun on or before Dec. 1.

St. Paul (Minn.) City Railway.—Work will be begun at once by this company on the extension of its St. Clair Street line in St. Paul.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—Work has been begun by this company on the reconstruction of its line from Pass Christian to Gulfport and Biloxi.

**Springfield (Mo.) Traction Company.**—Material has been received by this company for the relaying of its track on Booneville Street, and work will be begun at once.

**United Traction Company, Albany, N. Y.**—This company plans to install new curves from State Street south into Broadway, to shift the tracks several feet east at the crossing at Broadway and Church Street and to connect the new double tracks at the south end of the Plaza with the present tracks in Broadway at Steamboat Square.

**Interborough Rapid Transit Company, New York, N. Y.**—The proposed form of contract for the construction of Section No. 2 of Routes Nos. 19 and 22, being a part of the Southern Boulevard and Westchester Avenue branch of the Lexington Avenue subway, has been submitted by the Public Service Commission for the First District of New York to the Interborough Rapid Transit Company, which will be the operator of the line, for its criticisms and suggestions. The company is made a party to the contract, and will bear part of the construction cost. The underground portion of this line ends at Bancroft Street, Bronx, and Section No. 2, which will be elevated, extends northerly from that point along Westchester Avenue to Eastern Boulevard, or Pelham Bay Park. This is the last section of the new city-owned lines to be let in the borough of the Bronx. The commission has now completed negotiations with the Federal Government for the construction of the necessary fixed bridge across the Bronx River. This was the last obstacle to the construction of the line. The company must return the contract within ten days, after which it will be put in final form and advertised for bids.

**West End Rapid Transit Company, Cincinnati, Ohio.**—City Solicitor Schoenle of Cincinnati has given the West End Rapid Transit Company an opinion to the effect that the consents of owners of abutting property along the route on which it proposes to build a line for the entrance of the Cincinnati, Lawrenceburg & Aurora Electric Street Railway to the business section of the city are not necessary. The charter provides for the construction of a commercial railroad, he said, and its purpose is somewhat different from those of an ordinary street railroad.

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—This company plans to construct an extension of its lines from New Castle to Beaver Falls.

**Bartlesville (Okla.) Interurban Railway.**—Construction has been begun at Dewey Avenue and Fifth Street, which is the final step toward completing the connecting link of the loop of the Bartlesville Interurban Railway with the main line. The line will be extended to Dewey Avenue and East Third Street.

**Oklahoma & Interstate Railway, Oklahoma City, Okla.**—Both Columbus and Galena have called elections for voting bonds as bonuses for the Oklahoma & Interstate Railway. Columbus has been asked to vote $20,000 and Galena $15,000. Philadelphia financiers have agreed to purchase the bonds, and officers of the company say that actual construction will be begun by Dec. 1. It is practically certain that Columbus and Galena will vote the bonds, because it has been stipulated in the contracts that before the bonds are turned over to the company, the lines connecting Columbus with Galena, and Columbus with Commerce, must be completed and in operation. It is stipulated that this must be accomplished by May 1, 1916. [Oct. 16, '15.]

**New Toronto, Ont.**—The Council of New Toronto has passed a resolution that the Hydro-Electric Power Commission of Ontario be requested to investigate and report upon the cost of constructing and operating an electric railway from Toronto through New Toronto to London.

**Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.**—Claiming that the by-law did not receive the assent of the ratepayers, and further, was canceled by a new Council, the City of Windsor on Oct. 14 asked the Appellate Division to set aside the order of the Ontario Railway Board, which gave the Sandwich, Windsor & Amherstburg Railway power to construct a loop line at Ferry Avenue, Windsor. The court dismissed the appeal, but varied the order of the board to read without prejudice so that the city might take free action to test the legality of the railway company's action.

**Willamette Valley Southern Electric Railway, Portland, Ore.**—Operation has been begun by this company between Mount Angel and Portland.

***Columbus, Pa.**—It is reported that grading has been begun for an electric railway from Columbus to Mayville. C. E. Bentley, Jamestown, N. Y., engineer.

**Montreal (Que.) Tramways.**—At a recent meeting of the Outremont Council, it was decided to notify this company that it will be required to extend its line in the spring from Mount Royal Avenue along St. Jean Baptiste, Rockland and Maplewood Avenues, Outremont.

***Beaumont, Tex.**—Plans are being considered by A. R. Crawford, Normangee, and associates to construct a line from Beaumont to Waco, via Normangee, Madisonville, Huntsville and Cold Springs.

**Virginia Railway & Power Company, Richmond, Va.**—When this company tears up its tracks along the Boulevard north of Broad Street so that thoroughfare may be repaved, the track will not be relaid, but will be placed on Altamont Avenue. The company will not be permitted, if it extends its line, to run across the newly-built bridge on the Boulevard over the Richmond, Fredericksburg-Potomac Railroad Company's tracks, but in all probability the city will request the company to build a bridge over Altamont Avenue at a cost of $6,000 which will be refunded by the city when the structure is completed.

**Everett Railway, Light & Water Company, Everett, Wash.**—The Riverside Commercial Club has petitioned this company for an extension of its lines on Riverside Avenue. The plan is to have a line extended north on Chestnut Street to Sixteenth Street, east to Summit Street and south on Summit Street, making a complete loop.

**Chicago & Wisconsin Valley Railroad, Madison, Wis.**—Application has been made to the Secretary of State for an amendment to this company's charter, changing the name to the Wisconsin Interurban System. The new system has acquired all title and interest to property owned by the company absorbed. The company proposes to build lines from Madison to Janesville, Madison to Portage, from Middleton connecting with the Portage line and from Madison to Fond du Lac. The road will be financed by Herbert Green & Company, Chicago. J. E. Jones, who was the original promoter of the line, will be actively connected with the new organization. [Oct. 16, '15.]

## SHOPS AND BUILDINGS

**Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.**—Construction has been begun by this company on its freight shed on Water Street, Augusta. The building will be 25 ft. x 60 ft.

**Pekin (Ill.) Municipal Railway.**—The carhouse of the Pekin Municipal Railway at Rosedale, under construction for the past several weeks, was damaged by fire on Oct. 10 to the amount of more than $1,000.

**Southern Traction Company, Dallas, Tex.**—This company has completed the construction of its passenger station at Milford.

## POWER HOUSES AND SUBSTATIONS

**Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.**—This company is doubling the capacity of its Lowellville plant from 20,000 hp. to 40,000 hp. A 20,000 hp. turbo-generator has been ordered from the General Electric Company and also eight Babcock & Wilcox boilers, equipped with Taylor automatic stokers, similar to the ones now in use. The contract for the engineering and installation of the plant has been let to the Stone & Webster Engineering Corporation. To accommodate the new equipment the power house itself will be greatly enlarged.

**Ashland Light, Power & Street Railway, Ashland, Wis.**—Dismantling of the original power plant of the Kentucky Electric Company, at Louisville, has been completed and the machinery and much of the structural materials have been shipped to Wisconsin. The Ashland Light, Power & Street Railway bought everything except the reinforced concrete smokestack which the Louisville Gas & Electric Company is now wrecking.

# Manufactures and Supplies

## ROLLING STOCK

**Lewiston, Augusta & Waterville Street Railway, Lewiston, Me.,** has ordered five flat cars from the Laconia Car Company.

**Pekin (Ill.) Municipal Railway** in a fire which recently destroyed its car barns lost a storage-battery car which had formerly been operated on its lines.

**Boston (Mass.) Elevated Railway** has ordered from the Laconia Car Company forty-eight additional center-sections for the construction of Lindall articulated cars out of its present car equipment.

**United Traction Company, Albany, N. Y.,** has issued specifications for fifteen new cars, the purchase of which was recommended by the Public Service Commission, as noted in detail in the ELECTRIC RAILWAY JOURNAL of Aug. 21, 1915.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.,** was reported in the ELECTRIC RAILWAY JOURNAL of Oct. 16, as preparing specifications for ten new city cars. This company advises that its specifications are of a preliminary nature only.

**Durham (N. C.) Traction Company** is contemplating the purchase of a few new cars, through its operating company, the Doherty Operating Company, New York. The number of cars is undecided and specifications will not be ready to send out for about two or three weeks.

**Des Moines (Iowa) City Railway** was reported in the ELECTRIC RAILWAY JOURNAL of Oct. 16 as expecting to purchase twenty-five new steel cars. This purchase is contingent on the passage of a proposed ordinance for renewing its franchise, which has been approved by the City Council and which will be submitted to a referendum-vote on Nov. 20.

**Buffalo & Lake Erie Traction Company, Buffalo, N. Y.,** noted in the ELECTRIC RAILWAY JOURNAL of Oct. 16 as having issued specifications for ten new city cars, has placed the order for these car-bodies with the Southern Car Company. The cars will be of the end-entrance type, with closed vestibules, folding and sliding doors and folding steps. Sixteen cross-seats and two longitudinal seats at each end of the body will furnish a seating capacity of forty-eight. Trucks will be of the maximum-traction type.

## TRADE NOTES

**National Car Wheel Company, Rochester, N. Y.,** has reelected Edward H. Chapin as vice-president of the company and as a member of its board of directors.

**Electric Service Supplies Company, Philadelphia, Pa.,** has appointed the Grayson Railway Supplies Company, St. Louis, Mo., as its Southwestern sales representative in the States of Missouri, Arkansas, Texas and Oklahoma.

**Railway Specialties Corporation, New York, N. Y.,** has appointed J. N. Ebling as general manager to succeed Fred W. Roth, resigned. Mr. Ebling has been for five months sales manager of this company and continues to serve in this capacity in addition to that of general manager. He was previously connected for about four and a half years with the United States Light & Heating Company, Niagara Falls, N. Y.

**Stanley H. Smith** has been appointed district sales manager of the Pennsylvania Steel Company in charge of the Chicago territory, succeeding R. E. Belknap, who has been appointed district sales manager of the same company, for the New York territory. Mr. Smith has been a salesman in the Pennsylvania Steel Company's Chicago office for the past year, having come from the Cleveland office of the same company where he served in a similar position.

**T. L. Smith Company, Milwaukee, Wis.,** has purchased the exclusive manufacturing and selling rights of the Albrecht excavator and loader and is in position to make prompt shipments of these machines. This excavator and loader can be used for excavating, for big foundations, basements and drainage ditches, for back filling, for loading sand, gravel and other similar materials, and as an economical investment for the contractor who handles street and highway paving. It can be used to advantage on the ordinary roadway in place of the regular horse scraper.

**Van Dorn & Dutton Company** and the **Van Dorn Electric Tool Company, Cleveland, Ohio,** have acquired a new site on Woodhill Road between Kinsman and Buckeye Roads, on which they will shortly begin the erection of new plants, which will afford opportunities to more than double the capacity of their present factories in the production of gears for the former company and of electrically operated drilling and reaming machines, grinders, etc., by the latter company. The new plant of the Van Dorn & Dutton Company will be 400 ft. x 50 ft. x 80 ft., two stories high on the street level. The building site is on sloping ground, the contour of which permits the erection of a third story the greater part of the length of the building and a fourth story at the rear end. The plant of the Van Dorn Electric Tool Company will be a two-story building, 50 x 275 ft. The two buildings will be joined in the front by one two-story office building, as the management personnel of both companies is largely common. In addition to the main buildings a thoroughly equipped hardening and treating plant will be erected. Ample railroad facilities are provided by a switch from the Cleveland Belt Line Railroad. It is expected to occupy the new buildings by April 1, 1916.

## ADVERTISING LITERATURE

**S. K. F. Ball Bearing Company, New York, N. Y.,** has issued a catalog describing the applications of its ball bearings for car lighting generators.

**Holophane Works of General Electric Company, Cleveland, Ohio,** has issued a catalog describing the principles and designs of its holophane refractors for street lighting.

**Westinghouse, Church, Kerr & Company, New York, N. Y.,** have issued a folder describing the new Communipaw engine terminal of the Central Railroad of New Jersey, which this engineering company designed and built.

**Ohmer Fare Register Company, Dayton, Ohio,** has issued a folder describing its transfer machine for printing and issuing transfers on street cars. This machine was described in detail in an illustrated article which appeared in the ELECTRIC RAILWAY JOURNAL of Sept. 11, 1915.

**Barrett Manufacturing Company, New York, N. Y.,** has issued a large folder containing a bird's-eye view of the modern plant of the National Lamp Works of the General Electric Company at Nela Park, Cleveland, Ohio, all the buildings of which are covered with Barrett specification roofs. The foundations and all the connecting tunnels are water-proofed with specification pitch and felt and practically all of the buildings have Tar-Rok sub-floors.

**Hamilton Watch Company, Lancaster, Pa.,** has issued advertising literature on its watches for railroad men. The fact that 56 per cent of the watches in service on railroads where there is an official watch inspection are Hamilton watches, is quoted as an indication of its unusual time-keeping qualities. One of the booklets contains numerous testimonials from conductors, locomotive engineers and train dispatchers as to the liability of the watch. For railroad use the company recommends its larger watches because they are built heavy and their larger dials with bold figures and large black hands enable one to determine the time more quickly at greater distances, especially in a dim light. One of the booklets issued contains convenient blank forms for tabulating watch inspection records.

**Searchlight Company, Chicago, Ill.,** has issued a bulletin which contains a discussion of the oxy-acetylene process of cutting and welding. The booklet explains the properties of acetylene and shows by the history and method of its production the advantages of this particular process, i. e., the securing of an absolutely pure and dry gas by means of a thorough washing process. The elimination of such impurities as phosphorus, sulphur and ammonia is important, as these have a chemical reaction on most metals, and consequently will affect the welding of such metals. When the acetylene is thoroughly dried it is put in cylinders by being absorbed by acetone, which at a pressure of ten atmospheres will absorb 250 times its own volume of acetone. Through the use of a packing made of infusorial earth and pitch the acetylene gas is released in a dry condition without any acetone being released. This dry acetylene is capable of producing a temperature of 6300 deg., a heat unattainable by a gas which is not dry.