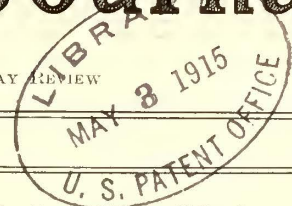


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WAGES IN WAR TIME

Reports from Europe indicate that the present warfare has already resulted in increased wages for electric railway employees. In Berlin the increase in price of foodstuffs and other necessities of life has led the Grosse Berliner Strassenbahn to raise wages, at least until peace is secured, while a committee of the London County Council recently recommended a grant of 3s. a week for those of its tramway employees who are receiving less than 30s. in order to meet "special and temporary conditions." The most interesting point in this connection is the effect of the increases upon rates of fare. The London County Council committee has decided that the higher cost of operation might be met by a general fare increase but that such a policy would involve serious objections, not the least of which would be the imposition of an additional increase in the cost of living on a considerable portion of the community. There is no doubt that present conditions in Europe necessitate a sympathetic financial adjustment between companies or municipalities, employees and passengers. In peace times the efforts of employees to obtain increased wages are made with little or no regard to the ultimate effect upon the riding public. A feeling of confidence is expressed now, however, that employees will be too patriotic to ask for much higher wages. We hope that this confidence will not be misplaced.

INERTIA EFFECT OF MOVING TRAINS

In commenting upon the recent discussion in our communications columns on the inertia effect of moving trains, one of our correspondents expresses the opinion that the subject is purely "academic." He says that on a section of line within which five or six trains are operating, the drop in voltage caused by the starting of another train would be so small and brief that the effect on the trains already in motion would hardly be noticed. We are not in accord with the implied suggestion that "academic" discussions are always without scientific interest, but it is probably true that the actual effect of inertia in smoothing out the load on the power station is small under all existing conditions. As the number of trains on a line is increased, the effect is to reduce the fluctuations in the power station load line, due to the fact that the peaks of the added load are not apt to coincide with those of the previous load, and this smoothing out effect will of course be greater than any so-called inertia effect. However, in the New Haven Railroad experience, which was described by W. S. Murray and was the basis of the discussion referred to, obviously both of these effects were combined. Without any more data than

are at present available it would be difficult to say just how much of the result is contributed by each cause. We do not understand that Mr. Murray intended to convey the impression that the inertia influence was the dominating one in improving the load factor.

THE NATIONAL ELECTRICAL SAFETY CODE

During the present week the revised safety rules which have been prepared by the national bureau of standards in consultation with all involved interests have been sent out in revised form preliminary to publication. This leaves only a little more than eight weeks for the study of the rules and the filing of suggestions and criticism. As the operation of this code will vitally affect the electric railway industry, the ELECTRIC RAILWAY JOURNAL will print such constructive suggestions as are received from railway men so that all may realize the full significance of the rules. The rules as they now stand, with introduction and other explanatory matter, would occupy about sixty pages like those in the body of this paper. If printed in the form of the "National Electrical Code" of the National Board of Fire Underwriters, a booklet $3\frac{3}{8} \times 5\frac{3}{8}$ in. in size, they would occupy a few more than the 200 pages of that code. It is obvious, therefore, that some study will be required to comprehend the proposed code. The main question to be kept in mind in this study is: Are the rules fair to small as well as large roads, and are they practicable as well as theoretically desirable? We know that the bureau is endeavoring to put the rules in such form as will enable an affirmative answer to be given, and during the past few weeks the results of many conferences have been incorporated. In another column Mr. Tingley presents an interesting communication on the subject. Let us have other points of view also.

SHARING FACTS WITH EMPLOYEES

The Chicago Surface Lines have adopted an excellent plan for acquainting their employees with the principal facts in regard to that system. This plan consists in the distribution among the heads of all the departments and sub-departments of the detailed report on the property recently submitted by President Busby to the board of operation of the company. This report, which is mentioned elsewhere in this issue, is a condensed statement of the operating and financial policies of the company with an account of the operating organization, a list of the officers and heads of the different departments and other data. This method of taking employees into the confidence of the executive officers cannot but be beneficial to both employee and company. With a good understanding of the facts men-

tioned, and of the interrelation of all the parts of the company and of its function as one unit, each worker in the organization will undoubtedly be better fitted to perform his duties. He will not only have a realization of his relative responsibility in bringing about general betterments but he will have a firmly established basis for a legitimate pride in his occupation as a whole and of his part in it in particular. When we remember that it has not been many years since the distribution of stock to employees was condemned on the ground of permitting improper access to financial information, it becomes more apparent that this voluntary disbursement of information in Chicago is a marked advance in corporation management.

THE ZONE SYSTEM OF FARES

Electric railway managers from abroad who have visited this country in the past to study city railway operation have often commented upon the fortunate circumstance that our lowest nickel coin, 5 cents, just about covered the cost, including profit, of a street railway ride, while the next lower coin, 1 cent, was entirely too small to be considered for that purpose. To this fact they have attributed, to a very large extent, the general use of the single fare for city rides in this country. In the opinion of many of them, had the same conditions prevailed in Great Britain, France and Germany, the uniform fare system might have been in more general use in those countries. But as far as this country is concerned, this condition is now gradually passing. The reduced purchasing power of the nickel and the increasing area of all of our cities are two reasons, not to mention others, which have made 5 cents inadequate as an average fare in many of our large cities. Of these two conditions, certainly the latter is bound to continue, and the average ride to grow in length, so that the question to be solved is to provide some basis of fares which will not only be adequate at present but can satisfactorily be adapted to future conditions.

An examination of the problem shows that there are two possible variables—the fare and the distance—so that to provide for future contingencies the system used should be such that either one or other of these two factors can be changed as may be necessary. Both of these plans, roughly speaking, are now in practical operation in this country. One of them is practically that in use in Cleveland, the other that in Milwaukee. To one or the other of these two methods, that is to say, to vary the unit fare or vary the distance traveled for a standard unit fare, we believe that every urban railway system will have to come, certainly if the tendency toward longer average rides and increased cost in passenger transportation continues.

The advantages of the Milwaukee plan of operation are set forth at length in a paper presented by R. B. Stearns of Milwaukee, at the meeting last week of the New England Street Railway Club. This paper was, in essence, an extension of the paper presented by the same author at the last meeting of the Ameri-

can Electric Railway Association, in which the system employed in Milwaukee was described and some of the results were given. In the paper of last week, published in abstract on another page, Mr. Stearns elaborated the idea of the flexibility of the system and its adaptation to a growing city and variable costs of transportation. In principle the system does not differ from the zone system, as used in Europe, except that the central area is much larger than that generally found in European cities, and the unit or minimum fare is 5 cents. Future flexibility can be obtained by the expansion or contraction of the central or other zone areas, according to the cost of supplying the transportation. Indeed, if conditions should seem to justify such a step, the central zone could be made much smaller and the charge for transportation therein could be made less than 5 cents to meet jitney or other short-haul competition, such a charge corresponding to the "demand charge" for electric lighting or power service.

A number of advantages are claimed by Mr. Stearns for the plan besides its flexibility. One of the most important of these, so far as the community is concerned, is that it is a rational basis for fares, and consequently removes the objection which most electric railways have under the present plan to extensions within the city limits. So long as such an extension means to a company that it must carry passengers a greater distance for no additional fare, there is little incentive to build such an extension. In fact, in most cases, there is every incentive not to do so. But with each part of the system bearing its own proportion of cost and yielding its own proportion of profits, as nearly as can be, transportation facilities can be extended as the need for them develops.

Altogether the zone system has a great many features to recommend it, and the only seeming drawback in the past, the difficulties of collection, seem to have been eliminated in Milwaukee. We believe the Milwaukee experiment is one of the most important steps in the direction of a rational rate of fare which has ever been undertaken in this country. It supplies a basis upon which other companies can work to reform the system of fares in their own cities. If the plan has worked satisfactorily in Milwaukee, it cannot present insuperable difficulties so far as operation is concerned, and there remains only the question of satisfying the public and the authorities of its desirability. Indeed, it is interesting to note that the plan has already been recommended for Boston in the report of William B. Bennett on Boston transportation conditions forming part of the special report on that subject just made by the Massachusetts Commission to the Legislature. We believe that the public has awakened to the necessity of higher electric railway fares and that the only reason which has prevented their more general introduction has been that the railway companies have been unable up to this time to propose any substitute which they considered satisfactory and workable. This is now provided through the plan now in force in Milwaukee.

MOTOR VENTILATION

The history of the electric railway motor since the beginning has been marked by a design struggle forced by two conflicting requirements, namely, that motors must be kept cool and at the same time internally dry and clean. The first motors of Sprague, Thomson and Houston, Westinghouse and others were well ventilated because uninclosed, but they failed on the side of moisture and dirt-proofness. The inclosing of the active parts in cases almost water-tight forced the development of internal air-circulating devices, which complicated the design from the motor standpoint. Parts of the armature had to do double duty, acting as both torque producers and fans, and the whole magnetic circuit had to be broken up to provide flues for air circulation. In the endeavor to bring about intimate contact between active metal and air, even the pole pieces were provided with air ducts in some cases.

With a motor entirely inclosed the possible rate of dissipation of heat depends partly upon the allowable temperature of insulation, for this determines the temperature "head" which drives the heat through the case. The hot air, churning around inside, has the function of keeping all parts as nearly as may be at the same temperature, carrying heat from the copper and iron where it is generated to the steel case which conducts and radiates it. With a given radiating surface area and outside air temperature there is therefore a limit to the rate at which heat can be dissipated through conduction. The advantages of introducing outside air to add heat convection to conduction are so obvious that designers have been at work trying to accomplish this, without subjecting commutator and windings to the effects of grit and moisture, ever since motors were first inclosed. In the early nineties this paper editorially directed attention to the possibilities of ventilation for increasing motor capacity. As early as 1902 C. O. Mailloux, among others, devised plans for piping compressed air into the motor case and distributing it effectively. At about the same time a New Jersey road tried the experiment of ventilating the motors with air piped from a ventilator placed on the front of the car. The results were remarkably satisfactory from the ventilation standpoint. While these piping schemes did not come into general use due to structural difficulties, the principle of admitting outside air into the motors has been tried with varying degrees of success until at present the ventilated motor is in keen competition with the inclosed type, although there seems to be a possibility of equitable division of the field between them.

In comparing ventilated with fully-inclosed motors it must be remembered that both are rated on the basis of a stand test of one hour's duration, during which the continuous-load temperature is not attained, and under conditions of ventilation inferior to those of service. Their heat-absorbing ability is thus more important than their radiating capacity from the rating standpoint. It is possible therefore for two motors to have the same one-hour rating and yet be quite different in

continuous capacity. The service conditions, therefore, must determine which is better for a particular case, even from the heating standpoint.

The agitation in favor of ventilated motors is due, of course, to the demand for weight reduction. This is urgent, and the prospects held out by forced ventilation are so tempting that it is not surprising that inventors are active. The ventilated motor with internal fan is inherently adapted to long, high-speed runs where the fan gets in its best work, so that we may look forward to the occupation of that field first. The whole subject, however, is in a state of flux, and predictions would be unsafe and unwise at this time. In the present state of the art, thus depicted, we feel sure that our readers will especially appreciate the article by R. E. Hellmund printed in this issue of the *ELECTRIC RAILWAY JOURNAL*, in which the subject is analyzed carefully.

DOUBLE LIABILITY FOR STOCKHOLDERS

We thoroughly disapprove of the recommendation made by the committee investigating the public service commissions of New York State that an increased liability should be placed upon public utility stockholders similar to that imposed upon stockholders of state and national banks. So dissimilar are these two forms of business enterprises that it is impossible to see by what stretch of imagination the investigators applied to public utilities the reasons that led to the adoption of the double liability plan by governmentally-controlled banking institutions. The smallness of bank capital stock as compared to the total deposits and other liabilities, the immediate liability of a bank to those whose money it uses, the lack of physical property, the absence of restriction of bank profits and of the necessity for continual new financing—all these combine to make double liability on the part of the stockholders a proper check against mismanagement.

With public utilities, however, the case is different. Capital stock is a large part of the capitalization, and the bonds and other evidences of debt find adequate security not in the liability of stockholders but in the physical property of the utilities. Furthermore, public service commissions now have power to regulate and restrict the return to stockholders. Lastly, public utilities are constantly in need of new capital. Any limitation placed upon stockholders, therefore, is certain to prove detrimental to the industry. With a constant appeal to the public, increased liability in securities must always be accompanied by an increased rate of return. Under commission regulation the rate of return is limited; hence the imposition of double liability would only be reflected in a narrowing popularity for utility shares and a decrease in money acquired for improvements or new enterprises. With profits restricted as at present, the single liability is a quite sufficient penalty for mismanagement. The suggested plan has nothing to commend it—one can only sigh at the vagaries of legislators and wonder what their next move will be.

The Vienna-Pressburg Single-Phase Railway

On the City Sections at Each End, the Cars Are Hauled by 600-Volt D. C. Locomotives; and on the 31.3-Mile Intermediate High-Speed Division by 15,000-Volt A. C. Locomotives

The reliability of a single-phase interurban railway under the extreme traffic conditions imposed by the war is presented in two articles by E. E. Seefehlner, published in three recent issues of *Kraftbetriebe und Bahnen*. During operation for the first six months preceding the war, which began late in July, 1914, it had already been found necessary to increase the rolling stock by 70 per cent. The war caused a change to two-car instead of four-car trains with triple the usual passenger load (186 instead of sixty). Although extra heavy freight traffic also had to be handled at the same time, no trains were appreciably delayed. This abnormal traffic was a big relief for the neighboring steam trunk lines which, of course, were severely taxed by the demands for military transport.

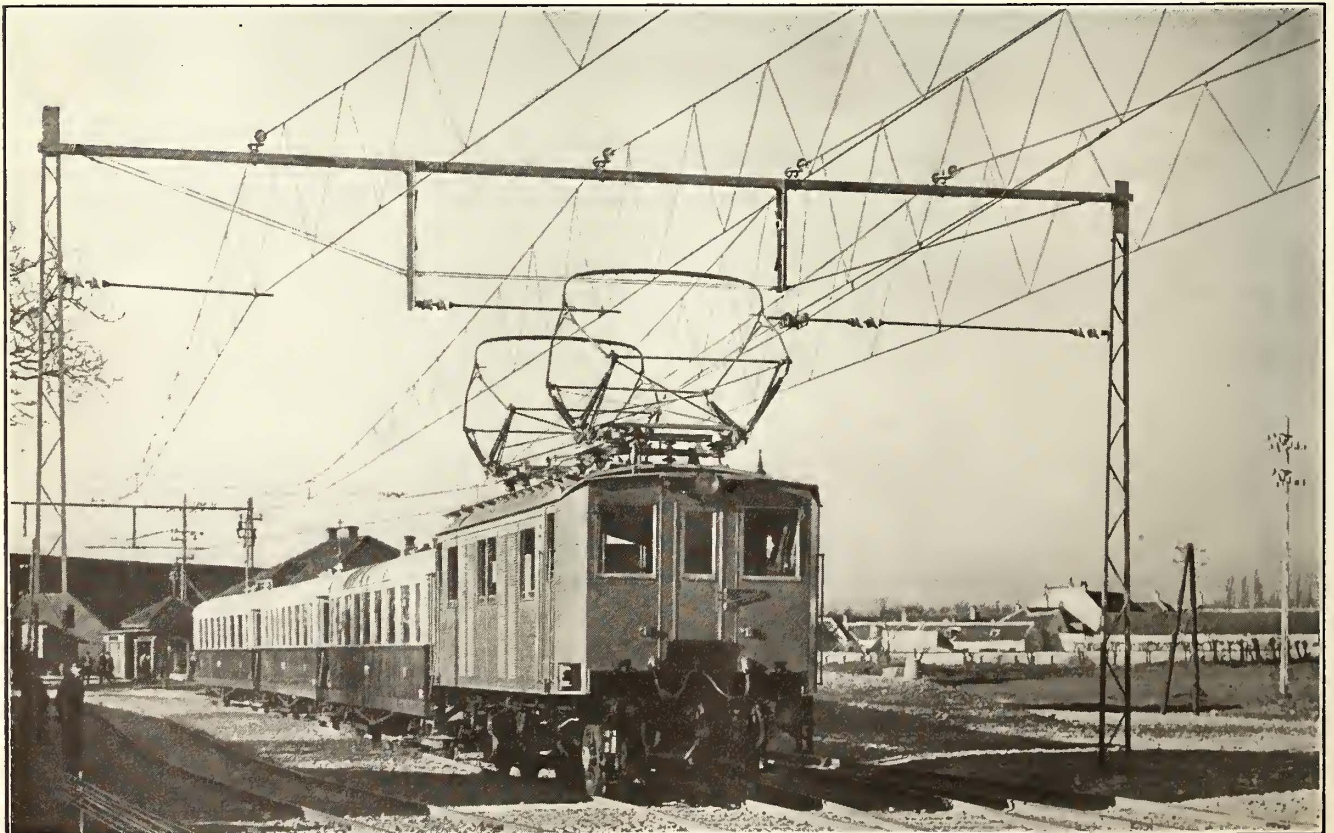
ROUTE

The line is operated between Vienna (Austria) and Pressburg (Hungary), which are about 70 km (43.4 miles) apart. Although earlier railway connections existed between the two cities there was no good through line. The Vienna division of the new route is along the Danube Canal, and while this portion is operated as a street railway the amount of purely city traffic is not enough to prevent good speed. The line crosses the tracks of the Vienna Municipal Tramways at four places, and at two others it is carried below the regular street level to avoid intersections.

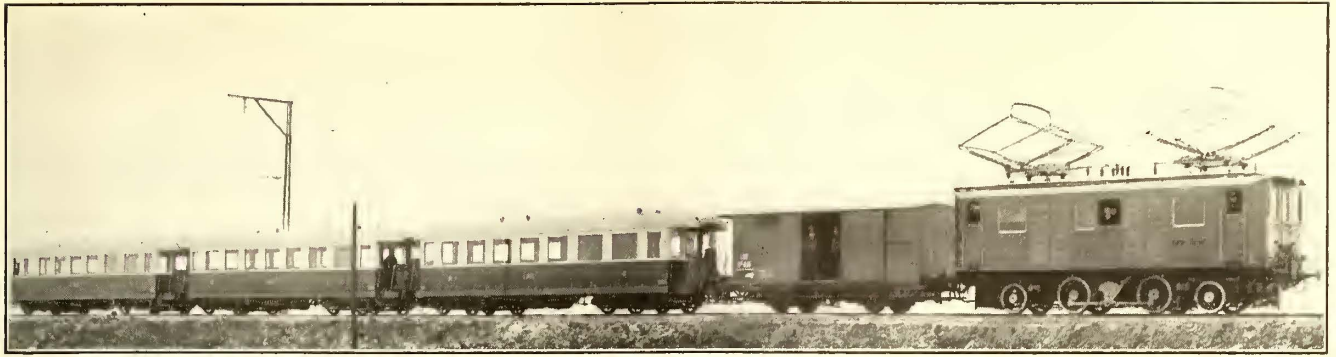
Outside Vienna the trains are operated along the public highway to Gross-Schwechat for a distance of 7.75 miles at speeds of 11.2 to 18.6 m.p.h. The locations of the sidings on this section permit a headway of seven

and one-half minutes over the well-populated portion. From Gross-Schwechat to Köpcsény, Hungary, a distance of 31.3 miles, the line becomes a trunk railway for operation at speeds of 37.2 to 43.4 m.p.h. This section has six stations and eleven sidings, the latter usually with three tracks or more. On the first 5.3 miles of this section, namely to Reichsstrasse, the same tracks are still used by a local steam railroad, which operates five to six trains a day. Joint operation with steam also exists between Petronell and Hainburg, a distance of 5 miles. After leaving Köpcsény, the line enters the precincts of Pressburg, where it again becomes a street railway.

Both the Vienna and Pressburg sections are operated at 500 to 600 volts direct current, whereas, the right-of-way high-speed section is operated with single phase at 15,000 volts or more. At first a through motor-car service was proposed, but this was found impracticable because the bridge over the Danube at Pressburg is unsafe for axle weights in excess of 6.5 metric tons. The importance of this point may be gaged from the fact that the trailers actually in use seat sixty passengers, are 47.6 ft. long, weigh 16.5 metric tons empty and 22 tons when loaded with 100 passengers. Consequently, only 4 tons would be available for electrical equipment. Motor car operation would also require greater energy consumption. Alternating current at high voltage was chosen for the high-speed line because it was found uneconomical to build a power station midway between the terminals, while it was more or less obligatory to purchase energy from the Vienna Municipal Works station. This plant, although unfavorably located at one



VIENNA-PRESSBURG RAILWAY—OVERHEAD BRIDGE CONSTRUCTION AT FISCHAMEND STATION



VIENNA-PRESSBURG RAILWAY—SINGLE-PHASE LOCOMOTIVE, FREIGHT CAR AND INTERURBAN TRAILERS

end of the line, offered the same low price for either d.c. or a.c. high-tension supply.

Under the system of locomotive operation adopted, it is necessary to change locomotives at Schwechat and Köpcsény. This change involves a loss of time of only two minutes.

CHOICE OF SYSTEM

If direct current had been adopted for the interurban division a prohibitive amount of feeder copper would have been required to meet the abnormally heavy holiday travel characteristic of the pleasure-loving Viennese. On the other hand, the use of 15,000 to 16,500 volt single-phase trolley potential permitted a light and economical overhead line even at 10 per cent line loss.

In the change from a.c. to d.c. two methods are employed: At Köpcsény, where there are but two tracks, a third-rail is used; at Gross-Schwechat, where yard conditions made a third-rail impracticable, storage-battery and overhead lines are used. Because of grades, the d.c. locomotives would require 6 tons of ballast in any event. This weight is supplied in the form of a storage battery, whereby the d.c. locomotive is enabled to haul trains to or from the a.c. track, a gap having been deliberately left between the a.c. and d.c. overhead lines. As the a.c. wire is 23 ft. and the d.c. line 19.7 ft. above the rails, it is impossible for a d.c. locomotive to collect alternating current.

As noted, the holiday peaks are so high that economical motor-car operation was impossible. Therefore trailer operation with two to five-car trains was selected. Further, the use of two distinct classes of locomotives was decided upon in preference to a hybrid a.c.-d.c. equipment. In this respect the engineers followed a fundamental feature of steam railroad work, namely, to supply each division with the equipment most suitable for the conditions of that division.

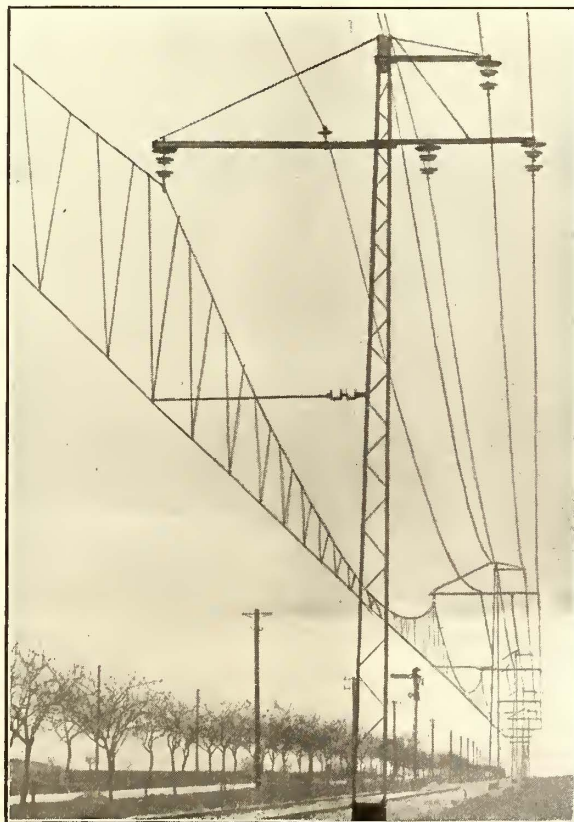
One d.c. end and the high-speed a.c. section

are fed from the Vienna Municipal Works located 3.6 miles from the Vienna terminal; the other d.c. end is fed from the Pressburg Tramways.

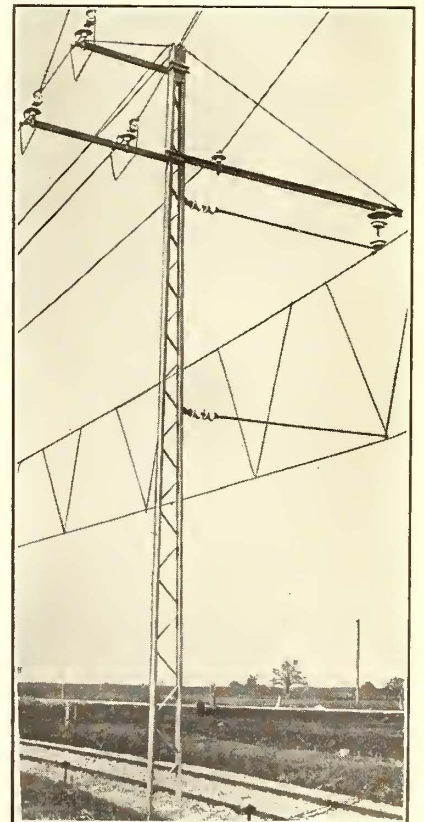
The 600-volt d.c. overhead line in Vienna, 3.6 miles long, includes two figure 8 wires of 80 sq. mm. (about No. 000) cross-section. The 15,000 to 16,500-volt section also has contact wires of the same cross-section. Direct a.c. rail return to the power house is avoided in order to minimize disturbances to near-by weak-current circuits. The grounding wire, which is of 100 sq. mm. (about No. 0000) section, is carried on insulators over the poles and therefore serves also for lightning protection.

The a.c. contact wire alone would assure economical distribution, but a feeder of 50 sq. mm. (about No. 0) section is carried in parallel therewith so that any portion of a contact wire can be cut out without killing the rest of the a.c. division.

The catenary system is that of the A. E. G. Union Company, in which weights for tension takeup are attached to both the catenary and contact wires. Correct alignment is maintained despite the difference in temperature coefficients due to the use of steel for the



VIENNA-PRESSBURG RAILWAY—CONSTRUCTION ON TANGENTS

VIENNA-PRESSBURG RAILWAY—
CURVE CONSTRUCTION

catenary and hard-drawn copper for the contact wire. The mutual give-and-take of these two wires, as herein-after described, would be impossible with the usual vertical hangers. Therefore, diagonal hangers are used. These hangers form the sides of an inverted triangle, whose base is formed by 9.84 ft. of the catenary and whose apex is formed by the junction of the diagonals with the contact wire. The apices are about 16.4 ft. apart. The hangers are rigidly clamped to the catenary, but flexibly connected to the roller from which the contact wire is suspended.

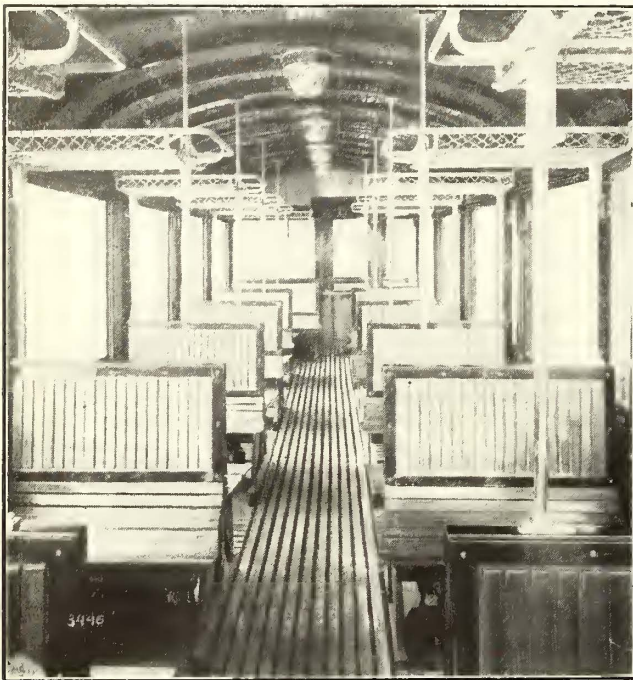
In the event of a change in temperature the roller carrying the contact wire is free to move in an ellipse whose foci are at the junctions of the diagonals and the catenary. Owing to the large distance (9.84 ft.) between the junction points or foci, the arc in which the roller moves is so small that the height of the trolley wire is changed but inappreciably.

The tension takeup weights are located at intervals of approximately 13,280 ft. Within the range of 60 deg. Cent. (-20 to $+40$) the catenary is elongated only 26.4

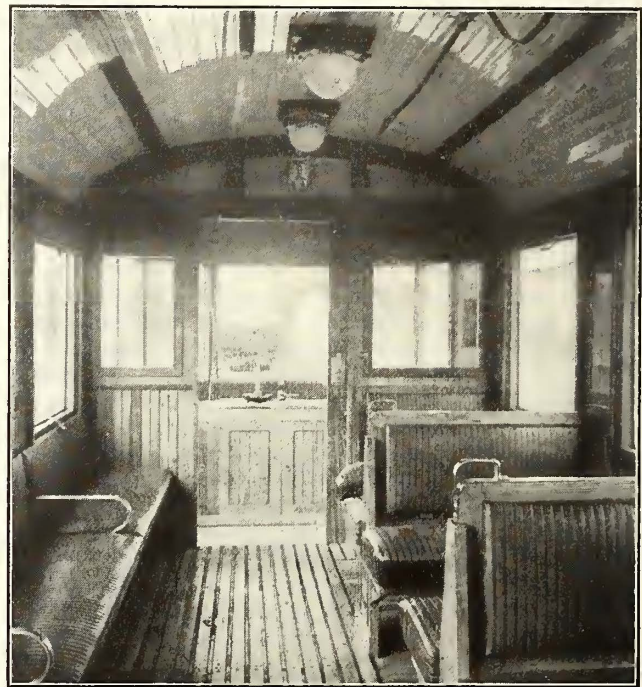
suspended structure is free to move in any direction. The insulators have a sherardized shield to throw off rain drip from the brackets or bridges. The transmission and feeder wires are also carried from suspension insulators. However, under certain conditions, as in bridge construction, the insulators are not of the suspension type but are inserted directly in the struts.

WEAK-CURRENT CIRCUITS

While the high-tension circuits are carried on steel structures exclusively, a separate line of wooden poles is installed alongside the right-of-way to carry two iron telegraph wires and four bronze telephone wires. Some trouble with the telephone was experienced at first because the original insulation of the apparatus was not capable of withstanding tensions as high as 2000 volts static. For a 31-mile high-tension railway the present satisfactory operation is considered all the more remarkable, as some parts of the telephone lines are but 6 ft. from the high-tension wires. This result was not obtained by the use of grounding coils, condensers or



VIENNA-PRESSBURG RAILWAY—INTERIOR OF A THIRD-CLASS COMPARTMENT



VIENNA-PRESSBURG RAILWAY—INTERIOR OF A CITY MOTOR CAR

in. and the contact wire 40.8 in., a difference of 14.4 in. This extreme condition will cause the contact wire to rise only 1.6 in. at the roller points and but half that distance midway between the rollers. For all practical purposes, therefore, the contact wire is always in the same horizontal plane. The automatic tension takeup weights were calculated on the assumption that the weights of the catenary and contact wires would remain constant. In operation, however, it was found that snow and ice added as much as 2 lb. per yard to both catenary and trolley. In view of this experience the weights have since been anchored to avoid trouble.

The catenary is made up of seven-strand sherardized steel cable 8.5 mm. (about No. 0) in diameter and weighing about 0.6 lb. per yard. This catenary is carried over rollers at intervals of 574 ft. on tangents and of 328 ft. or less on curves. The insulators are of the chain suspension type used on the Mittenwald Railway, as described in the *ELECTRIC RAILWAY JOURNAL* for July 5, 1913.

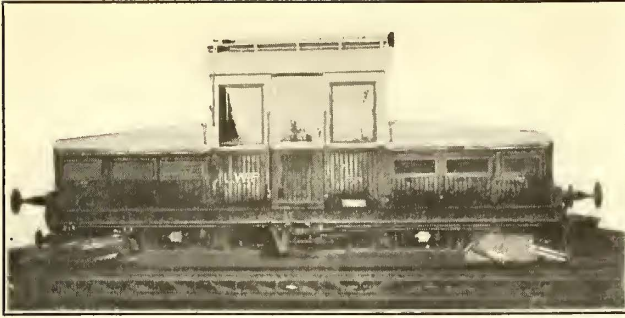
The catenary is usually carried over a roller hung from two such insulators and in such a way that the

similar devices, but rather by the careful transposition of the wires of each circuit and the use of high-grade insulation.

No complaints have been made about disturbances to the government telephone and telegraph lines in this vicinity. This condition is credited to the efficiency of the rail return. As protection against lightning a copper wire is carried up every pole; further, all poles and towers are in electrical connection with the rails, and the latter in turn are earthed at different points down to ground water. Only the joints in one rail are fitted with compressed terminal bonds; the other rail, however, is tied in with cross-bonds every 3280 ft. to 6560 ft.

ROLLING STOCK

The d.c. local service at Pressburg is handled with ten single-truck motor cars, each equipped with two 65-hp motors and carrying twenty-eight passengers. The interior fittings of both the city and interurban cars were designed in consultation with an architect. The a.c. trailers include twenty-four double-truck arch-roof



VIENNA-PRESSBURG RAILWAY—LOCOMOTIVE FOR TROLLEY (COLLECTOR NOT SHOWN) AND BATTERY OPERATION

cars. They are 41.6 ft. long, and the nine which have no baggage compartment or toilet can seat forty-three third-class and eighteen second-class passengers, chiefly in back-to-back cross seats.

The through trains between Vienna and Gross-Schwechat are hauled by six d.c. single-truck locomotives of 11.8-ft. wheelbase. These locomotives weigh 24 metric tons each, carry 200 hp in motors, exert a tractive effort of 7260 lb. and haul trailing loads up to 75 tons. In addition to two trolley poles they have a battery with a capacity of 89 amp-hr. at 280 volts. This capacity is ample for a full day's switching service.

Because of operation on both a.c. and d.c. divisions, each prismatic lighting dome carries one lamp for 100-volt d.c. service (operated six in series) and one 20-volt lamp for a.c. or battery service. The switching is so arranged that it is impossible to connect into circuit any but the correct lamps. A storage battery on each car supplies the 20-volt lamps during the short periods of locomotive interchange. The heaters are operated on 600 volts d.c. or 300 volts a.c.

The freight service is handled with three 800-hp (hour rating) 1-C-1 locomotives of Mittenwald type. The passenger service is cared for by seven 750-hp (continuous rating) 1-B-1 locomotives. Direct drive with parallel rods and jackshaft was selected for these machines as the saving in weight through the use of gearing would not have been appreciable for operation at 31 to 43.4 m.p.h. With a weight of 28 metric tons on the drivers, the 1-B-1 locomotive develops a maximum tractive effort of 15,400 lb. at the periphery of the wheels when taking 30 amp at 15,000 volts. The locomotive exerts for each kilovolt-ampere a turning moment torque of 8 mkg (57.8 lb.-ft.)

The mechanical data of the multiple-unit passenger locomotives follow:

Diameter of driving wheels.....	40.3 in.
Diameter of pony wheels.....	34 in.
Length over buffers.....	34.4 ft.
Fixed wheelbase.....	13.1 ft.
Total wheelbase.....	19.4 ft.
Pressure per driving axle.....	14 tons
Weight on drivers.....	28 tons
Service weight.....	53.3 tons
Weight of electrical equipment.....	26.2 tons

The brakes are of the vacuum type, but a compressor is provided for current collectors, sanders and whistles.

The transformer is of the oil-cooled type with a twelve-tap arrangement on the secondary to give 126 to 515 volts. The brush voltage is divided between stator and rotor by means of four taps. During standstill the rotor is short-circuited, full voltage being applied to the stator. Energy is transformed by induction, as in a repulsion motor, until a speed of 11 m.p.h. has been attained, whereupon the short-circuit connection is eliminated and the stator receives only 57 per cent of the total mileage. As the speed continues to increase the stator's proportion of the voltage is reduced to 17.5 per cent, so that only a

small portion of the input is now converted to mechanical form inductively. In short, the armature converts the greater part of the input to mechanical energy just as a series d.c. motor does. It is asserted that this motor has answered all commutating demands and, in addition, enjoys the variable speed characteristic not obtainable with the d.c. series motor. Master controllers, taking 300 volts maximum, and contactors with electropneumatic reverser are used.

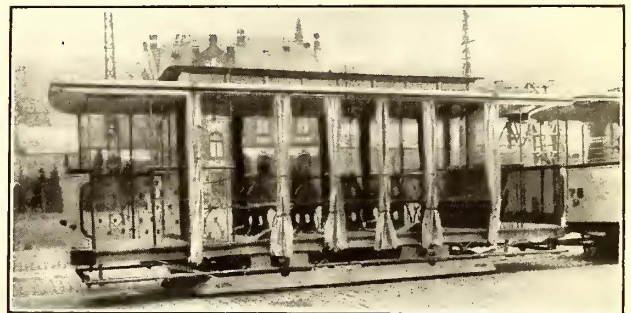
The motor has twenty-four poles with three brushes per holder. Its hour rating is 750 hp at 200 r.p.m. or 24 m.p.h., and its continuous rating 750 hp at 300 r.p.m. or 36.3 m.p.h. At 200 r.p.m. the continuous rating is 530 hp; and finally, at 160 r.p.m. the hour rating is 600 hp. This remarkable range is obtained with an efficiency varying from 84 to 90 per cent and with the great advantage of making up unusual time losses in locomotive interchange. The torque of this motor on an hour basis is 2860 mkg (20,638 lb.-ft.). Exclusive of breakages, which are gradually diminishing, the life of a brush is estimated at 66,960 miles for a wear of 1.2 in. This is based on experiences with maximum loads and runs as high as 6200 miles per month.

All electrical equipment was supplied by the A.E.G.-Union Company, Vienna. The line is operated by the Niederösterreichischen Landesbahnen, Prof. Joseph Sturm, director.

Special Ambulance Cars at Trier, Germany

Open-Bench Trailers Converted Into Hospital Cars for War Service

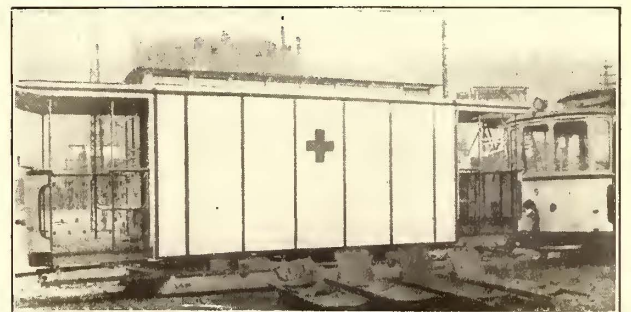
In the Jan. 2 issue of the ELECTRIC RAILWAY JOURNAL a description was presented of some German hospital cars used for wounded soldiers. While these cars were altered but slightly for the war service, the type shown in the accompanying illustration has been quite rad-



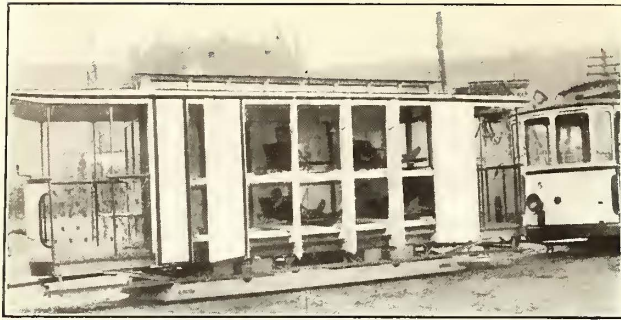
TRIER AMBULANCE CARS—CAR BEFORE CONVERSION

ically reconstructed. These cars are used on the Trier Tramways, according to data furnished by Eugen Eichel, editor *Elektrische Kraftbetriebe und Bahnen*.

In their original form the cars were open-bench trailers. Following the removal of the benches, the



TRIER AMBULANCE CAR—VIEW OF CAR CLOSED



TRIER AMBULANCE CARS—VIEW OF CAR WHEN OPEN

weather curtains were taken off. The curtain posts were then faced with nailing strips to permit the attachment of five wooden swing doors with a fixed panel at each end, as illustrated. The outer sides of the doors and panels are painted white except for a large red cross on the middle door. The interior is divided into two levels by means of longitudinal beams, across which the channels are placed at the right gage to support the "feet" of the stretchers. The lower pair of longitudinal beams is supported by springs. By this arrangement two levels of five stretchers each are secured. The upper level has clearance enough to permit the patient to sit up.

As the bulkhead windows and monitor roof were not altered, the interior of the car is well lighted and ventilated despite the solid side doors. The platforms are available for attendants or slightly wounded soldiers. The cost of converting one car in the manner illustrated, allowing for later salvage value of the material used, was about \$62.

Street Grade Changed 19 Ft. on Seattle Line

Operation of Car Lines Must Continue Without Interruption While Grade Is Being Changed

Improvements are now under way in that part of Seattle known as the Fremont and Ballard suburbs, which involve an average fill over the whole district of about 10 ft., with a maximum change in elevation of 19 ft. The Puget Sound Traction, Light & Power Company has car lines on most of the important streets in this district, and is required to pay for the fill on its right-of-way and to maintain operation of cars while the fill is being made.

The material for the first 3 ft. of the fill is supplied from hydraulic dredges in the Lake Washington canal, and above this level a dry fill is placed, dirt being handled in side dump cars, hauled by steam locomotives. The

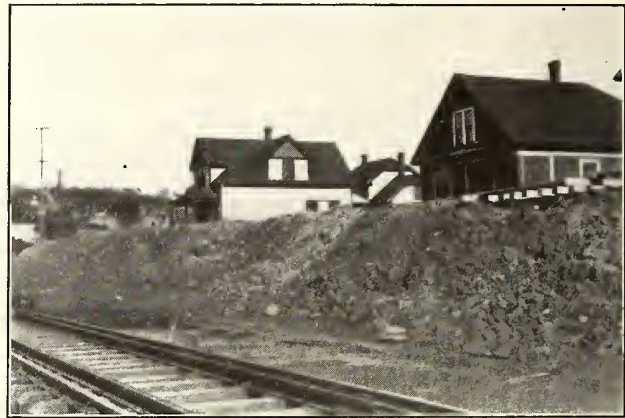


SEATTLE STREET GRADE—BALLARD AVENUE READY FOR HEAVY FILL

total volume of wet fill on the whole improvement, including private property, is estimated at 1,346,683 cu. yd., and the dry fill will amount to about 871,427 cu. yd. Of this total the railway company is responsible for 52,000 cu. yd. at a cost of \$87,940.

Owing to the height of the new grade above the old, it has been necessary for the railway company to build temporary trestles on several of the streets in order to maintain service, and before the work is completed some 12,900 ft. of track will have been relocated. Pavement on the old grade has to be removed if within 3 ft. of the new grade, and where the fill is more than this specifications permit the old pavement to be left if broken up so as not to hinder future ditching or drainage.

One of the accompanying illustrations shows the condition of Ballard Avenue after the concrete base had been broken up. In this view the building in the right foreground has a new waterproofed foundation wall



SEATTLE STREET GRADE—FILL ON HALF OF STREET, SHOWING TEMPORARY TRACK

whose top indicates the height of fill at this point. The other illustration shows both hydraulic and dry fill nearly completed on half the street before the track was removed from the other half.

The change of track grades is under the supervision of George P. James, chief engineer Puget Sound Traction, Light & Power Company.

Rail Statistics

Statistics in regard to the production of rail in the United States have recently been made public by the American Iron & Steel Association, with headquarters at Philadelphia. Table I shows the production of rails by processes in gross tons during the past three years. Girder and high T-rails for electric railways are included in the figures given in this table. For recent years the tonnage of rails of this kind was as follows: In 1911, 205,409; in 1912, 174,004; in 1913, 195,659; in 1914, 136,889 gross tons.

Table II shows the production of rails according to weights and processes during 1914.

TABLE I—PRODUCTION OF RAILS BY PROCESSES IN GROSS TONS

	1914	1913	1912
Open-hearth	1,525,851	2,527,710	2,105,144
Bessemer	323,897	817,591	1,099,926
Rerolled	95,169	155,043	119,390
Electric	178	2,436	3,455
Total	1,945,095	3,502,780	3,327,915

TABLE II—PRODUCTION OF RAILS BY WEIGHT AND PROCESSES, 1914

Kinds	Under 50 lbs.		From 50 to 85 lbs.		85 lbs. and over		Total	
	Gross tons	Per cent	Gross tons	Per cent	Gross tons	Per cent	Gross tons	Per cent
Open-hearth	96,068	40.29	211,414	68.23	1,218,369	87.23	1,525,851	78.45
Bessemer	78,280	32.83	97,063	31.32	148,554	10.63	323,897	16.65
Rerolled	64,061	26.87	1,358	.44	29,750	2.13	95,169	4.89
Electric	14	.01	30	.01	134	.01	178	.01
Total	238,423	100.00	309,865	100.00	1,396,807	100.00	1,945,095	100.00

Advantages and Limitations of Railway Motor Ventilation

Self-Ventilated and Inclosed Motors Compared from the Standpoints of Durability, Continuous Output and Overload Capacity, Under Different Operating Conditions

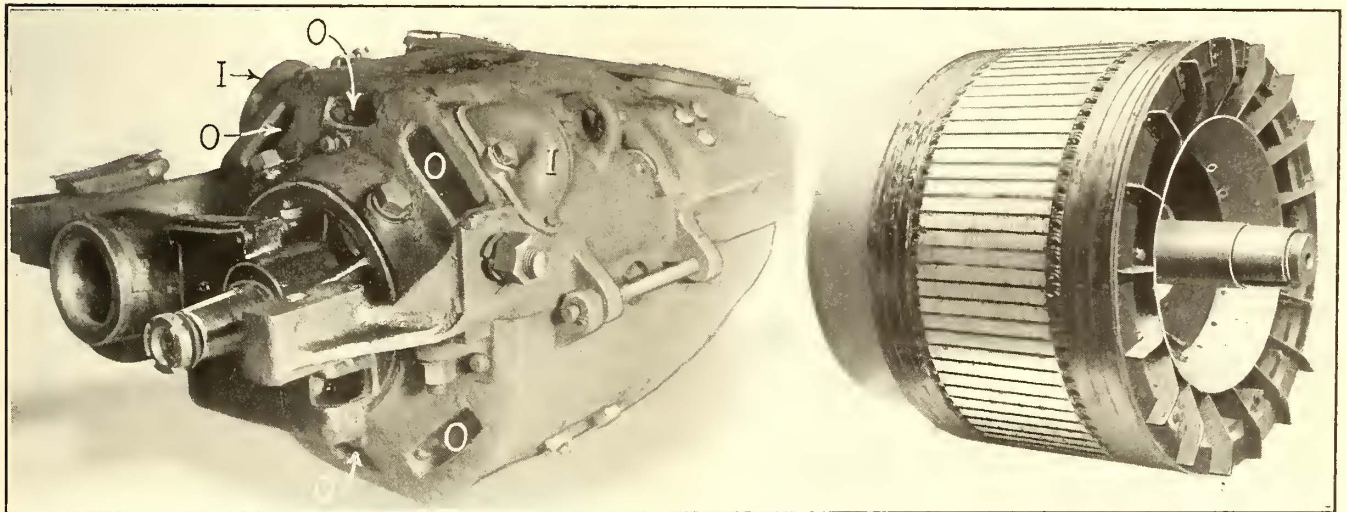
BY RUDOLF E. HELLMUND, ELECTRICAL ENGINEER WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, EAST PITTSBURGH, PA.

The purpose of this article is, first, to outline briefly the recent progress and present status of the self-ventilated railway motor, and, then, to discuss the advantages and disadvantages of its use in various kinds of service. While it is assumed that the readers of this paper are familiar with the construction of the modern self-ventilated motor, it is believed that they will be interested in a brief description of its development.

Early designs of railway motors plainly indicate that the designers appreciated the desirability of ventilation, as was illustrated in the Westinghouse No. 3 and other motors, which were protected from slush and dirt by solid lower frame halves but were open at the top. These

rear end of the armature, having about the same duct area. Since that year there has been very rapid progress, resulting in the present satisfactory status of the self-ventilated fan type of motor which was introduced into street car service about 1911.

The several types of self-ventilated motors are briefly defined in the following paragraphs. Before taking these up it may be said that a fan mounted at the rear end of an armature of an inclosed motor, circulating air through longitudinal ducts in the commutator and armature iron and in the space between the field coils, produces about the same quality of circulation as do the radial ducts in the older type of motor. In favor of the use of the fan are the structural advantages due



RAILWAY MOTOR VENTILATION—WESTINGHOUSE NO. 632-SB, SERIES-VENTILATED MOTOR, SHOWING INLET HOODS (I) AND OUTLET HOLES (O)—ARMATURE OF NO. 403 MOTOR, DESIGNED FOR NEW HAVEN RAILROAD

were soon supplanted by inclosed motors, as the insulating materials available in the early days were not able to resist the effects of dirt and dampness. In the inclosed motors, internal air circulation was provided by means of longitudinal core ducts and the fan action of the straight part of the coils beyond the cores.

About 1898 internal circulation was improved by the introduction of radial ducts, provided by inserting finger or fan plates between sections of the armature laminations. At first the use of longitudinal air ducts was continued, but later they were replaced by spaces provided between the arms of the armature spider.

About 1902 designers began to provide apertures in the motor casings, adding the "chimney" ventilating effect to that of the fan. About the same time the use of separate fans for driving air through the motors, driven either by auxiliary motors or from the main motor gears, was investigated particularly for use on large motors. This plan was adopted for ventilating some locomotive motors.

Since 1908 the first steps were taken in this country to replace the radial duct fans with a single fan at the

to the elimination of radial ducts and accompanying sharp corners in the slots against which the insulation of the coil rests.

TYPES OF VENTILATED MOTORS

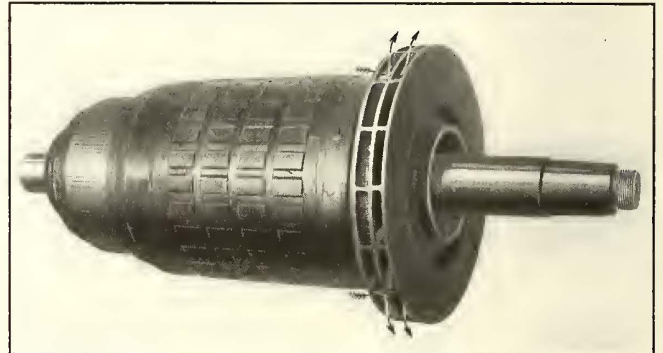
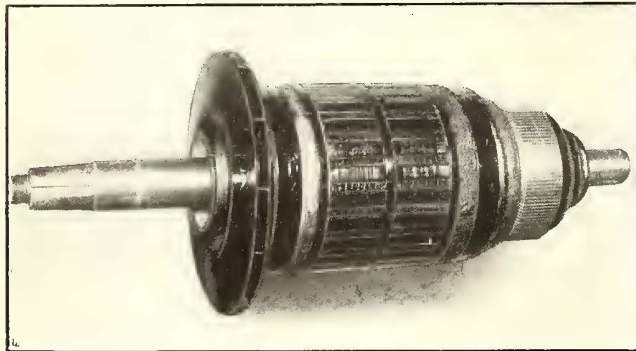
In the armature, (semi)-ventilated, fan-type motor with longitudinal ducts, external air circulates only through the armature, entering the motor through inlet openings at the commutator end, passing through the longitudinal ducts in the commutator and armature, through the fan, and out of the motor through openings on the pinion end. A baffle plate or ring at the pinion end of the armature prevents the heated air from circulating among the field coils. This method of ventilation has been used only in a few cases, because it permits the entrance of dampness and dirt into the motor without giving the full benefit of ventilation. Another plan, somewhat like this, provides a route through openings in the pinion-end housing, through the fan, through the inter-field coil spaces, and over the commutator, with an exit under the cover at the commutator end. The only reason for employing this type would be the ab-

sence of room in the armature core for ventilating ducts, in motors of very small armature diameter. It has been used very little.

A more popular plan is that known as series ventilation, in which external air is circulated in succession through the spaces between and around the field coils, and through the armature ducts by a single fan, the inlet being through a hood on the top of the motor and the outlet through holes in the pinion-end housing. The ingoing and outgoing air currents at the pinion end are separated by means of a baffle. An important feature in this type of motor is that the inlet hood should open away from the outlet so as to prevent hot air from re-entering the motor casing. By making the fan of as large a diameter as possible, an excellent circulation of air can be secured in this way. Some of the latest motors of this type give fully 15 per cent to 35 per cent higher continuous rating than earlier motors with series ventilation. A still more recent motor, which has shown very promising results, is the reversed, series, fully-ventilated fan type, in which external air is circulated, in succession, first through the armature ducts and second through the spaces between the field coils, the incoming and outgoing air being separated by a baffle at the commutator end housing. This plan brings the cool entering air directly in contact with the

ture coils it is possible for the wheel splash, etc., coming into the motor through the outlet holes, to come into contact with the insulation, although more recent designs have provided a fan arrangement to overcome this. It is at present impossible to state definitely how important these drawbacks of parallel ventilation will prove in practice. For parallel ventilation the fan diameter must be much larger than the armature diameter to get a reasonably effective depth for the fan blades overhanging the armature winding. The size of the fan is limited by the bore in the end of the housing, which in turn is limited by the distance between gear centers and the space required for the housing flange seat, the car axle bearing, and clearance. In cases where the fan diameter is limited, therefore, parallel ventilation will either not be very effective or it will necessitate the use of a very small armature diameter.

The final type of self-ventilation which will be mentioned is the compound type, a combination of series and parallel ventilation. In this, external air is circulated by the double fan through two routes, as follows: One fan drives air first through the armature and second through the spaces between and around the field coils. The second fan takes additional air through openings in the pinion-end housings and drives it past the field coil. The first fan draws air into the motor



RAILWAY MOTOR VENTILATION—ARMATURES OF WESTINGHOUSE NO. 323-SV MOTOR FOR SERIES VENTILATION (SINGLE FAN) AND NO. 547-A MOTOR FOR PARALLEL VENTILATION (DOUBLE FAN)

armature, and the dust and dampness carried by the incoming air do not come in contact with the motor windings until the air has passed the armature ducts. In addition, the parts of the motor containing the commutator, brush-holders, etc., are under air pressure, so that part of the carbon and copper dust formed by the wear of the brushes and commutator is removed by the outgoing air. Motors of this type can be easily changed to those of the inclosed type if desired.

Another very recent introduction is the armature provided with a double fan much larger in diameter than the armature core. In this scheme, which is known as the parallel ventilation, external air is circulated through the two sections of the fan in parallel streams, one going through the spaces through and around the field coils and one through the armature. One stream of air enters at the commutator end and is drawn by one section of the fan through the ducts in the commutator and armature iron, while another stream is drawn by the second section of the fan through the field coil. Both streams are expelled at the pinion end, and a baffle prevents the hot air from circulating within the motor. Both field coils and armature receive cool air and the parallel ventilation should in most cases, therefore, be more effective than the series ventilation with respect to cooling. There is slight disadvantage, however, in that the air enters at commutator end, so that water and dust settle on the live parts of the motor. Further, as part of the fan is located over the ends of the arma-

ture through holes in the commutator end housing, and through the ducts in the commutator and the armature core and then blows it out across the field coils through openings near the commutator end. The second fan takes in additional air through openings in the pinion-end housing and drives it out through the same openings at the commutator end. This plan seems to combine the advantages of series and parallel ventilation, and to eliminate their disadvantages.

RESULTS OBTAINED AND TO BE EXPECTED FROM VENTILATED MOTORS IN OPERATION

Ventilated motors have proved satisfactory in most localities when they have been cleaned out at regular intervals. When provision has been made in the design for keeping dirt away from the live parts, as in motors provided with compound ventilation, it may be expected that, under normal conditions, ventilated motors will give better results with regard to insulation breakdowns than entirely inclosed motors. This follows because it is difficult to render the latter tight enough to keep out dust and dampness altogether, and because a certain amount of copper dust is originated by the wear of the brushes and the commutator. In inclosed motors it is especially difficult, under certain conditions, to avoid condensation of water inside the case. If this is allowed to remain it may prove harmful. With proper ventilation water condensed within the case will, as a rule, be quickly evaporated. It is, however, impossible

to predict that the ventilated motor will be successful under all conditions. For instance, in some localities which are subject to severe snowstorms or other adverse weather conditions, it is quite possible that some trouble will be experienced with ventilated motors. It would therefore seem desirable to install motors which can be closed whenever weather conditions are particularly severe.

The principal advantage of the ventilated motor is the increase in its continuous capacity. The hourly rating is usually only slightly improved by the use of any fan arrangement. This is true because short-time ratings depend more upon the heat-absorbing capacity of the motor than upon the ventilation. Further, even inclosed motors, like those of the radial-duct type, are tested with the covers removed, according to the A. I. E. E. standardization rules, and have, therefore, a certain amount of ventilation during the hour run which affects the nominal horse-power rating.

The following table gives approximate percentages of increase in continuous rating obtained with various types of ventilation over the continuous rating of inclosed motors of the radial-duct type, for ratings on 300 and 400 volts.

	INCREASE IN MOTOR RATING IN PER CENT DUE TO VENTILATION	
	Up to 55 kw	Over 55 kw
Ventilated motors of the radial-duct type.....	10 to 20	15 to 35
Armature-(semi)-ventilated, fan-type motor..	10 to 25	15 to 35
Field-(semi)-ventilated, fan-type motor.....	10 to 25	15 to 35
Series-ventilated, fan-type motor (early types)	10 to 30	20 to 40
Series-ventilated, fan-type motor (fan diameter larger than armature diameter), recent types	25 to 55	35 to 80
Parallel-ventilated, fan-type motor.....	30 to 70	40 to 100
Compound-ventilated, fan-type motor.....	30 to 70	40 to 100
Forced-ventilation motor.....	50 to 250	

At voltages nearer to the rated values the relative gain is much larger because, on one hand, many inclosed motors cannot be run even with light loads on full voltage continuously, while on the other hand the ventilated motors get the maximum benefit of the fans, and comparatively high ratings at the high voltages, because these voltages mean high armature and fan speeds. Since the effect of the fan increases very much with the speed it is even possible that the 600-volt continuous ratings may be higher than those for lower voltages. If, for example, a motor rating is limited by the temperature in the field coils at low voltage the rating will increase with the voltage. If, on the other hand, the motor rating at low voltage is limited by the armature temperature, then higher speed is accompanied by increased losses and it depends upon the relative importance of core and copper losses, and the particular design of ventilation, whether or not the gain in ventilation at higher voltage is greater than the effect of the additional losses. The continuous ratings at higher voltages are not of practical importance, however, because the actual effective average voltage is between 300 and 450 on 600-volt motors.

In actual service the benefit derived from ventilation is not as marked as might appear from the stand-test ratings indicated in the above table. Inclosed motors mounted under a car derive appreciable benefit from the ventilation due to the movement of the car through the air. As a result an inclosed motor has for the same root-mean-square load usually 10 deg. to 20 deg. less temperature rise on the car than on the stand. With a ventilated motor this difference is usually very much smaller because the effect of the cooling outside air is relatively unimportant. In some cases the air currents under the car may interfere with the (internal) ventilating scheme by blowing against the inlet or outlet holes of the motor. For these reasons it may be that a ventilated motor with a continuous rating on the stand 15 per cent higher than that of the same motor inclosed, will in actual service show very little difference in re-

sults when operating inclosed and open. This has been found to be the case with the leading motor on the car which receives the maximum benefit from the car motion. The other motors usually show quite a marked difference under similar assumptions, especially motors which are housed in more or less by skirts, or which are located behind the low portions of low-step cars. These motors run much cooler when operated with ventilation.

The schedule speed in actual service is of the greatest importance with respect to the benefit which may be derived from ventilation. In city service the motor stands still much of the time, or runs at slow speed, with the fan practically inactive. The benefit derived from ventilation will thus be small. In high-speed interurban service, with long runs between stops, great benefit will be derived. With a separate blower the ventilation is, of course, independent of speed.

A ventilated motor does not have the same overload capacity as an inclosed motor of the same continuous rating. The ventilated motor is smaller and lighter, so that the inclosed motor has more metal to temporarily absorb heat during an overload of short duration. In the ventilated motor also there is always a chance that some dust may accumulate in the air passages, thus reducing their area and causing increased heating.

The causes which tend to reduce the practical value of self-ventilation in actual operation are at times, and especially in high-speed service, partly or entirely counteracted by the fact that the average speed of the motor, and therefore of the fan, is higher in service than on the stand. Nevertheless it is advisable to choose a ventilated motor with a slightly greater margin of safety in the continuous rating than is necessary in case of an inclosed motor. This is particularly advisable in very low-speed service, especially where short-time overloads, like those caused by operating trailers for one or more trips, are liable to occur. Even with such conservative practice, however, the benefit to be derived by the use of self-ventilated motors of the latest design, and from forced-ventilation motors, is quite appreciable and will permit weight reductions of from 15 per cent to 40 per cent with the former type and of from 30 per cent to 100 per cent with the latter type. Thus the use of ventilated motors can be recommended in all cases except those in which special local conditions would increase the maintenance very much on account of the open nature of the motor.

In conclusion it may be said that among other improvements in ventilation made during the past few years, the most important are the careful shaping and proportioning of the air paths within the motor, the diminution of causes of harmful eddy currents, and the increase of fan diameter.

Jitney in Literature and Movies

The mass of material about the jitney bus contained in the daily newspapers received by the ELECTRIC RAILWAY JOURNAL is simply stupendous. Writers have dealt with the jitney from every angle and it has even been put into verse. Here and there has appeared something striking, but the vast amount of this material has been mediocre. Standing out prominently, however, is an editorial which appeared recently in William Allen White's *Emporia Gazette*, with which Walt Mason gained fame, and the same paper that a number of years ago carried the famous editorial, "What's the Matter with Kansas?" The editorial in the *Gazette* did not deal directly with the jitney, but compared to the jitney the Kansas Legislature, which is indicted as being cheap, disorganized, irresponsible, unreliable, and stupid just like the jitney. On Broadway, New York, a film, "A Jitney Elopement," was recently shown.

Zone Fares in Milwaukee

Discussion of Recent Developments by the New England Street Railway Club—Advantages Set Forth by Mr. Stearns—Comments by New England Managers

About two hundred members and guests of the New England Street Railway Club gathered at the American House, Boston, on April 22 to hear a paper on the "Zone System of Fares in Practice," by R. B. Stearns, vice-president of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis. President Learned occupied the chair and there was a large representation of distinguished guests, including state officials from Massachusetts and elsewhere.

The paper by Mr. Stearns was an extended account of the zone system in Milwaukee brought up to date. In part it was a review of the paper on the same subject presented by him last October before the American Electric Railway Association at Atlantic City and published in the *ELECTRIC RAILWAY JOURNAL* for Oct. 24, 1914. Additional facts were given, however, based upon the experience with the system since the presentation of the previous paper mentioned. Among other points he said that since Nov. 14, 1914, in conformity with an order of the commission, tickets good for the outer zones and originally sold for 2 cents, have been sold on the cars at the rate of thirty for 50 cents. As a result of this policy the sales within the first four months exceeded 50 per cent on two of the lines and averaged 46.19 per cent of the suburban revenue on all lines. The accompanying chart shows the rapidity with which the public seized this opportunity. In the latter part of his paper Mr. Stearns discussed the application of the zone system to the regulation of fares.

An abstract of Mr. Stearns' paper, so far as it relates to the events of the past six months and his conclusions as to the practical working of the system, follows:

MR. STEARNS' PAPER

The steadily increasing cost of operation has brought forcibly before the traction industry the adjustment of present flat rates of fare for urban service. This has been brought about by the charge for transfers as occurred under the Cleveland plan, by increase in the price of commutation tickets as occurred in Milwaukee, or by increase in the cash fare rate as occurred in the recent case of the Massachusetts Commission and the Middlesex & Boston Street Railway. The zone system presents another solution, namely, the contraction of the limits of the metropolitan area or central zone.

A number of reasons have been advanced why contraction and expansion of zone limits as a means of regulating revenues is more in line with public policy and the best development of the business than increases and decreases of the flat rate, such as that provided for in the Cleveland plan. First, the burden of the increased cost is placed upon the long-haul business, conceded under any system of flat rates to be the least remunerative. Second, charges for short-haul traffic are not raised to a point where competition will be encountered from other forms of conveyance, such as the jitney, and walking. Third, the increase in transportation charges, where such occur, will fall upon the newest and least stable portions of the community and best adapted to change.

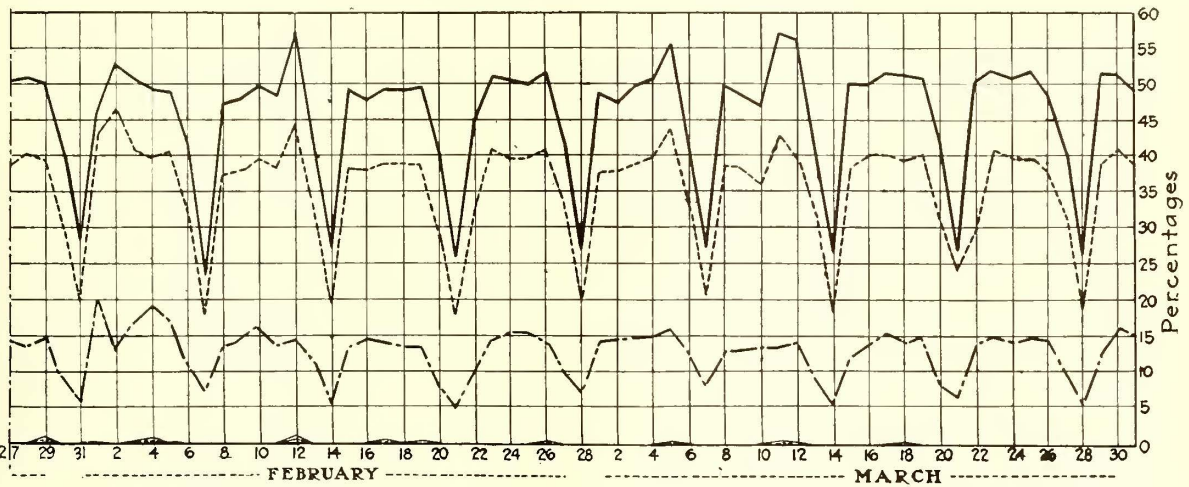
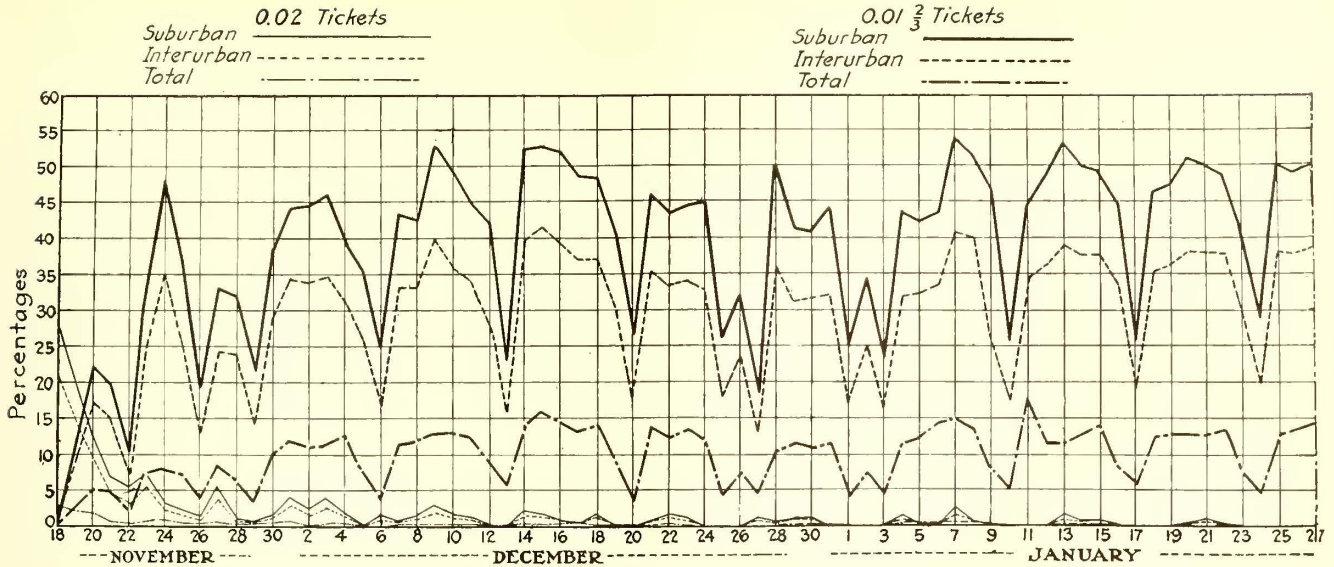
Of these reasons the danger of the falling off of short-haul business, due to competition by other conveyances or walking, is the most important. Any decrease in short-haul traffic cannot fail to disproportionately increase the cost of operation as compared with the revenue with the consequent detriment of the character

of service. In fact, the bureau of fare research of the American Electric Railway Association in its study of the "Cost of Service of the Jitney Bus" has pointed out:

"If the jitney service survives the experimental stage and finds, as it may, that after being put by laws and ordinances into its proper relation to the community, passengers can be carried from a mile to 2 miles for 5 cents, this short-haul competition will constitute the necessity for, and furnish a valid argument for, a much more serious consideration of the zone system of fares on the part of the electric railways and regulatory bodies than has been given to it in the past. It is obvious that, to the extent that the street railways are deprived of the traffic that costs less than 5 cents per passenger to handle, they cannot continue to carry passengers for 5 cents where the cost is more than 5 cents."

The effect of the contraction of central zone boundaries upon net operating revenues can only be approximately estimated. The contraction of the zone will depend upon an analysis of the costs of operation. Cost of passenger transportation service does not vary directly with the number of passenger-miles, since it contains a fixed element of cost independent of the length of haul of the passengers carried. In its original investigation of the cost of passenger transportation service in Milwaukee, the Wisconsin Railroad Commission pointed out that where the average fare per revenue passenger in the single-fare zone was 4.2631 cents upon the basis of analysis suggested by Frank R. Ford, of the committee of the American Electric Railway Association upon the determination of the proper basis for rates and fares, the expenses of operation, exclusive of return upon the investment assumed to vary with the number of passenger-miles, would be 0.9654 cent per passenger-mile. In other words, according to this basis of analysis, the elimination of 1 mile from the average haul of every passenger would mean a reduction in cost of operation and increase in net earnings of 0.9654 cent. According to its own scheme of analysis the Railroad Commission of Wisconsin determined that a considerably larger portion of the ordinary costs of operation were fixed in their nature and consequently found that the operating expenses which would vary with the passenger-miles would not exceed 0.5412 cent per passenger-mile. In other words, the subtraction of 1 mile from the average haul of each revenue passenger might be expected to decrease operating expenses 0.5412 cent as compared with 0.9654 cent, as disclosed by the Ford basis of analysis. The lower figure is probably more in accord with the facts in the case, since all ordinary operating expenses do not vary with the passenger-mile and experience indicates that where there is a lessening in the number of passenger-miles it is not possible to expect that operating costs will correspondingly decrease. The fixed costs of operation per revenue passenger were found by the commission to amount to 2.096 cents per revenue passenger and the average length of passenger haul within the central or single-fare area was found to be 2.93 miles.

These figures are merely illustrative, as experience has demonstrated that the costs assumed were abnormally low, and the railroad commission has had occasion in the revision of its order based on these costs so to point out. They refer, moreover, to costs based upon the density of traffic as found in the central area and



MILWAUKEE ZONE SYSTEM—SUBURBAN LINES, PER CENT OF 2-CENT AND 1 2/3-CENT TICKETS COLLECTED TO TOTAL REVENUES BY DAYS, SHOWING RAPID DISAPPEARANCE OF 2-CENT TICKETS

must not be confused with the costs in the outlying zones. This is evident from the following table, which indicates the proportionately small investment and operating costs and proportionately higher operating revenues and traffic in the central or single-fare area.

TABLE SHOWING, IN PER CENT, DISTRIBUTION OF INVESTMENT, REVENUE, COSTS, RETURNS AND SERVICE BY ZONES

	Total System	Central Zone	3 1/2 to 4 Mile Zone	4 to 4 1/2 Mile Zone	4 1/2 to 5 Mile Zone	5 to 5 1/2 Mile Zone	5 1/2 Over Zone
Investment in tangible property	100	57.37	2.88	1.86	2.18	1.38	34.33
Revenue passengers	100	84.04	4.07	1.57	.98	.78	8.56
Operating revenue	100	77.56	3.83	1.57	1.06	.82	15.16
Operating expenses, including taxes and depreciation	100	75.10	3.76	1.74	1.38	.98	17.04
Surplus available for return	100	84.69	4.04	1.08	.13	.37	9.69
Per cent surplus to investment	6.73	9.94	9.42	3.90	.39	1.81	1.90
Car-hours operated	100	81.44	4.01	1.65	1.03	.75	11.12
Car-miles operated	100	77.81	3.95	1.72	1.17	.89	14.46
Track-miles	100	34.78	2.31	1.92	2.34	1.61	57.04

The change in limits of the central area will not affect all passengers carried, but merely those long-haul passengers traveling to the outskirts, and the proportionate amount of this long-haul traffic to short-haul traffic must be taken into consideration in estimating any saving which would be effected in any contraction of the zone limits.

It is possible, however, that given a central or metropolitan area sufficiently confined, passengers can be carried at a zone rate approaching 3 cents. Assuming fixed costs at 2.3 cents per passenger irrespective of length of haul and a movement expense of 6 mills per passenger-mile, an average haul of a little over 1 mile would

yield operating expenses and return upon the investment at a 3-cent rate. Such a charge would be similar to the demand charge for electric service, with added increments in rate for added zones traversed.

The recognition of these principles of cost in regulation of rates for service would more equitably distribute the benefits of lower rates and lead to better development of short-haul traffic.

THE EFFECT OF THE ZONE SYSTEM ON THE RIDING HABIT

Because of the many factors affecting the riding habit it is impossible to determine at this time the stimulation in riding which has been produced through the operation of the zone system in Milwaukee. This is particularly true since the results during the past year have been influenced by the unusual business depression. While there has been a decrease of approximately 1.6 per cent in the number of rides per capita in the central or metropolitan area, there has been an undoubted increase in the number of rides per capita through suburban zones since the reduction in the unit fare from 5 cents to 2 cents. A smaller central zone at a reduced rate would probably change the stimulation of short-haul business resulting in increased riding.

SUMMARY AND CONCLUSIONS

The following brief conclusions may be drawn from the study which has been made of the zone system of fares as practically applied in Milwaukee.

1. An analysis of the data herein set forth indicates that suburban street railway traffic is not in itself profitable when viewed from the standpoint of the investor, the public service corporation and the regulating commission.

2. The present community development of most American municipalities is such as to prevent in a practical way the installation of a system of fares which will result in reasonable returns upon suburban lines.

3. The future profitableness of suburban lines must lie in the restriction of the allowable ride for a single fare and the gradual application to the extended metropolitan area of a zone system somewhat along lines described herein. No difficulties are encountered in the practical operation of such system and the American public will eventually see the equity of such a plan.

4. The zone system affords an equitable basis of regulation of rates of fare through the contraction or expansion of the metropolitan area.

5. The introduction of smaller units of fare than at present applied to outlying zones has probably increased the riding habit. A smaller metropolitan area with a reduced rate of fare would further increase riding, through the stimulation of short-haul business and through the competition with other means of conveyance, such as the jitney bus, and walking.

DISCUSSION

R. W. Perkins, president Shore Line Electric Railway, Norwich, Conn., said that the passenger-mile is the ideal method of selling transportation, with the rate bearing some fixed relation to the cost of service. In the past the length of the fare zone has too often been fixed on an optimistic basis and with ignorance of the cost. The need of increased revenue is clear, but the practical methods of securing it need extended consideration. The speaker favored the Milwaukee system.

P. F. Sullivan, president Bay State Street Railway, Boston, Mass., spoke of the electric railway financial situation, pointing out that the Milwaukee rate decision of the Wisconsin Railroad Commission, in the speaker's opinion, represents the most valuable contribution to electric railway economics ever promulgated. In this case the value of the property and the cost of doing business were scientifically determined. In this decision the commission decided that depreciation is an operating cost and should be added to the cost of transportation. The board also held that return on capital is not a profit, but a proper element of cost. They determined

6 per cent as a fair return on the investment, figuring 5 per cent on the bonds and 7 per cent on the stock. "If we had that rule established here," said Mr. Sullivan, "we could have a vacation every year instead of one just about the time the funeral begins."

Closing, Mr. Sullivan referred to the Middlesex & Boston rate decision of the Massachusetts Public Service Commission as the index of a constructive policy of street railway regulation. He said that depreciation must be cared for in the future and that dividends paid by depletion of the investment do not represent a proper conduct of affairs. Just how the Middlesex & Boston precedent is to be applied to other cases the speaker did not attempt to discuss, but he averred his belief that the findings in this case throw a most encouraging ray of light upon the trying problems of the street railway.

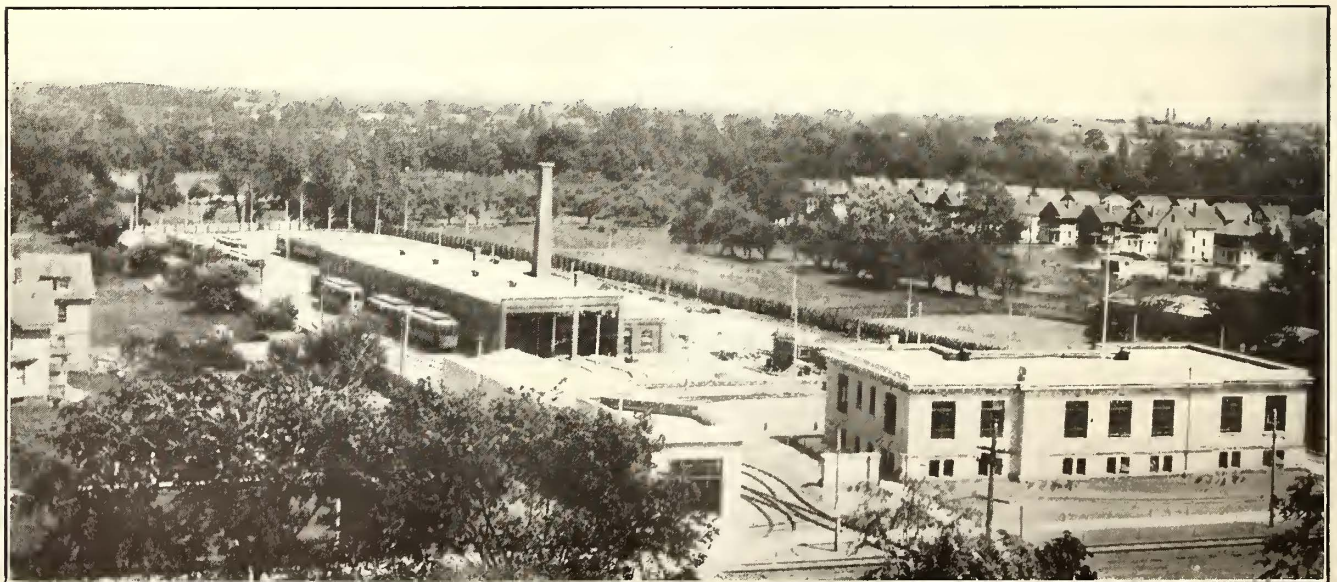
Passenger Handling at the Kodak Works

Opposite the Kodak Park works of the Eastman Kodak Company, the New York State Railways—Rochester Lines—completed during the past year a 205-ft. x 49-ft. carhouse, a 132-ft. x 43-ft. two-story transportation and employees' club building and a 24-ft. x 36-ft. x 20-ft. waiting room and a covered platform 90 ft. long x 15 ft. wide. The last named structure has been used since April, 1914, for the convenient transportation of Eastman employees. The accompanying halftone is a panorama of the entire installation.

Passengers enter the waiting room, deposit fare in two (out of a possible four) Cleveland fare boxes and then proceed to the covered platform where they find cars waiting for them. Transfers are handed out by the regular conductors as the passengers enter. By arrangement with the Eastman company, the female employees leave the works five minutes ahead of the men. Furthermore, the company attends promptly to all complaints about rowdiness and smoking. It also keeps the railway advised concerning increases or decreases in personnel so the service may be adjusted accordingly.

Not only does the railway give this seats-for-all service, but it also keeps the Eastman management informed concerning any unusual delays in traffic. The latter form of co-operation is naturally of value in avoiding arguments with tardy employees.

During the year 1914 the maximum number of passengers handled in the twenty minutes between 5:25 p. m. and 5:45 p. m. was 800. In this interval twenty cars were operated around the loop at this terminal.



VIEW FROM EASTMAN KODAK WORKS, SHOWING PASSENGER STATION, LOOP, TRAINMEN'S BUILDING AND CARHOUSE

Convention of Iowa Association

Operating Problems, the Jitney Bus, Welfare and Safety Were the Principal Topics of Discussion at the Meeting in Keokuk on April 22 and 23

Operating problems which would increase efficiency or result in direct economy were discussed at the twelfth annual convention of the Iowa Street & Interurban Railway Association, held on April 22 and 23, 1915, at Keokuk, Ia. The Thursday session was opened with President R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, Omaha, Neb., presiding, and an address of welcome by Mayor Moorehead of Keokuk. The Mayor remarked that it was eminently fitting that electric railway, light and power associations should hold their conventions at Keokuk, the home of one of the world's greatest hydroelectric developments. He mentioned briefly some of the more important features of the development and stated that while an inspection of this plant was of educational value, it should also suggest other water-power developments in the State of Iowa. Continuing, the Mayor said that he had found it very advantageous to deal in a friendly way with the utilities of Keokuk, since the development of the city depended so largely on everyone's working together. He said that it was easy to deal with these utilities, and he was satisfied that it was a great advantage to all parties concerned.

F. J. Hanlon, secretary and general manager Mason City & Clear Lake Railroad, Mason City, Ia., responded to the Mayor's address of welcome. He said that the close friendly relations existing between the city and the public utilities of Keokuk, and the remarks of the Mayor that it was advantageous so to be had touched a warm spot in the hearts of all the members present. Mr. Hanlon said that it would be a great relief if all utility companies could operate under the same conditions. He mentioned the present jitney bus problem, and stated that it was unfair to the railway companies, which supported the cities in many ways, to allow this piratical form of transportation to operate without proper restriction. He did not believe that cities could have both, and since it had been proved that motor-buses could not operate profitably for a 5-cent fare, it was wrong to encourage the deluded jitney owners. Turning to the importance of the industry, Mr. Hanlon expressed the opinion that extensions to steam roads were at an end in Iowa, and that in the future the State must depend on electric lines for transportation development. It was, therefore, important that the industry, which is still young, should be encouraged, since the growth of the State largely depended upon its future success.

President Leussler confined his annual address to brief remarks concerning the business situation. He said the past year had been an unhappy one for the industry because superimposed upon the slump in business conditions was the European war and the jitney bus problem. The gradual change in conditions for the better, however, furnished a hopeful prospect for the near future.

TIME SCHEDULES

The president then called for the paper by L. L. Sloss, superintendent of transportation Des Moines City Railway, Des Moines, Ia., entitled "Arrangement of Schedules with a View to Providing Service During the Evening Peak." An abstract of this paper was published in these columns last week.

F. V. Skelley, assistant general superintendent Tri-

City Railway, Davenport, Ia., led the discussion of this paper. He stated that the preparation of schedules must be left largely to the public to meet traffic demands. They should be adjusted from time to time when complaints are received. Personal supervision is also necessary to obtain most economical operation. He stated that rush-hour schedules for Davenport called for thirty-six regular cars, and, depending upon the season, from eight to thirteen extra cars for a tripper service. In addition to the seasonal service, however, there were a number of special tripper runs to and from large manufacturing plants.

President Leussler remarked that his company operated twice as many cars during the rush hours as it did during the non-rush hours. In closing the discussion Mr. Sloss said that his company had found it difficult to operate rush-hour service to the best advantage owing to congestion in the business district. Rerouting of cars had relieved this somewhat. According to the present plan of operation all outbound cars do not turn back short of the end of the line, while inbound cars are turned back before they reach the congested business district. He had also found that where the schedules were subjected to numerous interruptions in a congested district trainmen became indifferent.

WELFARE OF EMPLOYEES

"Measures for the Welfare of Employees," the second paper on the program, was then read by Maurice A. Welsh, chief special agent Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia. An abstract of this paper appears in another column.

D. D. Bentzinger, superintendent and purchasing agent Burlington Railway & Light Company, Burlington, Ia., led the discussion. He said that he held meetings with his trainmen four times a year to get acquainted and obtain suggestions for improvements in equipment and operation. He had found that these meetings had resulted in his company's gaining the confidence of its men. This condition had also been further improved by the adoption of a policy of never being too busy to listen to employees' suggestions and complaints.

In response to an inquiry, Mr. Welsh stated that his company had a better proposition to offer its employees than was required by the State law. Although of greater scope, no unmerited claims had been received since the employees' organization had been perfected. He mentioned several specific instances in which relief had been given by the railroads which would not have been covered by the employers' liability act. Mr. Welsh advised that the policy of the directors was to relieve distress rather than to avoid paying for relief. In response to another inquiry, whether an employee could collect both from the association and under the State law, C. D. Cass, general manager Waterloo, Cedar Falls & Northern Railway, advised that the law provided that no other plan could be adopted which did not prescribe greater benefits. Such a plan of compensating employees for injuries and illness, however, must be approved by the industrial commission. Mr. Cass said his company had put its plan before the commission and stated that it provided greater benefits and therefore should have the approval of the commission and take precedence over the law. His company held that the dues of 50 cents a month were of no consequence to the employees, since

98 per cent of the funds of the association were paid out for sickness, therefore the company more than compensated its employees as provided by the law.

President Leussler stated that his company had carried its own employees' liability insurance for the past five years. The disbursements had averaged approximately 34 cents per \$100 of payroll, while the liability companies asked for from \$1 to \$1.25 per \$100 of payroll to assume the same responsibility. He said that the employees had an independent organization to which the company contributed annually. President Leussler recalled his company's experience when a tornado struck Omaha and injured several of the employees. He said that the men made up a fund which the management doubled, and the company tripled the original amount. With this fund the injured employees were reimbursed to the amount of 40 per cent of all their losses. In closing, he said that while his company does not maintain a pension system it does pay out some money for that purpose.

SAFETY WORK

Continuing with the program, F. K. George, director of safety United Light & Railways Company, Grand Rapids, Mich., read a paper on safety first. An abstract was published last week. Following the reading Mr. George said that the Tri-City Railway had brought the formation of its safety organization before the public by using the methods employed by A. D. B. Van Zandt, publicity manager of the Detroit United Railway, Detroit, Mich. Pamphlets were issued each week. The first edition of these appeared early in April, and 10,000 copies were printed. These were placed in boxes on the cars of one line, and they were all gone in three days. All cars have now been equipped with boxes for distributing these pamphlets, and 15,000 copies are printed in each edition. All pamphlets have been taken from the boxes at the end of the second day. The company had adopted this method of distributing information, not because the newspapers were unfair to the company but because information could be distributed which newspapers would not accept as news.

C. G. Anderson, assistant general manager Tri-City Railway & Light Company, opened the discussion of this paper with the statement that the companies were operating under two misapprehensions: First, the failure of the public to assume responsibility for its own safety, and second, that the entire burden was placed on the shoulders of the railway. Such a situation was inequitable, and legislative bodies should pass measures which would more equitably distribute the responsibility. Other points brought out in the discussion were that the automobile clubs were doing good work in regulating themselves in some localities. The St. Louis method was cited as an instance where the company invites the public to suggest safety slogans, which were published and credited to the author.

At this point President Leussler appointed a committee on nominations to fill the vacancy on the board of directors made by the expiration of the term of office of C. D. Cass.

RAILWAY CIRCUITS

The Friday session of this association opened with a paper by F. V. Skelley, assistant general superintendent Tri-City Railway & Light Company, Davenport, Ia., entitled "The Investigation and Care of Railway Circuits." This paper appears in abstract on page 794 of last week's issue. C. M. Feist, master mechanic Sioux City Service Company; E. H. Hagensick, superintendent electric lines Omaha & Council Bluffs Street Railway, and H. A. Mann, of the Goldschmidt-Thermit Company, took part in the discussion of this paper. Some stated that good results had been obtained with twin terminal

bonds, particularly when they were inspected frequently with a milli-voltmeter. It was also remarked that the method of connecting the jumpers to the rail, and particularly with the 500,000-circ. mil cable type, that the soldered connections were not good, and oxy-acetylene welded bonds had been tested and gave every indication of producing good results. Mr. Hagensick said that jumpers were being connected on the Omaha property by providing a graphite mold in which molten copper was poured to bond the cable to the rail. In response to an inquiry, Mr. Skelley said that his company kept a record of its bond tests in a standard engineer's field book. In this book the readings and the date they were taken were set down, and when bonding work was undertaken the book was turned over for the guidance of the foreman. Mr. Mann spoke of the advantages of the Goldschmidt-Thermit joint with particular reference to high return-circuit conductivity. In response to an inquiry from one of the members, he stated that he did not believe in welding special work because of the difficulties which might be entailed owing to the expansion and contraction of the rest of the track.

THE JITNEY BUS

Following this discussion, E. H. Hagensick, superintendent of electric lines Omaha & Council Bluffs Street Railway, read a paper entitled "The Jitney Bus," prepared by C. I. Palm, of the same company. This paper was published in abstract last week. The discussion of this paper was largely devoted to the unreliability and irresponsibility of the jitney. It was suggested that steps be taken to make people think of the economic problems relating to the transportation business. C. G. Anderson brought out this point and suggested that the public must be taught to think about the ultimate rather than the immediate needs of the community. He mentioned the fact that Des Moines had in preparation an ordinance which would require jitney-bus operators to file a \$10,000 indemnity bond. F. J. Hanlon emphasized the importance of advising the public what proportion the railway companies were paying for street pavements. He remarked that statistics from Cedar Rapids and Davenport showed that the street railways were spending for pavements approximately \$1,500 a year per car operated. Mr. George dwelt on the increased hazard of operation because the bus drivers generally persist in talking to the passengers. He also called attention to the moral side of jitney-bus operation, stating that it was such in most cities as not to make one want to trust women and children in them. He also cited an instance of a collision between a jitney bus and a street car in which several of the occupants of the bus were killed. In this case the owner of the bus was irresponsible, and the heirs of the occupants killed sued the railway company.

CLOSING BUSINESS AND ENTERTAINMENT

The election of officers, which occurred in the executive meeting following the regular program, resulted as follows: Charles Fahrney, general manager Ottumwa Railway & Light Company, was elected director to succeed C. D. Cass, whose term had expired. In accordance with past custom the 1914 officers were re-elected and are: President, R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, Omaha, Neb.; vice-president, Joseph F. Porter, president Tri-City Railway & Light Company, Davenport, Ia.; secretary and treasurer, H. E. Weeks, secretary, Tri-City Railway & Light Company, Davenport, Ia.

A joint entertainment program was arranged for the Iowa Street & Interurban Railway Association and the Iowa Section of the National Electric Light Association, both of which held conventions in Keokuk during

the same week. The entertainment program included a reception for the ladies, automobile trips, smokers and theater parties on Tuesday and Wednesday. On Thursday afternoon both associations made a boat trip from Keokuk to Burlington and return. More than 260 members made the 90-mile boat trip and were entertained with music and dancing en route and a dinner at Burlington.

WELFARE MEASURES FOR EMPLOYEES

BY MAURICE A. WELSH, CHIEF SPECIAL AGENT WATERLOO, CEDAR FALLS & NORTHERN RAILWAY, WATERLOO, IA.

During the last few years welfare work has attracted a great deal of attention of railway managers with the result that there are now in effect on various railway properties different arrangements whereby the employer and the employee have merged their interests for the welfare of each other. Some of the forms of welfare that have been used by the Waterloo, Cedar Falls & Northern Railway are described in detail herewith.

On Jan. 15, 1912, the company entered into an arrangement with the train service employees and formed what is now known as the Cedar Valley Road Relief Association. This association is maintained jointly by the company and the employees. The membership fee is 25 cents, and the monthly dues, 25 cents. The company contributes an amount equal to the monthly collection from the members and also gives to the general fund.

The affairs of the association are administered by five directors, three of whom are elected from the ranks of the trainmen, the other two being the general manager and the superintendent of the railway. The board of directors has entire charge of the business coming before the association and its action is final. The association has a permanent "sick committee," whose duty is to visit sick or injured employees and report to the board. The board may take any action that, in its judgment, is merited. The association pays sick benefits of \$9 per week for a period not to exceed thirty-six weeks and a benefit of \$100 in case of death, and also tries, in various other ways, to relieve distress not only with the employee himself but also in his home.

It is noteworthy that the weekly sick benefit of \$9 is in excess of the average benefit mentioned in the 1912 report of the A. E. R. A. committee on welfare of employees, and that the association will pay sick benefits for thirty-six weeks as compared to three or four months, as mentioned in this committee report. The by-laws also provide that when a member employee is absent from duty, by reason of having been quarantined, whether the quarantine is a result of the illness of the member himself, one of his household, or a person at his rooming place, the directors will treat the claim as a sick claim and allow \$9 per week during his absence from service.

The workmen's compensation act operative in Iowa includes only injuries. The terms of the relief association are greater than those provided by the compensation act, in that the association pays \$9 per week for sickness as well as accident, and the payments date from the day of sickness or injury when the disability extends over a period of one week. A review of the disbursements of the association shows that 98 per cent of the claims paid have been for sickness and 2 per cent for trivial accidents.

Since the State compensation act became effective, the Waterloo, Cedar Falls & Northern Railway elected to come within the provisions of the act. When there

is an injury to an employee who has been in the service but a short time, he is paid under the terms of the act. When the injured employee has been with the company for a long time and his service has been worthy, however, his case is handled specially and taken up with the management. In some cases full time has been allowed together with all doctor bills, etc. The compensation act contemplates that the employer will furnish free medical care for the first two weeks following the injury. The company has ignored this two weeks' clause and continues furnishing the medical aid and hospital care until the employee is ready to return to work. Some of the so-called welfare legislation passed by various legislatures, such as the semi-monthly pay-day, etc., must fade into insignificance when compared with the real things voluntarily undertaken by the companies.

This particular law does not interfere with the company, since it was about five years ahead of the legislature on this proposition. Years ago, the track men indicated that they preferred to be paid more frequently than monthly and arrangements were made to pay them weekly. The trainmen for the past several years have been paid semi-monthly.

The workmen's compensation act is beyond question a piece of advanced legislation, for it furnishes insulation between the injured employee and the damage-suit lawyer. The present act is faulty, however, in the arbitrary requirement that employers insure the risk, because it absolutely removes the employer from the employee in settling injury cases. Sometimes, it is true, the interests of all concerned are better served by requiring that the employer insure the risk, for if personal injury accidents occurred to employees of some "wild cat" industry without assets, the injured employee would have a difficult time in recovering damages. At the same time, there are substantial companies which would prefer dealing directly with the men.

The rates offered to railways by insurance companies are confiscatory and prohibitive. The terms of the compensation act provide that the injured employee receive 50 per cent of the wages with a maximum of \$10 per week. Compensation payments of no kind, however, begin until the fifteenth day after the injury, and they cover only injuries arising out of or sustained in the course of the employment. Some of the company's interurban motormen, however, work nine hours per day, and a great many of the accidents are such that the disability is less than two weeks' duration. In other words, the insurance companies would carry the risk of the trainmen at a prohibitive rate and would insure them only nine hours per day and with benefits of only \$10 per week, while the trainmen can go out into the open market and buy a policy that will insure them for twenty-four hours per day, with much greater benefits and at a rate considerably lower than that offered to the employer.

The annual convention of the Ohio Electric Railway Beneficial Association was held at Zanesville, on April 13. The following officers were elected for the ensuing year: Grand President, F. E. Tomlinson, Newark; grand first vice-president, C. C. Moul, Springfield; grand second vice-president, Henry Baker, Greenville; grand third vice-president, George T. Shirley, Dayton; grand secretary-treasurer, Arthur C. Starkey, Lima; sergeant-at-arms, E. G. Painter, Zanesville; grand chaplain, William Wheeler, Columbus. Chapters from six cities were represented. The next convention of the association will be held in Springfield, Ohio, in October of this year.

“Mixing” as an Asset of Public Utility Business

The Personal Entity in a Corporation Is the Dominating Influence with the Public

BY H. S. COOPER, SECRETARY SOUTHWESTERN GAS & ELECTRICAL ASSOCIATION

Notwithstanding the idea may not be pleasing to their pride of achievement, notoriety, and success in business, it is a fact that the larger public utilities and the holding and operating corporations are nearly always more dependent on the personnel of each local company for their best assets—and, consequently, for their final best profits—than they are on their own prestige in their communities.

The best three assets of a public utility are satisfied customers, a pleased public and contented employees, and the personal element of the local executive cuts a very large proportionate figure in obtaining and retaining all three. While quality of service—which includes the double trinity of safety, convenience and comfort to patrons, public and employees—is a prime requisite for obtaining the trinity of the assets, these are not the whole thing necessary—as has been proved in many cases.

It is a natural instinct of human nature to select, for its likes or dislikes, a distinct human personality out of any impersonal group, to embody the group into that personality and to pin its faith or its doubts to the individual. Very few of us conceive of any corporation or group as such. Nearly always there is a personal entity which has a dominant position and influence with us. This is especially true in commercial life and distinctly so in the matter of those impersonal artificial bodies known as corporations, and its truth is most manifestly shown in those corporations which not only touch us most closely in civic life but whose activities are virtually thrust upon us—the public utilities of water, light, heat, power and transportation.

While, in an impersonal way, the public may have full cognizance of the corporation itself or of the firm, corporation or syndicate controlling its operation, and while it may have its likes and dislikes, its bias towards or its animus against these impersonal groups, its feelings and actions will always be greatly modified by its attitude toward someone who represents to it the personal entity—and that someone is generally the local head or representative.

Except in the very largest cities—and even in some of these, as was instanced with the late Captain McCulloch—this is invariably the case. Many attempts have been made by large corporations and operating firms to prevent or neutralize this effect, but it either has been unavailing or has led to such adverse results that such courses had to be abandoned. Automaton managers have been installed whose every word and action were known to be originated by wires pulled from the home office, the acts of active managers have been discredited, the apparent personnel of the parent company, its names, its doings, its wealth, its success, its overpowering prestige in financial circles have been publicly and locally paraded and acclaimed, but the public—even while granting all this—persists in having a local personal entity to whom, and through whom, it may voice its approbation, complaint or censure and on whom it will place the credit of success or the burden of failure in the relations of the utility.

It is therefore wisdom on the part of any public utility corporation, or those operating such, to select as its chief local representative—executive or adminis-

trative—one who has such characteristics as will enable him to be, or become, a favored and favorable representative for it—in other words a “good mixer.” Now there is mixing and mixing. There may be on the one hand the exclusive type which concerns itself only with the high and mighty of the locality and, on the other hand, there may be the diffusive type that wastes itself on unimportant and useless general acquaintances of the Tom and Bill style. Neither of these is a perfect asset to the company although, as a rule, the latter is to be preferred to the former, especially in the smaller cities and towns. While all people, especially those immediately involved, deprecate pride or aloofness in such a local representative they also appreciate a certain amount of reserve in familiarity with everyone. In this matter tact is the vital item. To know everyone, to be cordial and interested in each one, to make an individual interest with each one, to avoid useless discussions, partisanship and cliques, to show to each that respect, that cordiality, that affability, that geniality, demanded and approved by them, is the highest type of tactfulness and is that demanded in the local representative.

The company must realize these facts and not only make this trait one of the necessary qualifications of its local representative but it must stand behind him officially and financially in enabling him to have the time and means to do this. Social obligations within reason are very often a part of this duty, as are those connected with membership in commercial, industrial and benevolent organizations, all of which take time and money.

It is not necessary that he be a “j’iner,” with every grip and password at his finger’s and tongue’s end and ready to take on any new responsibility suggested or offered, but in almost every city there are certain organizations, private, public, social and commercial, an active membership in which is often a strong factor in the popularity of the local representative and one which, if properly handled by him, will add greatly to the benefit of his company.

It is not only necessary that he be readily accessible to everyone when in his office—that part goes without saying. Formality, delay, red-tape in this matter are things of the past with a public utility representative, but he must also be accessible outside of it. The local representative who sees his fellow-townsmen only across his office desk is that much of a failure, and he who allows himself or his company so to load him with continual and continuous work or detail that confines him exclusively to that desk or to routine visits over the property is permitting his company to make a grave mistake to which he is a greater or lesser accessory.

Now, it is an acknowledged fact that “too much of a good thing is good for nothing.” Both the representative and the company must see to it that the part does not become greater than the whole. A manager should fit his public position as neatly as a fine cork in a smooth-necked bottle, but if it is desired at any time to change corks, it should not necessitate a corkscrew, nor should the fit be such, as in a tightly wedged ground-glass stopper, where it becomes needful to use heat to extract it!

A portion of the precaution necessary for the avoidance of such a condition lies with the company. Without dampening the loyal ardor of its representative it must still retain a reasonable surveillance of his efforts and results, must co-operate with him in that of which his more minute local knowledge and impressions make him the better judge and must guide or counsel or warn in those larger matters which may—or do—affect something beyond the local situation.

The other portion of the problem is a personal one with the local representative, if he forgets that he is only a representative and begins to act as if he were "the whole cheese"; if, instead of the corporational "we" he gets into the habit of the egotistical "I," then it is time for suggestion, guidance, criticism, or something stronger. If this state of mind comes from youth, inexperience or professional ardor, suggestion and guidance are all that are necessary. Many a potentially good manager and loyal representative has been spoiled and lost by the whip or a snaffle-bit and blinders, when all that was needed was a light touch on the reins. It is always as well for the company to be able to discern which is enthusiasm, zeal and ardor, and which is egotism, thoughtlessness or personal aggrandizement before they rigidly limit the local activities of their local representative.

For they must remember that, to the local denizen, his locality is the biggest thing on earth. The map of his country or state may cover a page of the atlas and his city be a mere flyspeck with its name in diamond type, but, in his thought and governing his feelings and actions, that little flyspeck expands until all the pages of the atlas will not contain it. And so it often happens that while the holding company that operates his little city's public utility may be a power among financial powers and that utility one of the least of its holdings, it is not wise for that reason for the company to consider itself the special providence of that community, nor to imagine that it can obtain impersonal loyalty and liking because of its fame or its size. It must have a personal representative, a locally resident human entity, to whom and through whom it can obtain its best local assets, those on which it can depend to prevent loss during times of stress, strain and trouble. Profit may be gross or net, but loss is always that which its figures denote and is always a debit against net profits. Therefore, that which will, in all probability, forefend loss is well worth cultivating, if only as a matter of probability—as insurance.

The time should be nearing when the above should be unnecessary to formulate, and the utilities, their owners and operators are getting more and more mindful of its truth, but there are many cases yet—when one travels over the country—where it is seen that the personal element of the local representative has been absolutely neglected in his appointment or hiring, or where it is so limited, conditioned and hampered as to be of no use.

Most private commercial concerns learned this lesson long since. Even when locally owned and operated they acknowledge its value by following its leadings, and to those public utilities whose ownership or oper-

ation is foreign, there is added incentive to follow such a course because the local feeling and bias are always in inverse ratio to the size of the company and the distance to its home office. The only antidote or palliative to such is a popular local representative and a tendency on the part of the company to obliterate itself as such as much as possible and localize its holdings, its interests and its management within that locality.

Chilled Capital

Some of the Causes for Capital Chilling Are Given—
Effect on Labor

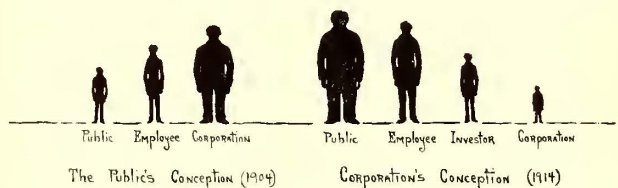
Under the above caption, used originally by Eugene L. Richards, superintendent of banks State of New York, in a recent address before the New York State Bankers' Association, S. H. Bennett, general auditor Hagerstown & Frederick Railway, has prepared a paper for the benefit of the men of his company. After



CHILLED CAPITAL—RIDE INCREASES, PURCHASING POWER DECREASES, BUT FARE REMAINS THE SAME

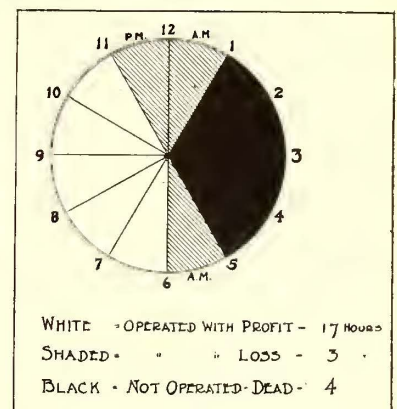
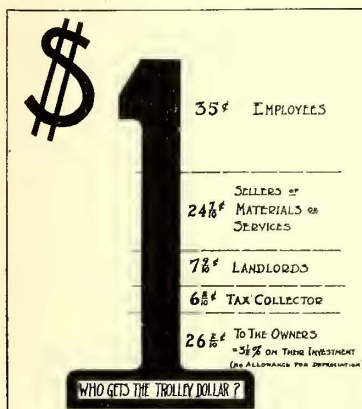
sketching the place of the electric railway in the economic fabric of the country he says: "The one great reason why growth has ceased is because undeserved attacks have cast a chill upon capital and 'when capital catches cold, labor freezes to death.'"

Mr. Bennett enumerates some of the causes of capital



CHILLED CAPITAL—FROM DIFFERENT VIEWPOINTS

chilling as follows: Unfair treatment of the utility by its partner, the public; the difficulty of securing the privilege of charging a reasonable rate of fare; the denial of the privileges of common carriers to electric railways in freight transportation, including that of



CHILLED CAPITAL—GRAPHICAL EXPLANATION FOR THE RELUCTANCE OF CAPITAL TO INVEST IN ELECTRIC RAILWAY SECURITIES

operating freight cars for 24 hours daily. He spoke a good word for the holding company which makes economical operation possible, and prescribed publicity as the remedy for present ills.

The self-explanatory illustrations on page 843 were used by Mr. Bennett in reinforcing his statements.

Recommendations of Engineers to New York Constitutional Convention

A committee of engineers representing national and local engineering associations has presented to the constitutional convention now in session at Albany suggestions and principles for consideration in connection with its work. The committee advises: (a) A short ballot, making possible close scrutiny of the qualifications of all candidates and concentrated responsibility of elected officers. (b) Tenure of office for all elected officials, for heads of departments, and for bureau heads, of sufficient duration to attract competent men and to permit them to become increasingly efficient in the discharge of their duties. (c) A continuing policy in the organization and control of all departments, so that appropriations may be spent most economically and work carried on most efficiently. (d) Selection of heads of departments by appointment instead of election by popular vote. (e) Ample opportunity for the proper development of natural resources. (f) Recognition of the value of technical advice through the inclusion of professional engineers in the membership of departments or courts where such advice is essential to the proper conduct of the work or adjudication of the matters involved.

Among other recommendations is one to the effect that "a department of public utilities should be created to be headed by five commissioners appointed by the governor, each to have a ten-year term of office so arranged that a vacancy will be created every two years. Commissioners should be eligible for reappointment. At least two commissioners should be professional engineers in good standing in the profession. Each appointee should have had experience in connection with public utilities which would fit him for the duties of the office. At least two and not more than three commissioners should be residents of New York City.

"This department should regulate and supervise all common carriers, all water supply, irrigation, drainage, gas, power, lighting, heating, intelligence-transmitting and other public utility corporations operating within the limits of New York State, including similar activities on the part of any other State department or political subdivision of the State. This department should be divided into such bureaus as may be essential. Each engineering bureau should be administered by a chief engineer selected with sole regard to his peculiar fitness for the office, and he should have power, subject to the approval of the commissioners, to select and appoint such division engineers as are essential to the proper conduct of his office."

Again it is urged that "in case provision be made in the constitution for the creation of one or more departments or commissions charged with responsibility for regulating, supervising, and inspecting buildings and the equipment thereof, trades, mines, industries or labor, each such department or commission should include in its membership at least one professional engineer in good standing in his profession. Commissioners should be appointed by the governor. Each appointee should have had experience and should possess qualifications fitting him to perform the duties essential to the department or commission."

COMMUNICATIONS

Automatic Registration of Fares

ROOKE AUTOMATIC REGISTER COMPANY

PROVIDENCE, R. I., April 26, 1915.

To the Editors:

In your issue of April 10 space is given to an "opening wedge" communication from V. L. Edmunds on the subject "Registration of Fares." Mr. Edmunds has invited "a fair and open discussion of this subject," and the inference is that the JOURNAL supports this invitation.

Mr. Edmunds seems to know intimately the chief factors, both animate and inanimate, bearing on this problem. He very correctly reaches the following conclusions: (a) that optional registration is "a continual temptation"; (b) that when inspection discloses irregularities under this optional registration system, the procedure of "warning" the conductor is ineffective; (c) that when legal convictions are sought in such cases the courts and juries refuse to convict.

The reason for the failure of legal action is that the system of optional registration fails to disclose the conductor's motive, dishonest intent or the fact of actual theft. In brief, the conductor gets the benefit not only of the "reasonable doubt" but also of all the other doubts universally known to attach to his enforced use of tools and methods which unfairly trust him while they also insidiously tempt him.

Mr. Edmunds makes certain recommendations, i.e., (1) that "concerted action be taken to place the stealing of nickels in the same class with other thefts"; and (2) that "state laws be framed prescribing definite methods of collecting fares and that legislators failing to pass such laws be made to understand that they have much to answer for." All this is suggested "if this temptation cannot be overcome in principle."

Mr. Edmunds has expressed no operating opinion. He has merely opened the subject and invited discussion. The writer suggests, however, that we forget our supposed need for new laws or legislative props, return to our operation and carefully consider the field for preventive rather than lock-the-barn-after methods.

The temptation to which Mr. Edmunds refers can be and is being overcome by a score or more of conservatively managed companies at the present time. Optional registration is unnecessary. A collecting-registering system is available which makes it impossible to "bunch" collections, to work substitution schemes between fare values, or deceive inspectors or passengers through the wrongful handling of cash once paid. This has been upheld by the highest state courts as being entirely reasonable, without hardship to the passenger and enforceable. Results where it has been used prove that it establishes a square deal for both the conductor and the company. The honest conductor is protected from unjust slurs and suspicions. The dishonest conductor can make absolutely no move of any kind to cover his dishonest intent. With substitution schemes and "bunching" rendered impossible and with each passenger knowing that his fare is properly audited as paid, the conductor who wishes to appropriate a dollar of the company's money is forced not only to sell out openly to twenty passengers but first actually induce these passengers to participate with him in the fraud. The proof of dishonest intent and actual theft is easily established legally, and explanations, excuses and guesses are eliminated.

The writer submits, therefore, that the remedy for conditions referred to in Mr. Edmunds' article rests with the management. In short, more carhouse and less court-house.

GEORGE F. ROOKE.

The Brass Band in the Safety Movement

BOSTON ELEVATED RAILWAY COMPANY

BOSTON, MASS., April 26, 1915.

To the Editors:

The "brass band" editorial, appearing in the issue of the *ELECTRIC RAILWAY JOURNAL* for April 3, was excellent. Our notion is, to carry out your simile, that after the band has passed the orderly and dignified procession should follow, the steady tramp of infantry, well disciplined, alive to orders and determined toward the accomplishment of whatever the purpose of the march may be.

In other words, after the attention of the public is attracted to the safety movement then a determined effort to accomplish the object of the movement should follow. We believe that the words "safety first" cannot be overworked. The continued sight of advertisements, repetition of popular songs of the day, etc., when one has no personal interest in them, become wearisome. Not so with "safety first." These words are similar to any words of warning that call attention to one's personal status and are not apt to be ignored. We use them whenever possible.

It has been the policy of our company, after a safety crusade had been initiated, to follow it up quietly and steadily as far as our ability and means will permit. Frequent communications are sent to the school authorities for the instruction of the children; regular meetings of the employees are held; carelessness on the part of teamsters is reported to their employers, and in a majority of cases the men are dealt with by the employers to better advantage than in a criminal prosecution, by bringing to the employers' personal attention the desirability of safe action on the part of their employees; regular printed and illustrated bulletins, received from a number of safety societies to which the company is a subscriber, are prominently posted for the information of the employees of the company, and those in charge of the employees, as foremen and superintendents, are regularly furnished with information concerning the accident reports of their departments or divisions. Whenever a justifiable text presents itself, paid advertisements are printed in the daily papers. Each accident to an employee that appears to have been preventable is called to the attention of the delinquent authority. Occasional interesting addresses to the employees concerning safe operation of cars are made by one experienced in such matters; and finally, in as orderly a manner as they can be cared for, safety matters receive attention on the way to and in the trenches after the last note of the band has died away.

M. C. BRUSH, Second Vice-President.

National Electrical Safety Code

THE AMERICAN RAILWAYS COMPANY

PHILADELPHIA, PA., April 27, 1915.

To the Editors:

You have published in recent issues an abstract of a statement by Dr. E. B. Rosa, chief physicist of the national bureau of standards and a digest of the proposed safety code which is being prepared by that bureau as applied to electric utilities. The writer has been following this matter rather closely since the issue of Circular No. 49 by the bureau last fall. This matter is one of exceedingly great importance to all utility operators and is worthy of their closest scrutiny.

In no sense do I wish to criticize the most excellent scientific work done by the bureau of standards, but it is done purely from the scientific standpoint and without regard to practicability; it has in mind large and expensive organizations such as are used in government work, and it has proposed rules which would im-

pose grave hardships upon the smaller companies. For example, one rule provides that where two or more men are employed on any job, there must be a foreman who shall be in charge and continuously on the ground. In reply to my objection to this, they suggested that one of the men might be foreman. Everyone who has had anything to do with the employment of labor knows that that man would at once demand increased pay, and it would open up a field of friction in the working force.

Another rule which is theoretically correct but practically, I believe, unnecessary in many cases, and which would certainly militate against good and continuous service, is that which would require the opening of switches when a line is found grounded by means of ground detectors. It does seem to me that it would be better, if the ground does not cause damage or excessive flow of current, to patrol the line immediately, allowing it to remain closed in order to maintain service until the ground can be removed.

These are merely instances showing the tendency of a number of rules. The bureau has, however, shown itself very amenable to reason and suggestion, and the last revision of the rules which came under my observation had been wonderfully bettered over those originally set forth in Circular No. 49.

I do feel that this is a matter in which the industry at large should take an interest and that they should get in touch with the bureau and express their views on the subject very frankly. Their criticism must, of course, be constructive and not merely destructive if it is to be worthy of attention. This is a matter which should be acted on promptly because the question has been pending now for many months, and it will be of little avail to criticize after it has once been authoritatively promulgated.

In this connection we must bear in mind that many of the states now have thoroughly organized departments of labor which are following closely the activities of the United States government and are being largely guided by the rulings of the various more or less scientific bureaus engaged in the investigation of matters affecting labor and business.

C. L. S. TINGLEY, Second Vice-President.

Value of Published Costs

THE W. K. PALMER COMPANY

CONSULTING, DESIGNING AND SUPERVISING ENGINEERS,

919 BALTIMORE AVENUE

KANSAS CITY, MO., April 21, 1915.

To the Editors:

The editorial in the issue of the *ELECTRICAL RAILWAY JOURNAL* for April 17 on "Publication of Cost Figures" has appealed to the writer, but possibly not in the manner that might be expected, and prompts the following observations.

It is believed that what is most needed by every engineer, and the same statement may be made with almost equal effect as to the operating man, is not greater display of published costs of other people but the acquiring of the ability first, and facility and habit secondly, of determining his own costs more systematically and more reliably, for his own particular conditions, and then interpreting these more significantly. This same great "bugaboo" that has been mentioned, of effect of local and varied conditions, instead of being terrifying and causing hesitation in the use of available data, too often is wholly ignored, and any figures put forth by anyone or any institution that may be looked upon as supposed authority are accepted with a degree of blindness which often is as amazing as it is distressing.

Costs, for purposes of present consideration, may be

classified as (a) costs of construction, and (b) costs of operation.

In the course of some years of engineering practice in which it has been the duty of the writer in many cases to review and criticise estimates, data and records of other engineers and institutions, he has become impressed with the general tendency and practice of relying with implicit confidence upon data and figures of others instead of developing by painstaking detail work probable costs for the conditions and requirements of the case in hand, if it is a matter of construction costs, or of analyzing operating conditions independently and fearlessly, if it is a case of studying probable or past operating results.

The persistent use of "average figures," from handbooks, accumulated data, reports of other constructions or properties and articles by current writers is the bane of the engineering practice and the fundamental cause of more disappointments, surprises, troubles and disasters, both constructional and operative, than any other one thing. Apparently the very nature of an "average" is forgotten. The probability of any given case in hand being just the "average" is exceedingly small. Neither can an isolated example be chosen and relied upon unless it is absolutely known that all conditions are the same, and to find such a case is unusual.

Referring to constructional costs, how frequently is a statement something like this found in an engineering estimate: "Take 58,750 cu. yd. at an average of 30 cents a yard," or "Assuming a total capacity of the power station at 3000 kw: 3000 kw at an average of \$60 per kw, etc."; or again "Figuring this line at an average cost of \$26,000 per mile complete, etc." Likewise, in estimating probable operating expenses, how common are such terms as these: "Assuming an average of 14.7 cents per car-mile for interurban roads for this territory we have, etc.," or "Assuming cost of power to be 1.2 cents per kw-hr. the expense for power will be, etc."

Such estimating is worse than useless. It is misleading and often ruinous. If such unit figures are to be used they should not be "assumed," but developed, determined and verified and their correctness and reliability set forth precedent to the estimating.

Similarly, in matters of determining operative earnings, what a great array of "conventional averages" there is, and arbitrary irrational standards, one characteristic illustration of which is the once prevalent notion that an interurban line to be good and worthy of financing must show a population that will "average" 1200 population per mile, figuring 3 miles on each side of the track. The simple fact seems to be ignored most generally and uniformly that there are two sides to every account and that the real test as to operating conditions is that the charges and credits of operation shall balance in favor of the business and therefore that a necessary high cost of operation may possibly be balanced satisfactorily by a more than average earning, or conversely that the lowest known operating expenses may not mean anything if the corresponding income is not commensurate.

The moral is for engineers and operators and all having to do with costs, first, in the matter of construction estimates, to go back to fundamental unit costs, verified by quotations and actual determinations for the certain conditions of the particular case, and develop therefrom itemized detailed estimates which will then be significant and express to the closest degree of accuracy possible the probable cost of a projected construction; and in the case of operating costs to analyze and compare these and set them down against the gross earnings in a way that will produce a financial statement expressive of the probable or past results, as the

case may be, for a given set of operating conditions.

Averages are interesting to figure and to have in hand, afford a general indication and are convenient for "off-hand" estimating of the most approximate character, but dangerous and wholly to be avoided when anything like accurate dependable results are required.

What is most needed is greater self-reliance, with painstaking detailed estimating and less dependence upon general data and the records of others, on the part of engineers and operating managements.

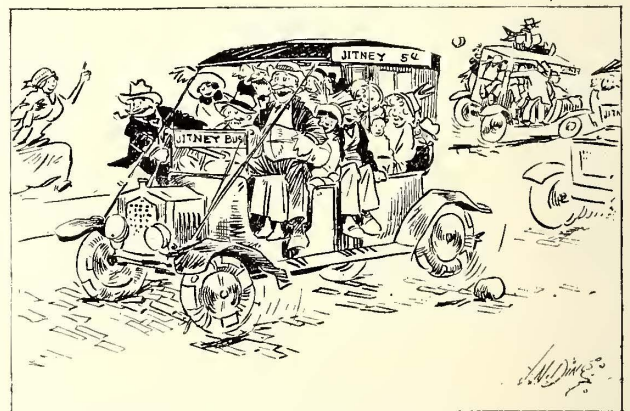
W. K. PALMER.

Jitney Cartoons

The jitney has been a favored subject of the newspaper cartoonist, and several sketches of this kind have been reproduced in this paper. Generally the idea conveyed has been the fear felt by railway managers of this new competitor. Sometimes, however, the cartoonist sees the other side and portrays the discomforts



We rave like mad if we have to stand up in a street car for four blocks—



But we will ride ten deep in a four-passenger jitney and compliment the driver on his service.

of the jitney as compared with the electric car. Such a sketch appeared recently in the *Des Moines Register and Leader* from the pen of J. N. Darling. A reproduction appears herewith. The views carry the general caption "What a Queer Lot We Are Anyway!"

More than one hundred students and instructors in mechanical and electrical engineering of the Ohio State University are to-day closing their annual inspection trip of a week's duration to points of technical interest. They visited Chicago, Milwaukee, Detroit and Gary, following in each an inspection program outlined in an interesting booklet published by the University.

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.)

Eliminating Frills to Reduce Paint Cost

BY A. P. LEWIS, SUPERINTENDENT POWER AND SHOPS CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY

Because the public did not appreciate its extraordinary refinements in painting cars, the Cleveland, Southwestern & Columbus Railway has decided to eliminate the frills and thereby has been able to make quite a saving. This new policy has been in practice for some time, and the absence of any adverse criticism has induced the company to make the change permanent.

The first step to reduce the cost of repainting cars was taken by eliminating the "piano finish." This was done because the mechanical department believed that it was its own severest critic; in other words, that the public did not appreciate the superior appearance of a car with several coats of varnish and a rubbed finish. Of course, the primary object of applying paint is to protect the wood and steel, but this can be done in a satisfactory manner without resorting to expensive rubbing. The repainting process now employed requires one coat of color surfacer after the body has been prepared to receive it, following which the surfacer is scraped off with a knife. The repainting process is then completed with two coats of varnish. The saving, compared with the painting process formerly used by this company, is 5 gal. of paint at \$1.50 per gal. and three days' work with three men at \$2.50 each.

Experience has shown that cars treated with the present process will give fifteen months' service, after which they are taken to the paint shop for revarnishing. If the condition of the paint on the car is watched carefully, it is possible to revarnish them twice before repainting is again necessary.

Slotting Commutators in the Motor Shell

BY J. G. KOPPEL, ELECTRICAL SUPERINTENDENT OF BRIDGES, SAULT STE. MARIE, MICH.

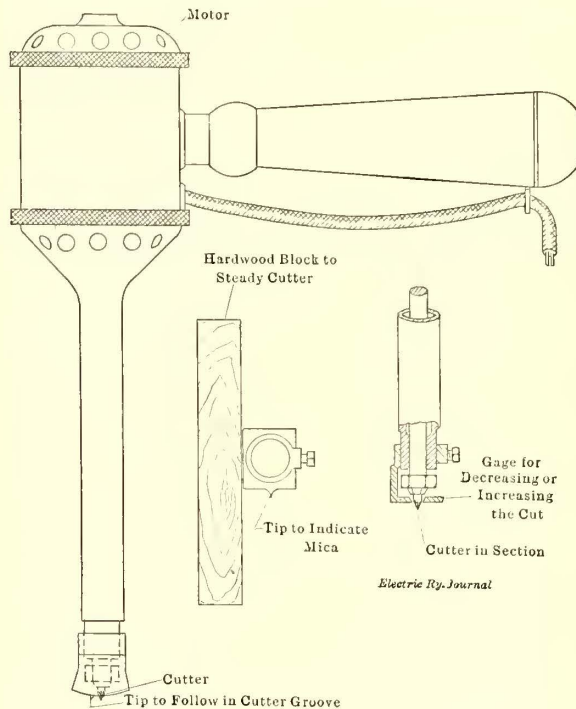
Several methods of undercutting or slotting mica are in use, but it is almost always necessary to remove the armature from the motor shell. For this reason, attention to the mica is often postponed until the bad condition of the commutator leads to burnt-out fields or armature coils, whereupon a costly general overhauling is necessary.

To overcome this trouble the writer has developed the device illustrated. At first he tried several kinds of scrapers but eventually the problem was solved by the use of a home-made motor of $\frac{1}{8}$ -hp capacity equipped with a suitable centrifugal cutter and a gage adjustable for different cuts.

The work is done as follows: A car with high mica commutator is brought in to a side post located about 8 ft. from the end wall of the shop. On this post a suitable eyebolt is installed for suspending a 5-ton chain fall. The car is secured to the chain fall and is pulled ahead a little at a time according to the progress made in the slotting of the commutator. The operator uses a short piece of hardwood block to guide the cutter along the mica grooves.

When the mica is undercut with this tool, we find that it is not absolutely necessary to sandpaper the commutator. The carbon brushes do the work of sandpaper, judging by the good appearance of the commutators when they come into the shop again.

I would not recommend that the average maintenance



PORTABLE COMMUTATOR SLOTTOR

man should undertake to build in his own shop a machine of the character described, unless he has the facilities for very accurate work. It takes much time and skill to make the little mechanism go just right. It would be desirable if some manufacturer were to make a device of this kind on a commercial basis.

Folding Box to Guard the Public Eye Against Welding

BY R. P. WILLIAMS, INSPECTOR OF SPECIAL WORK BROOKLYN RAPID TRANSIT SYSTEM

When the arc welder was first put into service, all that was thought necessary to save the eyes of the passer-by was a three-sided box 2 ft. 6 in. wide with 2 ft. sides; and although it was liberally covered with the notice "Do not watch the flame" some complaints were received of the injurious effects of the flame. These complaints led to a modification of the protecting box as herein described.

Fig. 1 is a front view of the box; Fig. 2 a rear view; Fig. 3 shows the front bevel flap unhooked and thrown back, this being the first move in knocking the box down for shipment; Fig. 4 shows the box completely collapsed and ready for shipment.

The front bevel flap serves two purposes: First, it

stiffens the box by making it sufficiently rigid to be handled by one of the helpers; second, it so confines the flame that a person in front cannot see it. The rear flap *A* shades the light from those at the back, and since this flap was added we have not heard of any complaints.

The anchor bar at the right of flap *A* is used only when the operator is working on an incline and pulls it to behind him. The box is made of wood, lined with asbestos to protect the sides from sparks. A metal box would be dangerous to the operator, for should the electrode touch the sides he might get a serious burn. Usually the operator rests the left arm on top of the

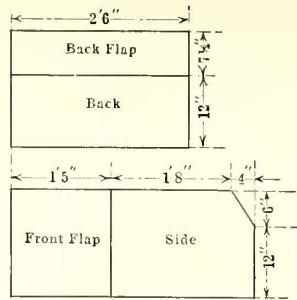
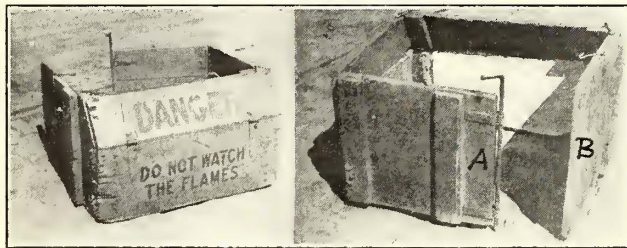
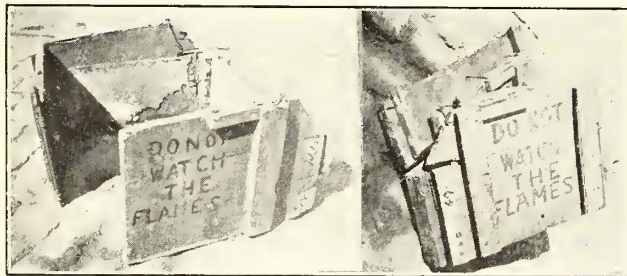


FIG. 5—BOX DIMENSIONS



FIGS. 1 AND 2—FRONT AND REAR OF BOX

flap *A*, the right arm being thrust through the opening between *A* and *B*. Thus the operator's body shuts out all light from the back. By resting the left arm, as



FIGS. 3 AND 4—FRONT BEVEL FLAP UNHOOKED; BOX COLLAPSED FOR SHIPMENT

already stated, he has always complete, steady control of the electrode.

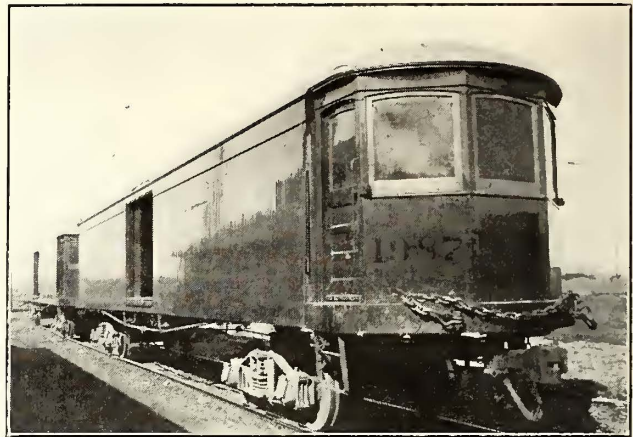
Fig. 5 gives full dimensions of the box. A little study will determine how to place the hinges to get the knockdown effect.

Locomotive and Trail Cars in Detroit United Freight Service

BY C. L. KELLER, ASSISTANT MASTER MECHANIC DETROIT (MICH.) UNITED RAILWAY

Although the Detroit United Railway is one of the heaviest package freight handling electric roads in this country, it has not until recently engaged in the transportation of bulk freight. A decision by the Railroad Commission of Michigan which was recently sustained by the United States Supreme Court, in which a physical connection was ordered between the tracks of the Detroit United Railway and the Michigan Central Railroad at Oxford, Mich., made the general handling of bulk freight possible. In order to equip itself for

switching and transporting steam railroad equipment, as well as for moving freight trains between Detroit and Flint, Mich., a distance of 67 miles, a 50-ton Westinghouse Baldwin electric locomotive has been purchased. Fifteen freight trail cars, comprising ten box cars and five express cars, were also purchased for this purpose. Views of one type of trail car and the 50-ton

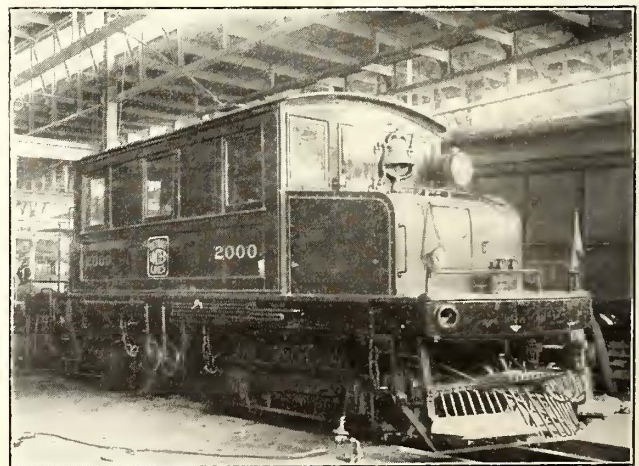


DETROIT UNITED RAILWAY EXPRESS TRAILER

electric locomotive are shown in the accompanying illustrations.

Owing to franchise restrictions in Detroit the locomotive may not enter the city, but freight is loaded into trail cars and delivered to yards just outside the city limits by means of motor express cars. During the day bulk freight loads are collected at this yard, where they are picked up early in the evening by the locomotive. The 67-mile run between Detroit and Flint is made in less than four hours, hence all freight delivered at the Detroit express terminal during the day reaches Flint the following morning. The locomotive is designed to draw a train of 250 tons over a track with sharp curves and heavy grades at a maximum speed of 22 m.p.h. on level track.

Essentially the locomotive consists of a steel underframe on which is mounted a cab, 16 ft. 6 in. in length,



DETROIT UNITED RAILWAY 50-TON FREIGHT LOCOMOTIVE FOR USE OUTSIDE CITY LIMITS

which contains the control apparatus. The underframe is 32 ft. 7 in. long over bumpers and 8 ft. 4 in. wide. This body is mounted on Baldwin trucks equipped with 33-in. rolled-steel wheels with A. E. R. A. treads and flanges. These trucks have a rigid wheelbase of 6 ft. 6 in., and with the 33-in. wheels are adaptable for a minimum radius curve of 35 ft. The distance center

to center of trucks is 16 ft., and the over-all wheelbase is 22 ft. 6 in. The locomotive is designed for double-end operation and is equipped with Tomlinson M. C. B. radial drawbars. Mounted on the trucks are four 301-D-6 Westinghouse motors with a nominal rating of 100 hp at 600 volts, 150 amp. These motors are of the tap-field type and are controlled by means of Westinghouse H. L. F. pneumatic control equipment.

Home-Made Saw for Tubing, Commutator Bars, Etc.

BY R. H. PARSONS, ELECTRICAL FOREMAN

A little device herewith illustrated will be found to be a decided time saver in a shop where it is necessary to cut much brass or copper bar or tubing at high speed. As this saw is not intended for heavy work, it can be run from belting at a speed of 1700 r.p.m., which will permit very fast production.

Fig. 1 shows an elevation of the saw. Its right side is used for making the slots for the leads of small com-

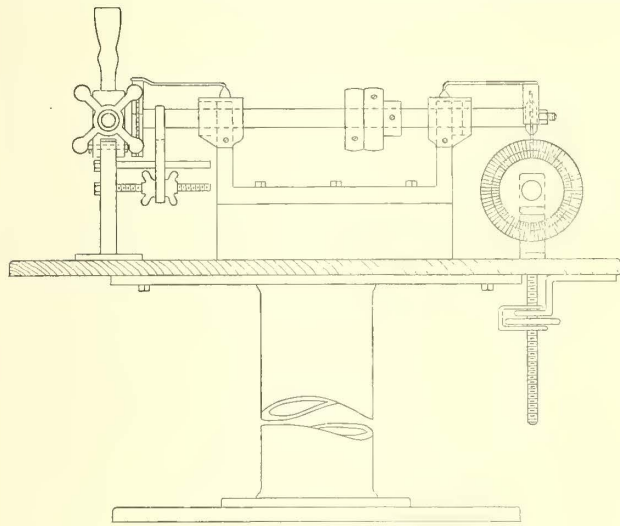


FIG. 1—ELEVATION OF SAWING TOOL

mutators, while the saw at the left side is used for tubing, etc. A piece of 6-in. pipe with a base and top constitute the frame on which the saw rests. Fig. 2, the top view of the saw, explains itself.

Fig. 3 shows an end view of the saw used for the

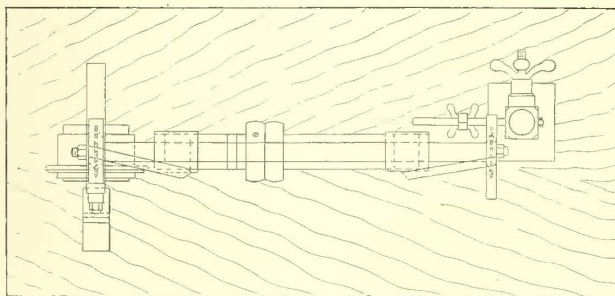
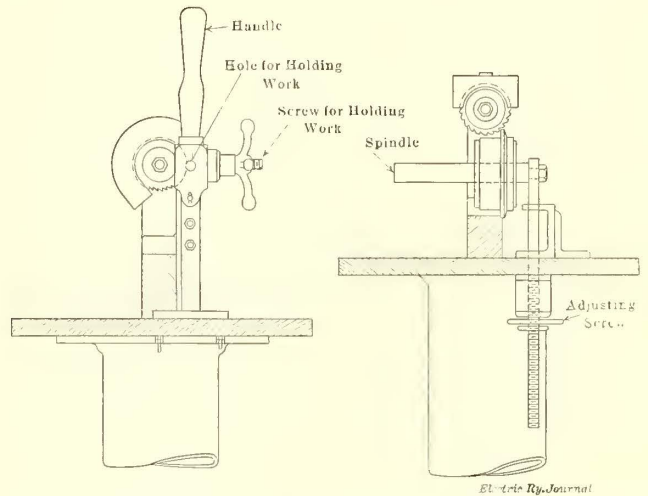


FIG. 2—TOP VIEW OF SAWING TOOL

commutators. It will be found good practice on commutators of small armatures, where the wire is fine and the slots for connections are small, to cut the lead (when stripping an armature) and then run a saw through the slot. This will save time, and prevent the ears of the commutator from being broken by tools in getting out the wires. The commutator, of course, is removed from the shaft and placed on a spindle of the machine,

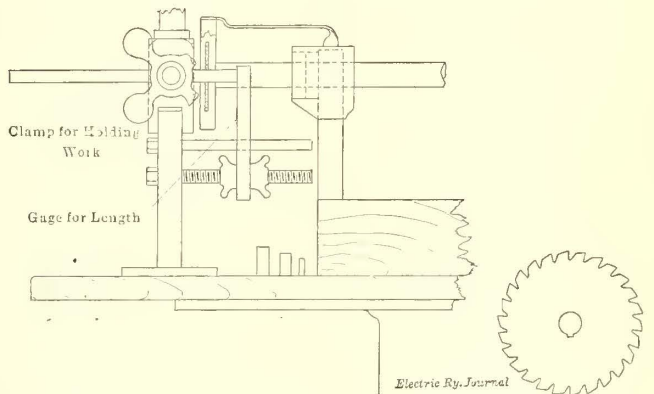
noted in Fig. 4. This spindle is in line with the saw and is adjustable for height so that the slot can be cut to any depth necessary.

Fig. 5 illustrates the end of the saw used for cutting tubing. The main feature here is the clamp which



FIGS. 3 AND 4—END ELEVATIONS OF SAWS FOR TUBING AND COMMUTATOR RESPECTIVELY

prevents the tubing from turning or moving. The tubing is placed through the hole until it strikes the length gage, where it is held by tightening the hand nut slightly. Then with the aid of the handle, the tubing can be moved against the saw and quickly cut.



FIGS. 5 AND 6—DETAIL OF CLAMP AND GAGE FOR TUBE SAWING; OUTLINE OF SAW

It is absolutely necessary that the proper saw be used. For that reason, Fig. 6 is presented to show an outline of the type of saw which will give the best results for such high speeds as 1700 r.p.m. The saw is 3 in. in diameter and $3/32$ in. thick, with a very slight set in the teeth.

Trial Trip on New Subway Line

Members of the Public Service Commission for the First District of New York, officers of the New York Municipal Railway Corporation, the Interborough Rapid Transit Company and many city officials and citizens made a test trip on April 2 on the Sea Beach railroad with the new subway cars to be operated under the dual system contracts by the Municipal Railway Corporation, New York.

George W. McNulty, Inc., had the contract for the reconstruction of this line and the work is now about 99 per cent completed.

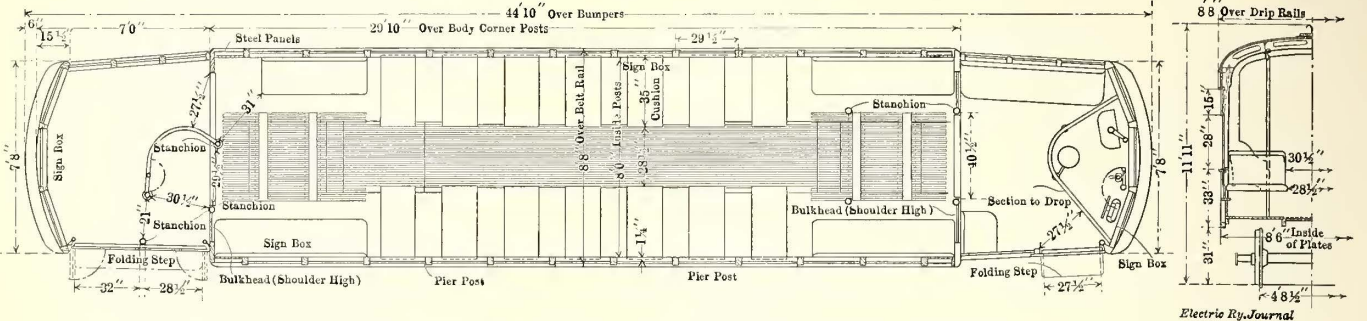
New Cars for Kansas City

The receivers of the Metropolitan Street Railway, Kansas City, Mo., have placed an order with the American Car Company, St. Louis, Mo., for fifty single-end, double-truck motor cars. These cars will be built according to specifications and designs prepared under the direction of William P. Woods and P. J. Kealy, representing respectively the city and the street railway

The car has a seating capacity of forty-eight and its estimated weight is 40,000 lb.

The general arrangement of the car will embody a large, roomy platform, wide aisle, wide seat cushions, safety treads set into the small ramps at the ends of the car body and stanchions in the forward end of the car.

The rear doors will fold out and the rear step will be folding, all operated by one lever. The front exit



KANSAS CITY CAR—GENERAL ARRANGEMENT OF SINGLE-END, DOUBLE-TRUCK MOTOR CAR

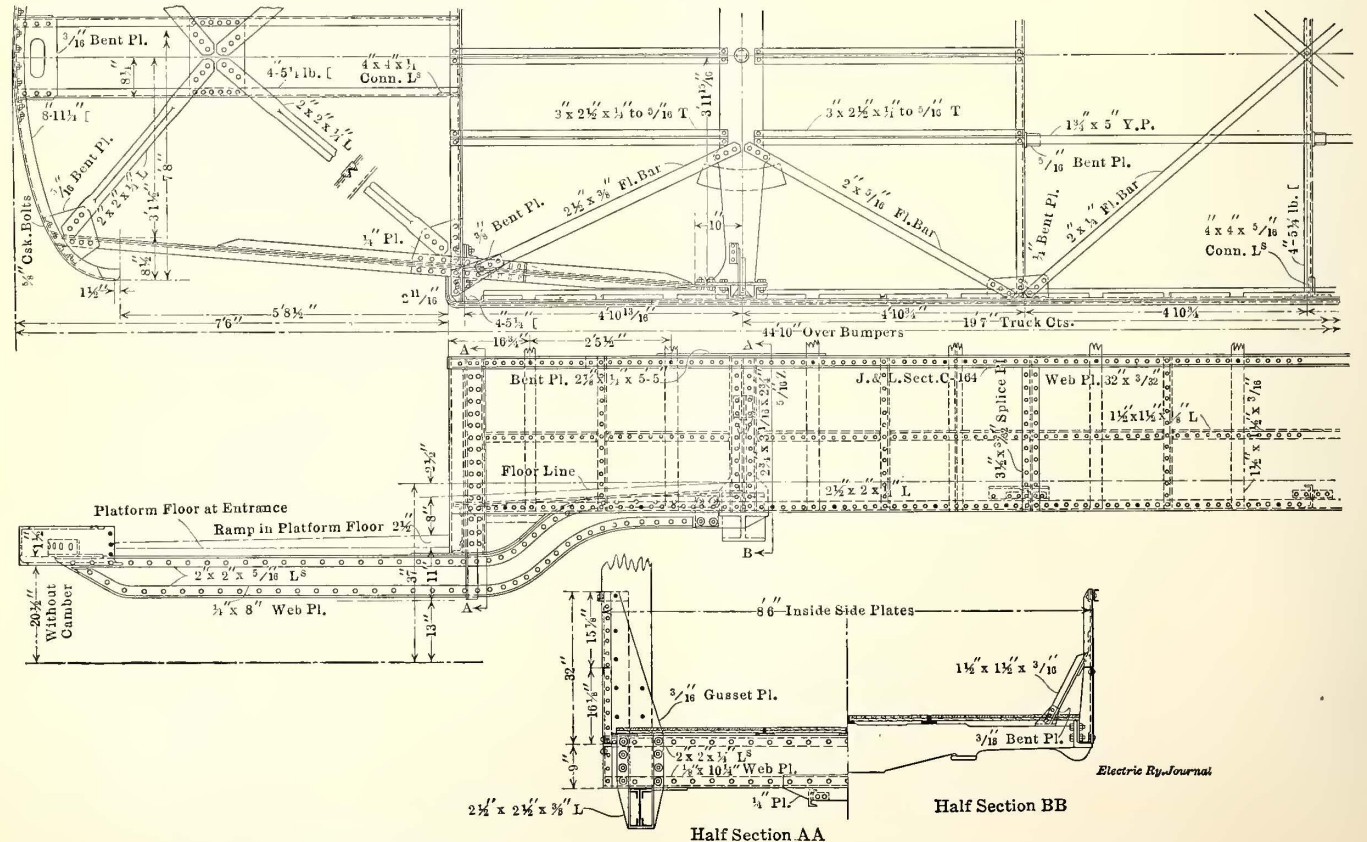
interests on the board of control. The new equipment will have the following general dimensions:

Length over body corner posts.....	29 ft. 10 in.
Length over bumpers.....	44 ft. 10 in.
Width over all at widest point.....	8 ft. 8 in.
Width of aisle.....	28 1/2 in.
Center to center of side posts.....	29 1/2 in.
Height from the top of the rail to the top of the trolley board.....	11 ft. 6 1/2 in.
Truck centers.....	19 ft. 7 in.
Diameter of wheels.....	30 in.
Wheelbase of truck.....	6 ft.
Truck gage.....	4 ft. 8 1/2 in.
Step heights:	
Rail to top of first step.....	13 in.
First step to platform floor.....	11 in.
Ramp in platform floor.....	2 1/2 in.
Platform floor to body floor.....	8 in.
Ramp in car-body floor.....	2 1/2 in.
Height of top of body floor above top of rail.....	37 in.
Entrance width in the clear.....	32 in.
Rear exit width in the clear.....	28 1/2 in.
Front exit width in the clear.....	27 1/2 in.

door is to be of sliding type with step folding up. Near the exit doors the passengers on the end seats are to be protected from drafts of cold air by a light-weight bulkhead of shoulder height.

To obtain quick loading, the rear doors are to be opened by one lever, and the hand rail on the rear platform will be shortened to give a space of 21 in. in the clear between the post dividing the entrance and exit doors and the hand rail. As the movement during rush hours is generally in one direction, the arrangement to permit the passengers to use both the rear doors at the same time will make it possible to use the rear platform space most effectively. There will be no grab handles on the exterior of the car, and as the steps are folding the car is practically "hitch proof."

The stanchions in the front end of the car are to be



KANSAS CITY CAR—STEEL UNDERFRAME FOR SINGLE-END, DOUBLE-TRUCK MOTOR CAR

set out from the seats approximately to the knee line, so that they will in no way compromise the use of the seats behind them.

The car is to be finished in cherry, and will have lower sash of brass, pressed-steel carlines, Agasote headlining, Honeycomb ventilators, sanitary enamel hand straps, aluminum stanchions and hand rails, Consolidated door signal and heaters, with Railway Utility Company's thermostat control. All cables are to be run in conduit. The bell cord will be concealed by running it through a light tubing inside the double ceiling.

The body of the car is to be equipped with fourteen lights in rows of seven on each side of the ceiling. The front platform is to have one light mounted on the hood ceiling, and the rear platform three lights in the ceiling. A light with special reflector will be placed on the outside of the car over the middle of the front exit, and a similar one over the rear step. At night the step lights will burn continuously. The front reflector will be provided with a green lens and the rear reflector with a ruby lens for markers.

Features of the underframe will be deep side plates, $3/32$ in. x 32 in., which are bent well around the corner posts, the large $3/16$ -in. vertical gusset plates between the side plates and the end sills; the platform knees which are straight in plan the entire distance from the bumper to the bolster, with improved knee hangers; the liberal cross-bracing in the platform and body underframe to take centrifugal and trailer strains. The 8-in. channel bumper will be attached with countersunk machine bolts and will be readily removable for straightening in case of accident.

The corner posts will be 10 in. wide across the car and will be firmly anchored in place by through bolts engaging the $3/16$ -in. gusset plates on the inside and the ends of the side plates, which are bent around the corner posts on the outside.

As the underframe is to be symmetrical about both center lines the car can be readily made double end at any time. At the bolsters the side plates are kept in a vertical position by angle-iron braces between the bolsters and the side-plate stiffeners. The hangers for the knees are to be made of $2\frac{1}{2}$ in. x $2\frac{1}{2}$ in. x $3/8$ -in. angles with the legs bent double on themselves under the knees. The hangers are to be attached to the built-up end sills by means of $5/8$ -in. drive fit bolts which engage not only the end sills but the $3/16$ -in. gusset plates, thus transmitting a large part of the stress directly to the side plates. The bolsters are to be of cast steel. The knees will be of a plate and angle built-up section.

On account of the racking of the roof of the car due to rapid acceleration and braking, and the severe grades existing in Kansas City, a special design of corner construction has been developed, the salient feature of which is the use of blind panels at the corners between the corner posts and the adjacent posts and extending from the belt rail to the letterboard. These are to be of sheet steel riveted directly to the side plates at the bottom and well anchored to the letterboard at the top. On their vertical edges they will have angles through-bolted to the posts. The racking of the roof will thus be transmitted directly to the side frames through the stiff steel panels, thereby permitting light side posts.

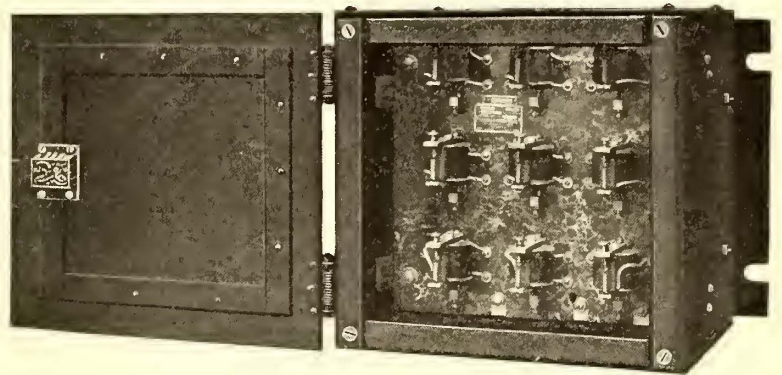
APPARATUS

The cars are to be operated single-end with K-type controller and four GE-247 ventilated, inside-hung motors. Straight air brakes with the emergency feature will be installed and a conductor's valve will be mounted

under the rear platform with suitable foot-operating plunger. This plunger, while accessible to the conductor, will not be in a position where it could be operated accidentally by a passenger. The trucks will be of the Brill 77-E type, with a graduated spring arrangement to give good riding qualities at all loads.

Regulator for Car-Lighting Circuits

Experiments have been carried on for the past two years on the Milwaukee Northern Railway, between Milwaukee and Sheboygan, to develop a regulator to keep a practically constant voltage on the car-lighting circuit, irrespective of the fluctuations in voltage in the trolley circuit and so secure good car illumination. It was found during these experiments that with a fluctuation in voltage not exceeding 7 per cent in the car-lighting circuit essentially uniform illumination could



VOLTAGE REGULATOR FOR CAR-LIGHTING CIRCUITS

be had if tungsten lamps are used, and a regulator to comply with these conditions has been developed by the Thomas S. Watson Company of Milwaukee.

As first arranged, the regulator took care of four lamp circuits in multiple, the regulator being arranged so as to take care of a range of from 450 to 650 volts. With this plan, however, as the headlight was in series with the lamps in the car, if one or more circuits went out, the headlight became dimmed so much as to be unsatisfactory. It was decided, therefore, to adopt a regulator of the constant current type, putting

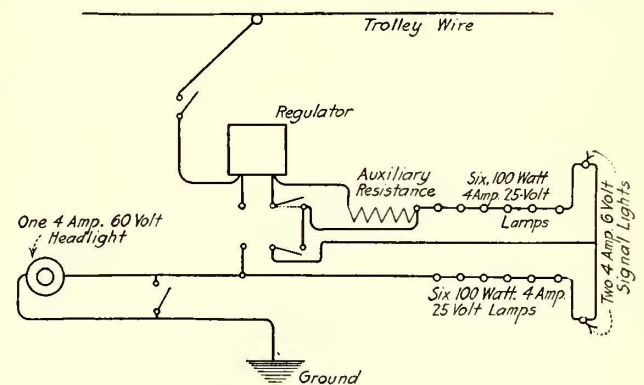


DIAGRAM OF CAR-LIGHTING CIRCUITS

all of the lights in the car and the headlight in series. This allows the use of low-voltage lamps in the car and a low-voltage headlight, all of which are desirable.

With this arrangement, ordinary street series sockets with short-circuiting disks are used to take care of the condition in case one lamp or more should burn out. In addition a third wire is run from the center of the

circuit, and single-pole double-throw switches are installed so that either half of the circuit can be short-circuited. With this arrangement, the conductor or motorman can quickly cut out the section containing the burnt-out lamp and keep one-half of the car lighting and the headlight in operation. The burnt-out lamp can then be replaced and switches opened, and all lamps are then in operation again. If a lamp is not available, a short-circuited plug can be placed in the socket of the burnt-out lamp and the rest of the lights can then be used.

One of the accompanying views shows the general construction of the Watson car-lighting regulator, which consists of series-resistance coils and relays to vary the number of coils in circuit. The number of relays varies with the desired voltage range. The coils are all in series with the lamps and no fine wires or shunt coils are used. The first diagram shows the connections with twelve 100-watt, 25-volt lamps in series, with two 4-amp, 6-volt signal lights and one 4-amp, 60-volt headlight, making the maximum voltage across the lighting terminals 372

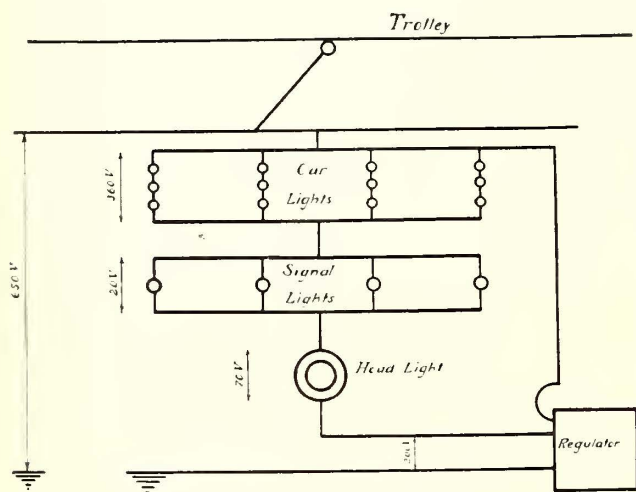


DIAGRAM OF MULTIPLE ARRANGEMENT OF LAMPS

volts. With this arrangement the voltage can vary from less than 350 to as high as 650 volts, without any noticeable effect on the lighting. It is possible, however, to make other arrangements with the lighting and regulator, with either higher or lower voltage. The diagram on this page shows the optional arrangement with the lamps in multiple.

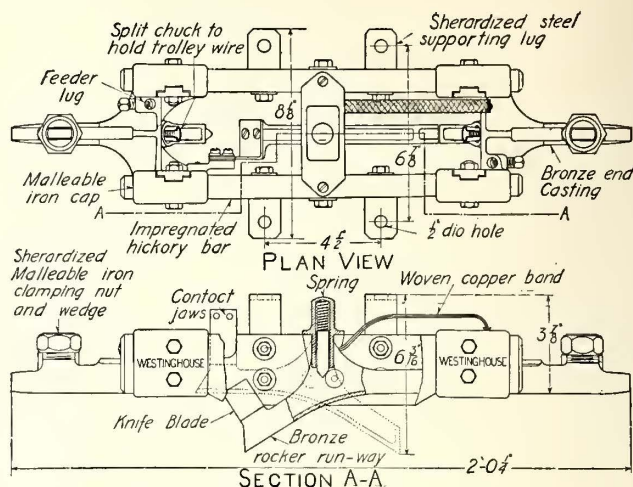
This type of regulator has been in service for over a year without renewal of any of the parts, except the contacts, which are the only parts that wear, but the cost of their renewal is slight.

Automatic Section Insulator

The automatic section insulator of the Westinghouse Electric & Manufacturing Company is inserted in trolley wires where it is desirable to energize a section when the trolley passes onto it and to de-energize it when the trolley passes off. It is used extensively in mining installations where a branch is to be energized only when the locomotive is on that branch. Leakage losses and dangers of contact by persons passing under the trolley wire are thereby averted when the locomotive is not on the branch. Electric railways sometimes use such insulators in the same way.

As illustrated, the circuit is opened and closed by a switch blade mounted on a rocker that the trolley operates. In one position the blade connects with copper contactors. In the other there is no connection.

A brass plunger pressing against a steel roller gives a position centering action and prevents the rocker from remaining in an intermediate position. There is no arcing at the switch contact, because the rocker is al-



AUTOMATIC SECTION INSULATOR

ways energized and the switch connection is always opened or closed while the trolley wheel is on the rocker.

Side bars of impregnated hickory take the stress. All metal parts are either sherardized or of bronze. Wedges are used to hold the trolley wire and an internally threaded chuck, like that used in the Westinghouse Cleveland splicer, supplements these. A flexible woven-copper bond carries current to the switch blade on the rocker.

Recording Speed Indicator for Railway Trains

An electric tachometer outfit has been prepared by the Holtzer-Cabot Electric Company, Brookline, Mass., for determining the speed of a railway train, or, with changes in equipment, to record permanently the different speeds of a train and the time the speed was recorded.

The outfit consists of a small, specially constructed magneto generator and an indicating device, which is essentially a voltmeter calibrated to indicate the speed of any revolving mechanism in miles per hour. The speed indicator may be placed at any desired distance from the revolving mechanism, and the voltmeter may be of the switchboard type, mounted on a switchboard, or it may be a portable instrument. If desired a recording meter can be furnished.

In cases of railway accidents traceable to non-conformity to time schedule this combination of voltmeter generator and recording meter dispels all doubt as to the actual train speed at the time the accident occurred, because it gives a permanent record of the speeds, stops and delays, and the time of each, during an entire run. When used for this purpose the generator is mounted on the trucks of a car, equipped with a "V"-grooved pulley and driven by a steel spring belt from a "V"-grooved pulley on the axle of the car. The generator is connected by conducting wires to the indicating or recording meter which is mounted on the wall of the car.

The meter is of extra high resistance, with an auxiliary resistance which permits adjustment of the instrument after it is installed and from time to time to meet actual working conditions.

LONDON LETTER

(From Our Regular Correspondent)

The negotiations for the purchase of the tramway system of the Bristol Tramways by the Bristol Corporation have been abandoned. The proposal of the Parliamentary bills committee to oppose the tramway company's bill has therefore been approved without debate. The company is asking Parliament to revive and extend the period of certain rights conferred by earlier statutes, which, not having yet been exercised, would necessarily expire. These lapsing powers would authorize the company to extend the system on the outskirts of Bristol, and the corporation act would oblige the city, if it buys any part of the undertaking, to purchase the whole.

Edinburgh Corporation proposed in the provisional order promoted this year to extend the existing line from the terminus at Craiglockhart to Bedford Barracks, thus affording a short and direct route into the city. Unfortunately the Parliamentary commissioners have refused to sanction this scheme except upon conditions which the corporation feels itself unable to accept. The alternative is the project of the Colinton Tramway, which some time ago obtained Parliamentary powers to construct a passenger line from Slateford to the barracks along the rail track used for the conveyance of building material and stores during the construction of the barracks. As the Colinton Company was first in the field, the Parliamentary commissioners evidently thought that the corporation was not entitled to succeed unless it took over the company's property and interests at a valuation of £9,000, and fulfilled certain obligations in the company's contract with the War Office. The corporation has decided that the conditions do not warrant it proceeding with its plans.

A sub-committee of the tramway committee of Edinburgh Town Council is considering a proposal to experiment with self-propelled cars over the tramway routes in the city. It has been agreed to recommend that a new car be acquired and that a cable car be converted to self-propelled mechanism for experimental purposes.

The Glasgow Corporation tramways department is experimenting with women conductors. Two women conductors made their appearance recently on the Dumbreck and University route, and continued on duty throughout the usual period. They were dressed in a neat navy blue jacket and skirt uniform, and yachtman's cap, with yellow braid. The route between the Hillhead and University district and the suburbs of Pollokshields and Dumbreck is one particularly suitable for the employment of women. James Dalrymple, manager of the tramways, said that the question of employing women was forced upon the department by the large drain on the staff through the war. At present the department is about 300 short of its complement. A short time ago the tramways committee asked Mr. Dalrymple to report on the practicability of working with women conductors. As he did not know any place, in Scotland at least, where women conductors were employed, he decided to experiment on his own account. He accordingly arranged with two women members of his staff to take duty for a week, supplied them with what he thought was a suitable uniform, and asked them to let him know how they got on. It is now reported that the employment of women as conductors on the tramway cars running between the University and Dumbreck has proved so satisfactory that women will be used on a route where the traffic is more varied and where many passengers are handled at the meal hours.

The use of Edison electric battery vans in London is increasing. The Edison Accumulator Company, London, has provided four of these omnibuses to the York Corporation, the last of which has just been put into service. When these vehicles were completed they were sent down to York by road, a distance of about 230 miles. An average speed of 9 m.p.h. was maintained throughout the journey. The omnibuses are single-deck vehicles, and each seats twenty-two passengers. One motor is used, and the transmission to the driving wheels is by chains. The battery consists of sixty-four Edison cells with a capacity of 300 amp-hr. and a working pressure of about 65 volts.

At a meeting of the Hull Corporation tramways commit-

tee, the Lord Mayor foreshadowed a reduction in the tram service consequent upon increased expenditure and shortage of men through drivers and conductors enlisting. Owing to war bonuses wages were up £6,000, coal would cost about £2,000 more, and there were other increases. Employees were still enlisting. The committee said that it might be necessary to reduce the service.

The electric tramway line from Colwyn Bay to old Colwyn is now completed and fully equipped, and all the contractors' plant has been removed. The road-widening work, which was necessary to accommodate the tramway traffic with the ordinary traffic of the Abergelge Road, is not yet finished in some places, but is being pressed forward. The extension is nearly 2 miles in length, and will serve a considerable population on the route, as well as the residential and industrial population at Old Colwyn and Llysfaen.

An effort is being made to get the treasury to remove its interdict against capital expenditure by municipalities so far as to allow the Manchester Corporation to proceed with the erection of the new electricity generating station at Barton. As the scheme was planned, the first portion of the works, which will cost £135,350, was to have been completed by March, 1916. The electricity committee contends that it is in the public interest that the work should proceed. The committee has been encouraged by the central executive committee of the Employers' Parliamentary Association, which expressed the opinion that "permission should be accorded to the Manchester Corporation, and other corporations similarly situated, by His Majesty's treasury to raise fresh loans for the purpose of the extension of any electricity undertakings, as any refusal to secure permission would hamper, to a very considerable extent, those firms engaged on government contracts which are dependent upon the corporation for their supplies of motive power."

The Metropolitan Electric Tramways and the London United Tramways, both of which are closely associated in the London & Suburban Traction Company, have the same unwelcome tale to tell of reduced traffic owing to the war. In the case of the United company this reduction amounted to £11,658, and in that of the Metropolitan company to £8,510. Owing to the number of employees who as reservists were recalled to the colors, it was found necessary to reduce both services, and further reductions were due to subsequent enlistments. As a result, the Metropolitan company pays an ordinary dividend of 2 per cent, as against 3 per cent, and the United one-half of 1 per cent on its preference shares, as against 1 per cent. Additional shares in both companies have been acquired by the London & Suburban Traction Company, the fortunes of which have also been affected by the war, for it finds itself unable to add anything to the interim dividend at the rate of 1 per cent per annum declared for the first half of the year. Even this is better than the result for 1913, when only the preference dividend was paid.

The congestion of traffic during the busy hours of the day on the London tramways appears to be getting worse. While this may be partly due to the natural growth of the business, it is very largely caused by the decrease which is evidently still going on in the number of motor omnibuses on the streets. The tramway traffic receipts now show increases of from £4,000 to £5,000 a week, as compared with the corresponding weeks of last year. The delivery of a large number of trail cars which the County Council has had on order for a considerable time is shortly to begin. These will be coupled to the electric motor cars which run on the main southern routes, and will serve to reduce the congestion.

The treasury has not yet replied to a letter from the London County Council asking for guidance on the subject of restricting capital expenditure by local authorities during the war, but letters from the department dealing with specific proposals throw light upon the attitude of the government. The treasury has intimated that it cannot, as at present advised, approve Clause 25 of the London County Council bill, which authorizes capital expenditure of £271,900 for tramway purposes. It urges that, as far as possible, all new capital expenditure should be postponed, and that works in progress should be slowed down unless special circumstances exist.

A. C. S.

News of Electric Railways

BAY STATE ARBITRATION

Evidence in Wage Arbitration Case at Boston Concluded on April 23

The presentation of evidence in the Bay State Street Railway wages arbitration case was completed at Boston, Mass., on April 23. Adjournment was taken until May 17 at Ford Hall, Boston, when final arguments will be made by counsel. The hearings began on Dec. 17, 1914, and have covered sixty days of sessions. The record consists of 6146 pages of testimony and 424 exhibits.

In the later hearings P. L. Saltonstall, of the firm of Tucker, Anthony & Company, Boston, a member of the executive committee of the Bay State company, was questioned at considerable length. The witness described the consolidation of the thirty-six street railways comprising the Bay State system and controlled by the Massachusetts Electric Companies as a voluntary association. He stated that the promoters of the enterprise originally expected that these properties would normally show a 5 per cent yearly increase in gross earnings, but in very few years have the results come up to expectations. Operating expenses have increased at a disappointing rate. Each member of the executive committee of the Bay State company receives \$1,000 per year. The president of the Massachusetts companies receives \$4,000 per year, and practically no other official of the holding company receives more than a nominal compensation for his services. Mr. Saltonstall said that in his opinion the Bay State company cannot grant any increase in wages without curtailing its service and reducing its dividends. The witness said that there has never been a dollar of inflation in the Bay State company's securities. A large percentage of the acquired companies would have gone into the hands of a receiver had there been no consolidation, which insured efficient management, good credit and financial economy. The total expenses of the holding company do not exceed \$25,000 per year, and this money comes from dividends on the Bay State stock.

Robert S. Goff, vice-president and general manager of the Bay State company, said that the road was organized on a departmental rather than on an independent divisional basis. This arrangement is believed to be the most economical possible. All reports come to one common center where are department heads who are experts in their lines. Their services are at the disposal of any locality. Formerly the company did not enjoy the uniformity of practice now maintained. Standardization has been effected on a broad scale by departmental organization. Mr. Goff stated that the permanent investment of the company has increased from \$8,000,000 in 1900 to \$48,000,000 in 1914, the respective investments per mile of track being \$36,600 and \$49,400. The average permanent investment per mile of track for fifty-two Massachusetts companies, excluding the Boston Elevated Railway, is about \$50,500. If the normal 5 per cent growth in receipts had been experienced by the company since 1903 the passenger revenue would have been greater in 1914 by \$1,165,000 notwithstanding an increase of 121 miles (14 per cent) in the trackage. Mr. Goff attributed the falling off in the rate of increase largely to adverse business conditions, and said that the jitney bus is making inroads, at least temporarily, in the revenue in Brockton and Fall River. The net income prospects for ten months of the fiscal year 1915 indicate that there will be a total drop of \$154,000 compared with a year ago. Of this decrease \$80,000 is due to an arbitrary order of the Interstate Commerce Commission requiring the company to set aside a depreciation fund hitherto not carried as such. Hence the company ought to reduce the wages of its employees to the 1912 basis in order to come out even. President P. F. Sullivan also testified that the wages ought to be reduced to at least the 1912 basis rather than increased, in a brief examination.

Mr. Goff also said that in 1914 the company expended 17.63 per cent of its revenue in maintenance, although the Massachusetts Public Service Commission has stated that some well-managed roads in other cities reach 20 per cent. The latter figure should at least be attained, in the speaker's

opinion. Wages of motormen and conductors represent 21.9 per cent of the total revenue on the Bay State, compared with 21.7 per cent in all Massachusetts, 19.98 per cent in New England and 18.35 per cent in the United States. Mr. Goff then referred appreciatively to the profit-sharing plan in force at Philadelphia as described by T. E. Mitten before the Federal Trade Commission, and suggested its feasibility of application on the Bay State system as a solution of the wages problem. The Philadelphia company carries about 23 per cent spare men, compared with a range of from 19 per cent in Nashua, N. H., to 98 per cent in Fall River, Mass., on the Bay State system. The witness questioned the justice of uniform wages throughout all operating divisions.

BILLS IN ILLINOIS

A number of bills affecting interurbans or street railways are pending in the Illinois General Assembly. Of interest to the interurbans especially is the effort of the steam railroads to secure a maximum passenger fare rate of 2½ cents a mile instead of 2 cents as now charged. The bill has had a hearing in the House committee on public utilities and is expected to be reported out within the next few days. The interurban lines also are interested in the so-called home rule bills providing for the amendment of the public utilities act in such a way as to give Chicago control of its own utilities through a local commission. All utilities in the State at present are governed by a central State commission. Other bills of interest to electric railways follow:

House Bill No. 55 (Ryan) limiting the hours of employment of motormen, conductors, gripmen, guards and other trainmen to ten hours within twelve consecutive hours during any one day except in cases of extraordinary emergency; pending before the committee on public utilities.

House Bill No. 114 (Walsh) requiring street railways and elevated railways to provide motor cars with devices or mechanical means to clean sleet, rain or snow from motor-man's windows; pending before the committee on public utilities.

Senate Bill No. 144 (Roos) prohibiting any unauthorized person except employees of the railroad, station agents, section foremen, etc., from walking, riding or driving upon or along the tracks of any railroad company in the State at any other place than a public or private crossing; pending in committee on railroads.

House Bill No. 25 (Dudgeon) providing that all railroad time-tables must be published in newspapers in cities, villages and incorporated towns of less than 100,000 inhabitants, rates to be fixed by the State Public Utilities commission; pending in the committee on public utilities.

Senate Bill No. 109 (Bailey) and House Bill No. 80 (Merritt) permitting the exchange of newspaper advertising for transportation; pending before the Senate on first reading and also before the House, with favorable recommendations by committees.

House Bill No. 126 (Burns) providing that where any street railway operates lines in any city, town or village under ordinances or grants, the consent of the city may be granted for the construction of mileage on extension or additional lines without a petition of the street railway, provided that the city shall give at least ten days' public notice of its intention to require such construction, the company to pay all damages to owners of property; pending in the public utilities committee.

House Bill No. 78 (Merritt) making it unlawful for any person driving a motor vehicle to cross railroad tracks without first stopping within 50 ft. of the tracks; pending before the committee on roads and bridges.

House Bill No. 553 (Quisenberry) empowering county commissioners of highways to authorize and permit the construction of pole lines and conduits for the transmission of electricity for lighting and power purposes along, upon and across public highways and public and private roads, and legalizes such transmission heretofore given; pending before the public utilities committee.

IMPROVEMENTS AT CEDAR RAPIDS

The Iowa Railway & Light Company, Cedar Rapids, Ia., which has been mentioned as having purchased new boilers and ash-handling equipment, has ordered two Edgemore boilers and Taylor stokers for its Cedar Rapids plant. A contract has also been let to the General Concrete Construction Company, Chicago, Ill., for a 210-ft. concrete stack for the same plant. The railway also plans to operate its 45-mile interurban line at 1200 volts direct current. The new line between Cedar Rapids and Mt. Vernon was built for this voltage and the Cedar Rapids-Iowa City line is being rapidly rebuilt with this end in view. It is planned to complete construction work so that 1200-volt operation may be started early in 1916. The new car equipments designed for the higher voltage were purchased in 1914.

The company has completed a 17-mile 33,000-volt transmission line between Indiantown and Gladsbrook and has taken over the lighting and power contract in the latter place. A 23-mile, 33,000-volt, high-tension line built on Franklin tripod steel poles, has also been completed recently between Perry and Grand Junction, Ia. An 8-mile extension of this line to Paton, Ia., is contemplated. Track and overhead reconstruction scheduled for this year by the Iowa Railway & Light Company includes 1½ miles in Marshalltown, Ia., and three-quarters of a mile in Tama and Toledo, Ia.

OHIO LEGISLATION

Having reconsidered the Ott bill on April 21, it was immediately put to vote in the Senate and defeated. This bill provided for eleven consecutive hours of rest in every twenty-four for motormen and conductors and limited the hours of labor to ten.

The Myers bill, enabling steam and electric roads to join in the construction of union depots and terminals, was passed by the House on April 21 and sent to Governor Willis for his signature.

The Behne bill was recommended for passage on the same day by the public utilities committee of the House. It makes the issue of bonds for the purchase or construction of utility plants subject to a vote of the electors in case they are to be made a lien on the general credit of the municipality. Where issued on a vote of Council they are a lien only on the utility property itself. A majority of two-thirds is required where the question is submitted to the voters, although provision is made for exceptions where laws are enacted relating special cases, such as the proposed municipal loop in Cincinnati.

Governor Willis has before him the Reighard bill, which makes the valuation of public utilities properties by the Public Utilities Commission optional instead of mandatory, as was the case in the law under which the commission has been operating for the last two years. This will not affect the examinations that have already been begun.

INDIANAPOLIS LABOR CONTROVERSY

Attorneys for the union employees of the Indianapolis Traction & Terminal Company, who have been restrained by the Federal Court from attempting to call a strike on the company's lines, on April 23 moved to dismiss the motion which they had filed in the United States Circuit Court asking that the company be enjoined from securing signatures to its individual service contract, apparently on account of the fact that they were totally unable to substantiate any of the charges made. The employees and the Indianapolis Traction & Terminal Company were made joint defendants in a suit for temporary injunction obtained in November in the Federal Court through petition by the Guaranty Trust & Safe Deposit Company, Philadelphia, trustee under the mortgage of the Indianapolis Traction & Terminal Company. The motion for a restraining order filed on April 14 by attorneys for the union asked that the company be compelled to live up to the arbitration agreement, alleging that the company was compelling its employees to sign individual contracts in violation of their interpretation of a decision of the Public Service Commission acting as a board of arbitration appointed to settle disputes arising between the company and its employees.

William Blackman and James A. Smythe, who were sent

to Indianapolis by the Department of Labor at the request of the Central Labor Union, arrived on April 23 and conferred with the permanent board of arbitration, composed of Governor Ralston and the members of the Public Service Commission. The Central Labor Union has issued a public statement, protesting against the alleged delay of the board of arbitration in trying the cases of men who have been discharged by the company and refused reinstatement. This so-called "protest" has been made notwithstanding the plain facts that there are now no cases before the board of arbitration which have not been acted upon.

CLEVELAND MATTERS

New Construction and Several Extensions Considered— Earnings for March

At the meeting of the City Council of Cleveland, Ohio, on the evening of April 19 legislation was enacted providing for the appropriation of land that will enable the Cleveland Railway to extend the Superior Avenue line along East 123rd Street to St. Clair Avenue. Mayor Baker declared that the Council was committed to building the line through a resolution adopted a year ago.

The City Council of Lakewood, a suburb of Cleveland, passed the new franchise on April 19. It provides for a 3-cent fare in Lakewood and 5 cents between Lakewood and Cleveland. Interurban cars are to pass through the town without stopping for local traffic.

Peter Witt, street railway commissioner, has espoused the cause of the Cleveland Railway in its refusal to pay taxes on the valuations fixed for 1913 and 1914, because it considered them unfair. The company brought injunction suits against the county treasurer to prevent him from collecting the taxes and demanded that the State tax commission explain its method of valuing the property. So far it has failed to do so. Mr. Witt says the company has a right to know the details of the plans employed by the commission in arriving at the value.

On April 26 the City Council authorized the extension of the Hough Avenue line to East 105th Street. This will require the expenditure of about \$15,000. Mr. Witt has submitted his report for 1914. It states that if the increase in business for the last five months had been as great as the first seven months, the earnings of the company would have been \$200,000 greater than they were. The 1 cent transfer charge, which went into effect on Sept. 1, 1914, returned \$232,719, or an average of \$1,907 a day. A total of \$2,577,866 was expended for improvements during the year, an increase of \$65,576 over 1913.

J. J. Stanley, president of the company, has notified Council that the company will not agree to a reduction of fare from 8 cents to 6 cents for the newly annexed section of Euclid Avenue about the village of Euclid. He says that rate would be below the cost of the service.

The street railway committee of the Council considered the resolution authorizing the Cleveland Railway to enter into a contract with W. I. Thompson & Company for the construction of a new division building at Harvard Avenue and East Fifty-fifth Street at a cost of \$99,500. Some of the members wanted bids for contracts sent in sealed envelopes to be opened in the presence of Mr. Witt. According to Mr. Witt his office has authority to check the figures and object if they are too high, but contended that the company had the right to give work to its friends. The resolution was held over for a week.

The report of operation for March presented to the directors of the Cleveland Railway on April 24 shows a net ordinance surplus of \$57,859, which increases the interest fund to \$376,017. The revenue from transfers was \$60,914.

The company has accepted the franchise which was approved by the Lakewood Council recently.

On April 21 the Cuyahoga County Common Pleas Court fixed May 25 as the date for hearing the injunction suits brought against the county treasurer to prevent the collection of about \$600,000, claimed to be due the county as taxes. The company claims that the State Tax Commission placed too high a valuation on its property for 1913 and 1914, and it asks that the commission come into court and explain the methods used in arriving at the values announced.

Michigan Commission Bill Fails.—The bill to create a public service commission in Michigan has not been reported out by the ways and means committee of the House.

Minneapolis Enabling Act.—The Minnesota Legislature has passed the bill to enable the Minneapolis Street Railway to agree with the City Council on a renewal of its franchises. The new grant must, however, be submitted to a referendum vote of the electors.

Park Purchases Contemplated.—The railway department of the Southern Public Utilities Company at Charlotte, N. C., expects to purchase two ostriches, a cage of monkeys, merry-go-round, row boats, one or two engines for naphtha launches, 500 chairs, 100 park benches, two skeeball alleys, etc.

Toledo Contempt Case.—The Toledo Newspaper Company and Negley D. Cochran, who were fined some time ago on the charge of contempt of court in connection with the street railway injunction case, applied to the United States District Court on April 23 for an extension of time to May 29 for making a return to a writ of error.

Full-Crew Measure Stands.—The Assembly of New York on April 23 defeated the Spring bill modifying the full-crew law. The vote was sixty-eight to sixty, seventy-six votes being needed for passage. The measure had been passed by the Senate. The Spring bill gave the Public Service Commissions power in a measure to regulate the size of train crews.

Another Health Department Pronouncement.—The health department of New York has extended its investigation of the overcrowded street car to the subway, and has warned the Interborough Rapid Transit Company against reducing the number of cars or trains below the number operated during the winter, as "a deliberate act tending to create or to aggravate the nuisance."

Court Decision in Fare Case.—The District Court of Appeals in Los Angeles, Cal., has handed down a decision sustaining the right of the company to charge 10-cent fares from the city to Eagle Rock, Glassel and other points in that district. The suit was brought under the old public utilities act of 1878, which provides for a penalty against any street railway where an overcharge is demanded. The court holds that the section was repealed in 1911 by the later public utilities act.

Report on Wooden Cars.—Alfred Craven, chief engineer of the Public Service Commission for the First District of New York, has made a report to the commission upon the proposed use of the 478 wooden cars to be removed from the subway to the elevated railroads. Mr. Craven thinks that they may be used with safety upon the elevated railroads. On motion of Commissioner J. Sergeant Cram the report was referred back to the chief engineer with instructions to make a further report as to whether the operation of such cars would be as safe as the operation of steel cars.

Progress on New York Dual System.—Travis H. Whitney, secretary of the Public Service Commission for the First District of New York, contributed to the New York *Herald* of April 25 an article reviewing the progress to date on the \$330,000,000 dual rapid transit system in course of construction in New York. The article was accompanied by a map showing the routes of the lines and with reproductions of portraits of Commissioners McCall, Wood, Cram, Williams and Hayward, Counsel George S. Coleman, Assistant Counsel LeRoy T. Harkness, Mr. Whitney, Assistant Secretary James Blaine Walker and Chief Engineer Alfred Craven.

Maintenance Statute Amended.—The statute relating to the maintenance and repair of street railway tracks of Houston, Tex., has been amended by an ordinance providing that in case any portion of the roadway between tracks and between rails or within 1 ft. outside of the tracks shall become worn and defective, upon notice by the Mayor, street and bridge commissioner or by the city engineer of the conditions, the railway must make the necessary repairs, and upon failure to make such repairs within ten days after notice the city will do the work at the cost and expense of the railway. A penalty of \$100 a day is fixed for failure of the railway to do the work after giving notice of the intention to do it.

Meeting of Engineering Committee of Illinois Association.—The engineering committee of the Illinois Electric Railways Association held a meeting at Chicago on April 27. This committee will prepare a report on "Power Economies" and present it in three parts. Sub-committees have been appointed to prepare the following parts: (a) Economies in Direct Current Distribution, John Leisenring, Illinois Traction System, and L. E. Gould, *ELECTRIC RAILWAY JOURNAL*, (b) Power Economies on the Car, G. T. Seeley, Chicago Elevated Railways, and E. F. Gould, Aurora, Elgin & Chicago Railroad; (c) Economies in the Return Circuit, B. J. Fallon, Chicago Elevated Railways, and W. F. Carr, Chicago, Ottawa & Peoria Railway.

M. O. Resolution Defeated.—The City Council of Toledo, Ohio, sitting as a committee of the whole, defeated the following resolution on the evening of April 26: "Resolved, That this Council believes in municipal ownership and will not grant a franchise to the Toledo Railways & Light Company or any other corporation." Councilman Dotson and others, replying to talks from labor leaders in the lobby, had expressed themselves in favor of municipal ownership if it could be had in proper shape, but they refused to be bound by the resolution introduced by Councilman Kryzaniak. Councilman Mulholland had introduced a similar resolution a week previously. For some reason this resolution of Mr. Mulholland was dropped and the second one was introduced.

Safety-First Convention.—It was decided at the recent meeting of the executive committee of the Safety First Federation of America, held in New York, to hold the safety-first convention in Detroit, Mich., on Sept. 20, 21 and 22, 1915. A committee consisting of Police Commissioner John Gillespie, of Detroit, chairman; Jefferson DeMont Thompson, chairman of the executive committee, and Frederick H. Elliott, executive secretary of the Safety First Federation, was appointed to arrange for the program of the convention and to perfect the preliminary arrangements. This will be the first convention to be conducted under the auspices of the national federation. It is also the intention to have an exhibition of safety-first devices and appliances in connection with it.

Workmen's Compensation in Maine.—Governor Curtis of Maine has signed the workmen's compensation act, which provides in substance that employees totally disabled shall be paid one-half their average weekly wages for 300 weeks, the total sum to be paid not to exceed \$3,000. For partial disability workmen are to be paid from \$4 to \$10 a week, according to a sliding scale. If an employer of more than five workmen comes in under the provisions of this act he cannot be sued for damages by the injured employee. Corporations which maintain liability insurance for their employees are not obliged to come in under the provisions of this law. Employers having five or less employees are not liable to the operations of the act. The measure goes into effect on July 1.

Trial Signals on New York Elevated.—Commissioner J. Sergeant Cram of the Public Service Commission for the First District of New York has given notice of a resolution to require the Interborough Rapid Transit Company to equip its elevated railroads with a system of signals to prevent collisions and permit the operation of its tracks to the maximum capacity. The resolution proposes that the company shall place in operation on some portion of its system a trial installation of such a signal device not later than Oct. 1, 1915, and submit it to a thorough test under actual operating conditions. Not later than June 1, 1916, the results of such tests shall be submitted to the commission for a determination whether the trial system shall be extended to cover all the lines included in the elevated system.

Board to Arbitrate Strike at Wilkes-Barre.—The board of arbitration which has been selected to settle the differences between the Wilkes-Barre Railway and its motormen and conductors has fixed on May 6 at Wilkes-Barre for hearing both sides to the controversy. John Price Jackson, commissioner of the State department of labor and industry, was selected chairman of the board. The other arbitrators are S. D. Warriner, president of the Lehigh Coal & Navigation Company, selected by the street railway, and

Thomas B. Shea, a lawyer of Wilkes-Barre, named by the men. These two recently selected Commissioner Jackson as the third member of the board. When the board meets each side will be asked to outline its case. The board will determine the scope of the proceedings and will then request each side to present its case in full at once. The men, who were on strike for increased wages for about ten days, returned to work pending a decision by the arbitration board.

Boston Transit Bills Signed.—Two bills affecting the Boston (Mass.) Elevated Railway, one of which provides for the tearing down of the elevated structure in Charlestown and the other for an investigation of the crowded conditions at the Dudley Street station, with a view to the establishment of a new elevated station at Dale Street, Roxbury, have been signed by Governor Walsh. The Charlestown bill provides for a tunnel as a substitute for the elevated structure. Under the new act the Supreme Court, upon petition of the city, company or any party at interest, is to appoint three commissioners to decide what damages, if any, the elevated road will sustain over benefits by the tearing down of the road and the construction of a tunnel. The bill also provides that the owners of property abutting on the elevated structure shall be assessed not more than half the betterments which their property derives from the change, and that they shall be given twenty-five years in which to pay this. The Dudley Street station investigation act directs the Public Service Commission to investigate the operation of the elevated and surface cars at the Dudley Street terminal, also to determine the advisability and practicability of requiring the company to issue to each passenger a free transfer ticket enabling persons to leave the station and transfer to other cars going in the same general direction on adjoining thoroughfares. The commission is also directed to investigate and report as to the necessity and practicability of a new elevated station at Dale Street and of the extended use of the present station which is located at Eggleston Square.

PROGRAMS OF ASSOCIATION MEETINGS

Railway Materials Association

The annual convention of the Railway Materials Association will be held at the Hotel Sherman, Chicago, Ill., on May 17, 18 and 19 in conjunction with the Railway Storekeepers' Association. Among other subjects the Railway Storekeepers' Association is preparing to discuss the reclamation of material, and will exhibit slides showing pictures of reclamation machinery, reclamation plants, reclaimed material, etc. All manufacturers or supply houses which have slides pertaining to this subject should forward them to E. C. Curtis, inspector of stores of the Chicago, Burlington & Quincy Railway at Chicago, Ill. The program of entertainment includes a theater party and a dinner and a dance at the Hotel Sherman.

Central Electric Railway Association

The Central Electric Railway Association committee on arrangements announces in a circular issued on April 26 that all arrangements have been completed for the boat trip from Cleveland to Buffalo and return. Meetings of the association will be held on the boat. The *City of Erie* has been chartered and will leave the Cleveland & Buffalo Transit Company's new pier at the foot of Ninth street, Cleveland, Ohio, at 9 a. m., Central time, June 17, 1915. It will cruise over the western end of Lake Erie among the islands and along the northern shore of the lake during the day and night, reaching Buffalo on the morning of June 18. The International Railway and the Niagara Gorge Route have asked the association to be their guests from Buffalo to Niagara Falls and return. Luncheon will be served on the trip to the Falls, and the boat will leave Buffalo on the return trip late in the afternoon of June 18, arriving at Cleveland at 9 o'clock in the morning of June 19. Tickets for the round trip on the ship, including meals and berth for two days, will cost \$15. Reservations may be made by sending the money direct to L. G. Parker, 6917 Bessemer Avenue, Cleveland, Ohio.

Financial and Corporate

ANNUAL REPORTS

United Railways & Electric Company

The statement of income, profit and loss of the United Railways & Electric Company, Baltimore, Md., for the year ended Dec. 31, 1914, follows:

Gross earnings:	
Revenue from transportation.....	\$9,083,555
Revenue from operation other than transportation....	120,284
Total	\$9,203,839
Operating expenses:	
Maintenance of way and structures.....	\$399,716
Maintenance of equipment.....	408,211
Traffic expenses	12,563
Conducting transportation	2,727,442
General and miscellaneous.....	764,507
Total operating expenses.....	\$4,312,439
Net earnings from operation.....	\$4,891,400
Income from other sources.....	24,721
Total net income.....	\$4,916,121
Fixed charges, etc.....	\$2,964,326
Balance	\$1,951,295
Deduction from income—rental account—1½ per cent sinking fund, Maryland Electric Railways 5 per cent bonds	65,501
	\$1,885,794
Extinguishment of discount on securities.....	37,950
	\$1,847,844
Interest on income bonds and dividend on preferred stock	560,000
Surplus	\$1,287,844
Dividends paid on the common stock in 1914.....	818,448
Balance carried to the credit of depreciation reserve....	\$469,394

Notwithstanding the industrial depression resulting from the European war, the company, though feeling its effects during the latter portion of the year, was able to show an actual increase in gross receipts for the fiscal year. Although it failed to obtain the normal increase in gross receipts and largely increased its expenditures, the surplus for the year was but slightly less than that of the previous year. The increase in gross earnings for 1914 was \$157,347, or 1.74 per cent, while the increase in operating expenses was \$166,008, or 4 per cent, and the increase in fixed charges, \$37,358, or 1.28 per cent. The percentage of operating expenses to gross earnings was 46.85 per cent, as compared with 45.83 per cent in 1913. If the charges to depreciation of \$469,395, or more than 5 per cent of gross earnings, were included in the operating expenses, the percentage of operating expenses to gross earnings would have been 51.95 per cent.

The average earnings per car-mile were 30.43 cents, an increase of 0.48 cent, and the cost of service (exclusive of depreciation, etc.) 14.26 cents, an increase of 0.53 cent. The number of car-miles run was 30,250,194, an increase of 47,009 miles. The total number of revenue passengers carried was 185,296,350, an increase of 3,115,583. The number of transfers used was 77,102,879, an increase of 2,468,849, about 42 per cent of the paying passengers having made use of the transfer privilege. The average fare per passenger in 1914 was 3.45 cents.

The total amount of taxes and public charges was \$1,137,201, an increase of \$72,032, or 12.35 per cent of the gross revenue and 23.25 per cent of the net receipts after paying costs of operation. The park tax for the year was \$593,813, an increase of \$12,828. The total taxes represent the total net earnings (after paying only costs of operation) of one car in slightly more than every four.

During the year the company placed in service eighty-five new double-truck semi-convertible cars of the pay-as-you-enter type. There was expended during the year \$461,719 for cars, heaters and substation equipment out of proceeds of Maryland Electric Railways bonds. There was also expended, under the terms of the Maryland Electric Railways mortgage, \$6,205 for cables and switching apparatus out of the special sinking fund of that company. The company now operates 404.6 miles of single track. During the year 10.8 miles of single track were reconstructed; 1.4 miles of new track were constructed, and 0.03 mile of track was taken out.

In 1914 the company substantially increased the wages of its motormen, conductors and several classes of employees in other departments and also inaugurated a pension system. On Oct. 1 final payment of \$35,000 was made on car trust certificates, series A, and the equipment covered by the trust assigned to the company. The company now has no car trust certificates outstanding.

Chicago Surface Lines

The statement of earnings and expenses of the Chicago (Ill.) Surface Lines for the year ended Jan. 31, 1915, follows:

Earnings:		
Passenger cars		\$31,299,201
Chartered cars		5,206
Funeral cars		5,516
Mail cars		71,767
Mail carriers		24,837
Newspaper cars		8,040
Freight earnings		874
Garbage car service		22,492
Advertising		218,744
Rents of buildings, etc.		91,712
Sale of power		86,642
Interest on deposits		120,199
Miscellaneous		10,888
Gross earnings		\$31,966,048
Expenses:		
	(Percentage of gross)	
Maintenance of way and structures	2.91	\$ 931,408
Maintenance of equipment	4.80	1,533,156
Renewals	8.00	2,557,284
Traffic expenses	0.01	2,110
Operation of power plants	8.70	2,781,907
Operation of cars—trainmen	23.76	7,596,037
Operation of cars—other	3.73	1,190,487
General expenses—damages	3.75	1,198,727
General expenses—other	2.06	658,881
Expenses of B. O. S. E.	0.27	86,205
Taxes	4.23	1,353,073
Total expenses	62.22	\$19,889,275
Residue receipts		\$12,076,773
Divided:		
Chicago Railways, 59 per cent.		\$7,125,296
South Side Lines, 41 per cent.		4,951,477

The above statement is taken from the report of Leonard A. Busby, president, to the board of operation. This report covers in detail the general and operating organization of the lines and the scope of the work of the various departments. For purposes of information it is to be distributed among all department and sub-department heads of the surface lines.

According to Mr. Busby, during the first six months of the fiscal year, the properties showed a slight increase in receipts, amounting to \$101,536, or 0.6 per cent of the gross. For the fiscal year ended Jan. 31, 1914, the properties had showed an increase in gross receipts over the preceding year of more than 7 per cent. The drop in the rate of increase in gross during the first six months of the last fiscal year was largely caused by the fact that under the unification ordinance the companies were required to give a 5-cent fare in the Calumet district in lieu of the former 10-cent fare, and were also required to give free transfers in the downtown district.

Moreover, the beginning of the European war, Aug. 1, 1914, was followed by the closing of, or by a material reduction in the operating forces of, a large number of manufacturing plants in the city. This immediately affected the receipts adversely. During the last six months of the year the gross receipts fell \$608,085 below the receipts for the same period during the preceding year. It is stated that not much reliance can be placed upon a substantial improvement until industrial conditions in Chicago change for the better.

The surface lines carry an average of more than 3,000,000 cash, free and transfer passengers per day, or more than 1,100,000,000 passengers a year. They serve a territory of approximately 190 square miles and own 1000 miles of track within the city limits of Chicago. They have more than 2700 double-truck passenger cars in daily use and operate more than 110,000,000 car-miles annually. They employ more than 13,000 men, of which nearly 9000 are trainmen, and pay to these employees each month in wages more than \$1,000,000. During the year \$4,786,419 was expended for new capital requirements.

INTERBOROUGH-METROPOLITAN READJUSTMENT

Directors Propose Formation of New Corporation to Permit Payment of Dividends—Even Stock Exchange—New Common Stock Without Par Value

Under the terms of a plan published on April 23 by the board of directors, the Interborough-Metropolitan Company, New York, which is the holding company for the Interborough Rapid Transit Company and the New York Railways, is to be consolidated with the Finance & Holding Corporation, a small company organized with common stock having no par value. A new corporation, whose name it is said will be the Interborough Consolidated Corporation, will be formed with a capital stock of \$50,000,000. The present Interborough-Metropolitan Company has outstanding \$47,740,000 of 5 per cent cumulative preferred stock and \$93,262,192 of common stock.

It is officially stated that the purpose of the formation of the new company is to conform the nominal capital of the Interborough-Metropolitan Company "to the present condition of its assets and thus enable the stockholders of the Interborough-Metropolitan Company to participate justly in its recurring annual surplus profits, which under present conditions are not divisible." Referring to the large investment of the Interborough-Metropolitan Company in the Metropolitan Street Railway and the Metropolitan Securities Company and the losses resulting from their bankruptcy and liquidation, the directors state that it has not been generally realized that because of such shrinkage in capital assets the holding corporation could not prudently make distribution of its steadily accruing annual surplus.

Under the proposed plan the new capital stock of \$50,000,000 will be represented by certificates of two classes. The present 5 per cent cumulative preferred stock of the Interborough-Metropolitan will be exchanged, share for share, for 6 per cent non-cumulative preferred stock with a par value of \$100. Shareholders agreeing to the exchange will surrender all rights to the dividends now accruing on the preferred stock, amounting to between 35 and 40 per cent. Yet by coming in under this plan, according to the announcement of the board of directors, the shareholders will gain the advantage of immediately getting their first 6 per cent dividend on the new shares. There is at least \$500,000 more than enough surplus in the treasury now to pay 6 per cent on the present preferred stock.

The new common stock is to be issued in shares without par value, also share for share, or approximately 932,000 shares of common stock without par value. The scaling down of the book capitalization from approximately \$141,000,000 to \$50,000,000 will in no wise affect the intrinsic value of the common stock, which will be entitled to participation in the profits and assets of the consolidated company to the same extent as if bearing a par value.

In regard to the advantages of the plan the directors say:

"The consolidated company will be in possession of stocks and securities the probable earnings of which, in the judgment of the directors, will be sufficient to pay 6 per cent upon the par value of the new preferred stock—which dividend may be paid without delay—and also to leave a further sum for the benefit of the common stock. It is the general opinion also that when the common stock is relieved from the burden of the accumulations upon the existing preferred stock, and the danger of further similar accumulations is removed, it will have immediately a substantial value and will be placed in a situation to participate in a distribution of available surplus earnings."

To complete the proposed readjustment, the consent of two-thirds of both the preferred and the common stock vote must be given to the plan. A meeting of the stockholders has been set for June 30. It is specifically set forth in the plan that it is not the intention of either the proxy committee of the Interborough-Metropolitan preferred stock or the voting trustees of the common stock to vote for the reorganization "until general consent shall have been obtained, at least from the holders of the preferred shares."

Already a strong independent preferred stockholders' committee has been formed which asks preferred shareholders to approve the readjustment plan and give their proxies to the committee for a special meeting on June 1. The members of the committee are A. J. Hemphill, chairman of board

of directors Guaranty Trust Company; James S. Alexander, president National Bank of Commerce; Vernon C. Brown, of Vernon C. Brown & Company; J. Horace Harding, of C. D. Barney & Company; A. Barton Hepburn, chairman of Chase National Bank, and D. B. Van Emburg, of Van Emburg & Atterbury.

A special independent committee representing large holdings of the common stock has also issued a circular to common stockholders asking that they consent to the plan. Hope of dividends is held out. The committee consists of Willard V. King, president Columbia Trust Company; Harry Bronner, of Hallgarten & Company; Daniel E. Pomeroy, vice-president Bankers' Trust Company, and Henry Rogers Winthrop, of Harris, Winthrop & Company. Under the voting trust agreement which remains in effect until March, 1916, the common stock can be voted by the five trustees—August Belmont, Edward J. Berwind, Andrew Freedman, Theodore P. Shonts and Cornelius Vanderbilt. Technically the voting trustees could take matters in their own hand and ratify the plan, but this is not their purpose.

It is reported that the Public Service Commission for the First District will try to assume supervision over the readjustment, although the company is not an operating railway.

BERLIN PURCHASES POWER COMPANY

The city of Berlin, Germany, has decided to purchase the Berlin Electrical Works, the system which supplies the German capital with electric light and power. This company is one of the oldest as well as one of the largest of its kind in Europe. Service was begun in 1885 with a station having an annual capacity of 37,000 kw-hr. The output last year was 267,600,000 kw-hr. The purchase price agreed upon is \$92 per kw. The reason for the purchase by the city is the intention of the latter to establish a low rate for electric power and thus build up an industrial load from small factories which might not otherwise locate in Berlin.

American Public Utilities Company, Grand Rapids, Mich.—The general financial depression reduced the volume of business done by subsidiaries of the American Public Utilities Company, particularly those serving industrial communities, for the eight months ended March 31, 1915. All the subsidiaries except two, however, showed substantial increases in the sale of gas and electricity, the two decreases being 1 per cent and 7 per cent. The earnings figures for the period are: Gross earnings, \$1,980,959; operating expenses \$1,079,991; net earnings, \$900,968; miscellaneous income, \$23,169; gross income, \$924,137; expenses, \$27,172; net income, \$896,965; fixed charges, \$610,706; dividends, \$156,560, and balance \$129,699. The American Public Utilities Company controls the Wisconsin-Minnesota Light & Power Company, which controls the electric railways in Eau Claire and Chippewa Falls, Wis., the interurban line between these cities and that between Eau Claire and Altoona, and also the Jackson Light & Traction Company, which operates in Jackson, Miss.

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The Barcelona Traction, Light & Power Company has secured the consent of the British treasury and the French government to the underwriting of new securities by existing interests in the company, which will permit of the completion of the second unit of the company's work at Barcelona. The plan involves the creation of £4,000,000 of 7 per cent prior lien bonds, divided into "A" and "B" series, both ranking as charges upon the property and income of the company in priority to the existing 5 per cent bonds. It is understood that the British and French bondholders, with the consent of their respective governments, have agreed to finance the construction of the second unit at Barcelona, and the Canadian bondholders are called to meet for the same purpose. It is hoped that the funds to be obtained by this plan, which will be passed upon at a meeting of bondholders in London on May 11, will enable the company to enter the operating stage upon a more substantial basis. Previous references to this company were made in the *ELECTRIC RAILWAY JOURNAL* of Dec. 12, 1914, and Feb. 27, 1915.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—E. H. Rollins & Son, New York, have purchased

\$1,150,000 of Birmingham Railway, Light & Power Company two-year 6 per cent notes dated May 1, 1915. The notes are issued to provide a portion of the funds required to retire at maturity \$1,500,000 of notes due on July 1. It is reported that the greater part of the issue has already been privately placed and that the unsold balance will shortly be offered for public subscription at 99.50 and interest to yield 6.25 per cent. Bertron, Griscom & Co., New York, have also bought an issue of \$640,000 of refunding and extension 6 per cent bonds, due May 1, 1957, but these have not yet been offered for subscription.

Boston (Mass.) Elevated Railway.—The directors of the Boston Elevated Railway have declared a quarterly dividend of 1 per cent, making 2½ per cent for the last half of the year and 5½ for the fiscal year ending June 20. The present disbursement is payable on May 15 to stock of record on May 6. For 1915 the company has paid dividends of \$2.50, including the present declaration, which compares with \$5 for 1914 and \$6 for 1913-1902.

Cape Breton Electric Company, Ltd., Sydney, N. S.—A semi-annual dividend of 1½ per cent has been declared on the \$1,125,000 of common stock of the Cape Breton Electric Company, Ltd. This is accompanied by the payment of the regular semi-annual dividend of 3 per cent on the \$234,000 of preferred stock, both dividends being payable on May 1 to holders of record on April 22. The common dividend compares with 3 per cent paid semi-annually in 1913 and 1914.

Charlottesville & Albemarle Railway, Charlottesville, Va.—The Munsey Trust Company, Baltimore, is offering at 96 and interest \$350,000 of first mortgage 6 per cent gold bonds of the Charlottesville & Albemarle Railway, dated April 1, 1915, and due on April 1, 1943. The bonds are redeemable at 105 and interest at any interest date on sixty days' notice. The total authorized issue is \$750,000.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—Hayden, Miller & Company, Cleveland, have sold to private persons at par and interest \$200,000 of underlying Cleveland & Elyria Electric Railroad first mortgage bonds, which are extended from May 1, 1915, to August 1, 1920, at 6 per cent.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—The consolidated mortgage bondholders of the Columbus, Delaware & Marion Railway have chosen a committee, consisting of R. W. Bingham, E. Jones, M. Hertenstein, E. H. Turner and J. J. Jennings, to report on June 4 in regard to a plan for the future operation of the company and the advisability of ending the six-year receivership within a reasonable period or of issuing \$150,000 of receiver's certificates. Eli M. West, receiver, states that there are claims amounting to about this sum which are superior to the consolidated first mortgage bonds. It is said that the receipts under the receivership have increased from about \$308,000 to \$480,000 a year.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Columbus Railway, Power & Light Company has applied to the Ohio Public Utilities Commission for authority to sell at 80, or to pledge at 66 2-3 per cent of their par value, \$1,900,000 of first and refunding extension sinking fund 5 per cent bonds, dated April 1, 1915. The proceeds of \$1,250,000 of the bonds are to pay \$1,026,979 of floating debt. The proceeds of \$300,000 of bonds are to be used to bring the working capital of the company to \$750,000, and the proceeds of the remainder are to be used for extensions and additions to the property. The sale of these bonds will enable the company to pay off its minor debts and also an issue of \$600,000 of coupon notes marketed last autumn.

East St. Louis & Suburban Company, East St. Louis, Ill.—The directors of the East St. Louis & Suburban Company have declared a quarterly dividend of three-quarters of 1 per cent on the 5 per cent cumulative preferred stock, payable on May 1 to holders of record on April 22. This compares with the regular payment of 1¼ per cent made to February, 1915. It is said that the reduction has been made necessary by decreased earnings caused by the business depression and increased interest charges on power plant investment made for business that has not materialized on account of the depression.

Front & Union Streets Railway, Wilmington, Del.—Attorney-General Wolcott on April 20 filed an indictment charging that the Front & Union Streets Railway, which is leased by the Interstate Railways to the Wilmington & Philadelphia Traction Company, had failed to file reports for 1913 and 1914. The grand jury returned a true bill. Counsel for the railway state that the section of the corporation law under which companies are required to file with the secretary of state a certified copy of the annual reports to stockholders relates expressly to railways created under that law. The Front & Union Streets Railway was incorporated under a special act passed prior to the passage of the general corporation law and is therefore thought not to be required to file its report.

Kansas City Railway & Light Company, Kansas City, Mo.—The receivers of the Metropolitan Street Railway, the operating subsidiary of the Kansas City Railway & Light Company, have applied to the United States Court to issue certificates to secure funds for necessary maintenance and construction expense in 1915. The amount required is placed at \$2,427,865. This week Judge Hook intimated that he might allow interest due on May 1 and May 15 if the reorganization plan soon seems likely of adoption, even if the payment of interest would necessitate receivers' certificates for improvements. He caused Mayor Jost to modify his statement that absolutely no further extension on the time limit for the new franchise would be granted.

Minneapolis & Northern Railway, Minneapolis, Minn.—Judge William E. Hale of the District Court for the Fourth Judicial District on April 12 issued an order setting April 24 for a hearing on the question why the Northern Pacific Railway should not be allowed to intervene and its claim be made a first lien upon the property of the Minneapolis & Northern Railway. A previous order of the court on Feb. 9 delivered the possession of the property to the trustees. Prior references to this case were made in the *ELECTRIC RAILWAY JOURNAL* of Jan. 2, Jan. 23 and Feb. 20.

Portland Railway, Light & Power Company, Portland, Ore.—The Portland Railway, Light & Power Company has called a special meeting for May 14 at Portland, Ore., for the purpose of approving a readjustment of the capitalization of the company. Under the proposed plan the present outstanding common stock will be reduced from \$25,000,000 to \$20,000,000, and there will be authorized \$5,000,000 of 6 per cent cumulative first preferred and \$5,000,000 of 6 per cent non-cumulative second preferred stocks. Of the new stocks \$2,500,000 of each class will be retained in the treasury for future corporate purposes, and \$2,500,000 of each issue will be sold to stockholders to raise additional capital on the following terms: Each holder of 100 shares of present capital stock, or smaller holders in proportion, may turn in twenty shares, accompanied by \$25 for each share, and will receive ten shares of first preferred and ten shares of second preferred stock. With the completion of the plan the company will have a capitalization of \$2,500,000 of first preferred, \$2,500,000 of second preferred, and \$20,000,000 of common stock, the latter 75 per cent paid up, and the company will have raised \$1,250,000 in cash.

Pacific Gas & Electric Company, San Francisco, Cal.—The Pacific Gas & Electric Company has asked the California Railroad Commission for permission to pay a common stock dividend. In announcing the filing of the application the commission stated: "Between Jan. 1, 1914, and April 1, 1915, the Pacific Gas & Electric Company retired \$849,500 of bonds through payments into sinking funds. During the remainder of 1915 the company will be further required to retire \$1,461,000 of bonds. All of the above payments have been made, or will be made, out of net earnings or surplus profits, and the company wishes to capitalize these payments by the issuance of a common stock dividend. This dividend, it is proposed, shall consist of as many shares of its unissued common capital stock as shall be equal to the amount of net earnings or surplus profits which the board of directors shall determine permanently to capitalize, but not exceeding 6 per cent of the common capital stock now in the hands of the public."

Rock Island Southern Railway, Rock Island, Ill.—A bill has been filed in the Circuit Court at Monmouth, Ill., for an accounting and the appointment of a receiver for the Rock Island Southern Railway, which operates an inter-

urban line between Monmouth and Rock Island and Monmouth and Galesburg. The minority stockholders of this company are the complainants. It is alleged that the line between Monmouth and Rock Island is bankrupt. Hearing on the bill was set for May 3.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The San Joaquin Light & Power Corporation has filed an application with the California Railroad Commission, requesting authority to renew promissory notes in the total sum of \$317,260.

Staten Island Midland Railway, New York, N. Y.—The Public Service Commission for the First District of New York recently authorized the Staten Island Midland Railway to issue \$135,000 of equipment trust certificates for the acquisition of thirty-two double-truck closed cars. The order certified that the purchase cost of the additional cars was reasonably chargeable to capital, except as to \$26,680, representing the amount by which the new cars were deemed to be a replacement of old cars. On evidence from the company that these old cars could be repaired, the commission modified its order to provide that if by May 31 the car bodies and equipment of twenty specified cars were not overhauled and put in first-class operating condition, there should be deducted from the total capital charge the amount at which the old cars were carried on the books, less their scrap value or sales price. The application to the commission for the issuance of these certificates was noted in the *ELECTRIC RAILWAY JOURNAL* of Nov. 31, 1914.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—The holders of certificates of deposit for the first mortgage 5 per cent bonds of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad have been notified that the bondholders' committee appointed in 1908 has declared a dividend of \$90 for each \$1,000 bond, payable to all holders on presentation of certificates at the Central Trust Company, New York, on and after April 23.

United Railways of St. Louis, St. Louis, Mo.—The Missouri Public Service Commission has authorized the United Railways of St. Louis to issue \$500,000 of 4 per cent bonds, maturing on July 1, 1934, to take up a like amount of Southern Railway 6 per cent bonds falling due on May 1.

Washington-Virginia Railway, Washington, D. C.—The directors of the Washington-Virginia Railway have declared a dividend of 1 per cent on the company's \$1,378,300 of common stock, together with the usual semi-annual 2½ per cent dividend on the \$1,000,000 of preferred stock, both payable on May 1 to holders of record on April 19. In 1912 and 1913 the company paid common dividends of 4 per cent and in 1914 2½ per cent.

York (Pa.) Railways.—It is reported that the York Railways has arranged to purchase the Merchants' Electric Light, Heat & Power Company and to consolidate this company with the Edison Light & Power Company, which is already owned by the railway.

DIVIDENDS DECLARED

Bangor Railway & Electric Company, Bangor, Maine, quarterly, one-half of 1 per cent, common.

Cape Breton Electric Company, Ltd., Sydney, N. S., \$3, preferred; \$1.50, common.

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

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil, quarterly, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil, quarterly, 2½ per cent.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

Washington-Virginia Railway, Washington, D. C., 2½ per cent, preferred; 1 per cent, common.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

**BANGOR RAILWAY & ELECTRIC COMPANY,
BANGOR, MAINE**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$60,380	*\$29,465	\$30,915	\$17,636	\$13,279
1 " " '14	57,347	*28,985	28,362	17,422	10,940
12 " " '15	782,428	*375,208	407,220	209,488	197,732
12 " " '14	771,941	*350,992	420,949	207,884	213,265

**CHATTANOOGA RAILWAY & LIGHT COMPANY,
CHATTANOOGA, TENN.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$77,848	*\$54,430	\$23,418	\$28,941	†\$5,523
1 " " '14	88,664	*54,664	34,000	27,208	6,792
12 " " '15	1,056,377	*701,346	355,031	342,837	12,194
12 " " '14	1,208,315	*715,896	492,419	304,803	187,616

**COLUMBUS RAILWAY, POWER & LIGHT COMPANY,
COLUMBUS, OHIO**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$248,596	*\$149,014	\$99,582	\$38,727	\$60,855
1 " " '14	246,540	*154,066	92,474	40,465	52,009
12 " " '15	3,071,080	*1,873,923	1,197,157	476,985	721,072
12 " " '14	3,001,131	*1,943,853	1,057,278	490,152	567,126

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

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$1,140,832	*\$594,403	\$546,429	\$362,301	\$184,125
1 " " '14	1,133,879	*603,081	530,798	346,933	183,865
12 " " '15	14,026,762	*7,525,642	6,501,120	4,244,490	2,256,630
12 " " '14	13,804,622	*7,723,520	6,081,102	3,921,202	2,159,900

**CUMBERLAND COUNTY POWER & LIGHT COMPANY,
PORTLAND, MAINE**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$182,301	*\$107,797	\$74,504	\$62,494	\$12,010
1 " " '14	168,062	114,456	53,606	63,465	†9,859
12 " " '15	2,537,562	1,450,770	1,086,792	756,881	329,911
12 " " '14	2,377,457	1,351,056	1,026,401	727,867	298,534

**EAST ST. LOUIS & SUBURBAN COMPANY,
EAST ST. LOUIS, ILL.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$187,792	\$113,323	\$74,469	\$61,896	\$12,573
1 " " '14	204,411	137,998	66,413	54,921	11,492
12 " " '15	2,581,426	1,564,943	1,016,483	724,108	292,375
12 " " '14	2,724,006	1,652,345	1,071,661	594,020	477,641

GRAND RAPIDS (MICH.) RAILWAY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$94,889	\$63,629	\$31,260	\$13,679	\$17,581
1 " " '14	96,747	62,638	34,109	13,662	20,447
12 " " '15	1,286,852	832,498	454,354	161,921	292,433
12 " " '14	1,302,624	814,911	487,713	164,352	323,361

**LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY,
LEWISTON, MAINE**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$45,980	*\$35,105	\$10,855	\$15,578	†\$4,723
1 " " '14	39,554	*36,450	3,104	15,347	†12,243
12 " " '15	687,556	*465,713	221,843	186,888	34,955
12 " " '14	674,106	*439,654	234,452	181,299	53,153

HOUGHTON (MICH.) COUNTY TRACTION COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$18,765	*\$13,918	\$4,848	\$5,599	†\$751
1 " " '14	20,946	*15,277	5,669	5,595	74
12 " " '15	272,331	*178,326	94,005	37,063	26,942
12 " " '14	293,446	*178,439	115,006	67,355	47,651

JACKSONVILLE (FLA.) TRACTION COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$48,521	*\$34,533	\$13,988	\$13,517	\$472
1 " " '14	56,778	*36,679	20,099	20,099	7,239
12 " " '15	699,213	*465,260	233,953	153,879	80,074
12 " " '14	699,567	*446,182	253,385	147,588	105,796

**NORTHERN TEXAS ELECTRIC COMPANY,
FORT WORTH, TEX.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$121,301	*\$75,277	\$46,023	\$27,204	\$18,819
1 " " '14	155,976	*94,868	61,107	25,338	35,768
12 " " '15	2,008,002	*1,112,668	895,333	322,403	572,928
12 " " '14	2,161,438	*1,202,767	958,671	287,002	671,669

PENSACOLA (FLA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$19,989	*\$11,612	\$8,377	\$7,248	\$1,128
1 " " '14	22,287	*14,302	7,985	7,168	816
12 " " '15	259,073	*165,402	93,672	86,922	6,749
12 " " '14	282,923	*181,384	101,539	82,868	18,671

**PUGET SOUND TRACTION, LIGHT & POWER COMPANY,
SEATTLE, WASH.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$591,692	*\$385,442	\$206,249	\$181,473	\$24,777
1 " " '14	691,464	*405,767	285,696	175,510	110,186
12 " " '15	8,268,052	*4,973,698	3,294,354	2,129,059	1,165,295
12 " " '14	8,701,725	*5,001,313	3,700,413	2,079,536	1,620,877

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$64,995	*\$41,826	\$23,169	\$22,956	\$213
1 " " '14	66,654	*43,838	22,816	22,613	203
12 " " '15	839,109	*548,681	290,428	276,071	14,357
12 " " '14	836,699	*555,715	280,984	272,791	8,193

**NASHVILLE RAILWAY & LIGHT COMPANY,
NASHVILLE, TENN.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$169,450	*\$101,726	\$67,724	\$41,712	\$26,012
1 " " '14	173,144	*122,030	51,114	43,919	7,195
12 " " '15	2,233,329	*1,314,551	918,778	495,336	423,442
12 " " '14	2,210,900	*1,372,447	838,453	478,216	360,237

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$2,027,911	*\$1,182,265	\$845,645	\$812,925	\$32,720
1 " " '14	1,949,518	*1,187,591	761,927	802,945	†41,018
9 " " '15	17,805,207	*10,345,666	7,459,541	7,285,440	174,101
9 " " '14	17,974,593	*10,622,574	7,352,020	7,204,019	148,000

PORTLAND (MAINE) RAILROAD

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Feb., '15	\$67,673	*\$48,568	\$19,105	\$24,603	†\$5,498
1 " " '14	64,123	*50,027	14,096	22,713	†8,617
12 " " '15	1,049,602	*645,170	404,432	251,802	152,630
12 " " '14	1,036,612	*676,314	360,298	206,308	153,990

Traffic and Transportation

THE JITNEY BUS

The Jitney Bus East—Experience in Connecticut—New York, Rhode Island and Iowa Bills Before State Governors

The jitney has made its appearance in many of the large cities and important towns in Connecticut. In Bridgeport the Bridgeport Jitney Bus Company, Inc., has been organized with a capital of \$50,000 to operate large buses. The large bus has also made its appearance in Hartford, where a vehicle of the double-deck kind has been placed in operation. For the most part, however, the cars in service in Connecticut are of the touring-car type and many of them are Fords. The question of regulation has come up, and a bill is pending before the General Assembly to regulate the jitney. A feature of the bill is a requirement for a \$3,000 bond for each jitney. The measure also includes a variety of regulations tending to put the jitney on a par with the electric railway as a public carrier.

The Connecticut Company, operating in New Haven, Hartford, Meriden, Bridgeport, Waterbury and other cities, published recently in the daily papers an advertisement outlining its attitude as regards the jitney. It discussed, first, the question of the general public; second, the question of the employees of the street railways, and, third, the matter of equity to the street railways. The company said that electric railway fare limits have been extended beyond profitable distances and their justification has been the compensating effects on the general results of the short haul passenger on rush-hour riding. If this short-haul riding is to be taken away from the street railway to any considerable degree a reduction in service must inevitably follow and contraction of fare limits must also result. The average length of ride given by the jitneys in New Haven at present, as contrasted with the distance to the first fare limits of the electric railways, is 56 per cent, in Waterbury 45 per cent, Meriden 41 per cent, Hartford 55 per cent. These are the relative distances to a radial point out from the center of the cities which are given by the jitneys as compared with the trolley, whereas by transfer or direct route this distance can usually be doubled in riding from one side of the city to another in electric cars so that as a matter of fact, if passengers desire to take the ride, the jitney, instead of giving 50 per cent of the trolley ride, is giving one-quarter. The company said that in general the jitney is actually doing the work of a common carrier without the regulation and supervision of any authorities except the Public Utilities Commission passing upon the methods of operation and qualification of bus operators and paying to the State or municipality much less than the average owner of a private automobile. The company went into the details of the payments made by it to the State. In conclusion the company said:

"The constantly increasing cost of material, the higher rate of wages and the added burdens imposed by the General Assembly and the Public Utilities Commission on one hand, and the granting of universal transfers, extending of city fare limits and elimination of fare zones, on the other, have rendered the net revenue to electric railway companies so small that the managements of the companies in the last few years have been obliged to refrain from building extensions which have been requested and earnestly urged by the communities which they serve."

The Board of City Commissioners of Dallas, Tex., on April 21 passed an ordinance requiring a bond of \$2,500 of jitney drivers for the protection of passengers and public. It was the intention to take no final action on the ordinance until the decision of the Court of Criminal Appeals in the case appealed from Fort Worth, testing the constitutionality of the ordinance of that city regulating the jitneys, but the large number of accidents, cumulating in a head-on collision on April 20, made prompt action on the bond feature imperative. The report of the committee of the whole to the board providing for passage of the ordinance follows in part:

"We attach hereto an amended ordinance prepared by the City Attorney requiring a bond in the sum of \$2,500 for

*Includes taxes. †Deficits.

each jitney or other automobile engaged in carrying passengers for hire. This bond may be executed by an approved surety company or by two personal sureties. We have deemed it fair and just to require bonds from all automobiles carrying passengers for hire and not from jitneys alone. We file with the city secretary ordinances and letters from various city officials over the country pertaining to the regulation of the jitney buses in different cities. Some cities require jitney buses to take out franchises the same as other public carriers. Many cities require them to run on fixed routes and on regular schedules for certain hours of the day, and it has been suggested that the city ordinance of Dallas should also require them to give transfers and to transport school children for half fare. Inasmuch as this is the first ordinance regulating the jitney in Dallas, we have omitted all these provisions from the attached ordinance, and deem it sufficient to start the regulation by merely requiring a bond. This bond will protect the public and passengers against loss occasioned by the negligence of the operator of the jitney when this negligence has been established in a court of competent jurisdiction. We have further provided that the ordinance shall not take effect for thirty days, so as to give the operators or owners of jitney buses and other automobiles engaged in carrying passengers for hire ample time to prepare their bonds. We further appreciate the fact that the new administration will assume charge of the city government on May 1, and this will enable them to amend the ordinance before it goes into operation if they deem it insufficient. We recommend that the ordinance be finally passed."

The matter of regulating the jitney was taken up before the Councils of Pomeroy and Middleport, Ohio, which constitute the congested zone of the Ohio River Electric Railway & Power Company and regulatory ordinances have been passed in both towns. The ordinances were drawn by authority of section 3632 of the general code of Ohio, giving councils the power to control, regulate and license vehicular traffic, using the public streets, alleys or highways. This power has been sustained by the Supreme Court of Ohio in the action of *Marmet vs. the State*, *Hill vs. the city of Cincinnati*, *Hayman vs. the city of Cincinnati*, *Fernberg vs. the city of Cincinnati*, and *Hammerly vs. the city of Cincinnati*, reported on page sixty-three, volume 45, of the Ohio State Reports. The license fees provided in the ordinance follow: For motor bus with a seating capacity of five or fewer persons, including the driver, \$15 a year; for each motor bus with a seating capacity of seven or fewer, but more than five persons, including the driver, \$25 a year; for each motor bus capable of seating more than seven passengers, including the driver, \$50 a year. It is unlawful under the ordinance to drive or operate any motor bus upon or along any street unless there is in force a valid license as prescribed in the ordinance. In order to insure the safety of the public it has been made unlawful for any person to operate a motor bus or to obtain a permit therefor until he has filed a bond in the sum of \$5,000 with private individuals as security or with a reliable and responsible surety company.

The signature of Mayor Buschemeyer of Louisville, Ky., to the jitney ordinance makes that measure, passed by the General Council and providing for regulation of the jitney bus in the city, effective as soon as it is duly published. The Mayor stated that he would give the operators and owners of the automobiles in the passenger traffic service a reasonable length of time to prepare to abide by the law, the terms of which provide principally that graduated licenses be paid, varying according to the carrying capacity of the vehicle and that cars be represented by a bond of \$5,000 deposited at the city hall.

City officials of Nashville, Tenn., are working out a system for numbering the cards used on jitney cars which are licensed to operate. The plan provides for additional number plates, bearing conspicuous figures, to be carried just above the State license plate, so as to enable the city to exercise thorough supervision. The ordinance required the jitney driver to obtain his license in the office of the Mayor, pay a tax of \$15 a quarter and to present certificates showing that these provisions have been complied with, together with a bond of \$5,000 to the city commissioner before he will receive his number plate.

Governor Whitman of New York will hold a public hearing on May 6 on the Thompson jitney bill. The provisions of this measure have been referred to previously in the *ELECTRIC RAILWAY JOURNAL*.

On the last day of the session of the Legislature of Rhode Island, a bill was passed dealing with the jitney. Few restrictions are imposed upon cities and towns by the new law. Commenting on the law the *Providence Journal* said editorially:

"The Legislature wisely left practically all of the details of regulation to the city and town councils. Rules which work well in one community may easily be inadequate in another. The problems of Exchange Place and Dorrance Street, Providence, are different from those in the Pawtuxet Valley. One great merit of the State law is in its broad provision for the exercise of discretion, particularly at this time, when the jitney is a novelty and experience has not altogether demonstrated the best methods of dealing with it."

The Frailey bill to regulate the jitney referred to in the *ELECTRIC RAILWAY JOURNAL* of April 17, page 775, has passed both houses of the Legislature of Iowa and is now before the Governor for his signature. The bill is broad in its scope and applies to all motor vehicles operated on the streets and engaged in carrying passengers for hire. City councils are empowered to require the operation of jitney buses over reasonable routes and upon reasonable schedules. Owners of jitneys may be required to file a proper indemnity bond for the protection of the city or public against damages resulting from negligence. In short, the measure empowers the city councils to regulate jitney traffic by requiring license fees and fixing streets and routes upon which the jitney is to operate.

The Board of Control of Toronto, Ont., on April 20 approved the following resolution of Mayor Church:

"That the City Solicitor prepare a draft by-law regarding the regulation of jitneys in Toronto, empowering the city to fix the route, speed, number of passengers and fares, also empowering the city to require each applicant for a license to deposit a bond as security for damages, and further increasing the fees for such licenses. The solicitor is also to report what power the city has to regulate jitneys and what legislation, if any, is necessary on the subject." In addition the chief of police has been asked for a report as to the regulations of the jitney relative to traffic.

The Paducah (Ky.) Traction Company has announced reduced service, effective immediately, with prospects of still further reduction "should present business conditions prevail for any length of time." Details of the enforced inferior service were presented to the city in display advertisements carried in the local papers, which began with the following paragraph:

"Owing to the large decreases in the earnings of this company it has been deemed advisable to attempt to meet these decreases, in part at least, by a reduction in expenses, consisting of changes in schedules and the removal of some conductors."

The reduction includes the adoption of the twenty-minute schedule, instead of the ten-minute schedule on the Third Street line, and adoption of the one-man prepay system on the Third Street, Guthrie Avenue and cemetery lines, which means doing away with conductors and reversion to the system in effect some years ago. The jitneys are doing a large business and as yet have been subjected to no restrictions and call for and deliver passengers to any destinations, just as the customary taxicab, making, however, only a 5-cent charge.

The Tucson (Ariz.) Rapid Transit Company has applied to the State Corporation Commission for permission to operate cars with only one employee. The company contends that the operation of its system in Tucson never has paid and that its credits and resources are being taxed to the utmost by the current expenses. The new motor bus ordinance in Tucson has gone into effect, but it will probably come before the court.

Following the passage of an ordinance by the City Council of Muskogee, Okla., regulating and requiring bonds of the jitneys, the Muskogee Traction Company has reinstated service on the lines which had been abandoned on account of the jitneys.

HEARING ON FARE INCREASE

The Massachusetts Public Service Commission gave a hearing on April 14 upon the proposed fare increase on the Blue Hill Street Railway from the present 6-cent basis to an 8-cent unit. A. Stuart Pratt, district manager of the Stone & Webster Management Association, Boston, Mass., represented the company. The proposed schedule offers seven tickets for 50 cents and ten tickets for 40 cents for pupils entitled to half-rate transportation. No change is proposed in the fare limits on the road, which has 18.5 miles of equivalent main line single track. The line runs from Mattapan Square, Boston, through Milton and Canton to Stoughton.

Mr. Pratt stated that the present 6-cent fare unit was adopted in January, 1908. In the six years ended Dec. 31, 1914, the assets decreased from \$749,174 to \$712,947. The Blue Hill construction cost was \$22,192 per mile compared with \$23,098 in fifty-one other Massachusetts street railways, excluding the Boston Elevated; its equipment cost was \$7,416 per mile against \$7,732 for the other roads; other permanent property cost \$6,122 compared with \$8,254 per mile elsewhere, giving a comparative total cost per mile of \$35,730 for the Blue Hill and \$39,084 for the others. Unit operating results were as follows:

Per Mile	Blue Hill	51 Other Mass. Roads
Gross earnings	\$4,925	\$8,068
Expenses	3,532	5,523
Net earnings	1,493	2,545

The percentage of maintenance to gross earnings has increased from 9.25 in 1909 to 25.5 in 1914. Assuming that 25 per cent of the gross earnings should be set apart for maintenance and depreciation there was at the end of 1914 a cumulative uncared-for maintenance and depreciation account of \$117,766 (figured from 1899, when the road began to operate) and a cumulative maintenance, depreciation and deficit account of \$154,536. Since the inauguration of the 6-cent fare in 1908 the cumulative deficit had decreased from \$70,454 to \$36,770, but the increased depreciation and maintenance requirements have brought the company to a lower financial ebb than before.

In 1907, the last year of the 5-cent fare unit, the gross earnings were \$89,946, operating expenses and taxes were \$76,098, and net earnings, \$13,847. In 1908 the 6-cent fare went into effect and the results were: gross, \$95,567; operation and taxes, \$75,615; net, \$19,951. In 1914 the gross earnings were only \$94,790, operating expenses and taxes being \$68,411, and net, \$26,379. For the last four years of the 5-cent fare the average net earnings were \$14,484, and for the seven years of the 6-cent fare unit they were \$26,822. Assuming that 25 per cent of the gross earnings had been set aside for depreciation and maintenance (the Massachusetts commission suggested 20 per cent in discussing the Middlesex & Boston case), the average return upon the investment represented in stock, bonds and notes was 0.92 per cent, or \$6,545 for the four years prior to the 6-cent fare and 2.22 per cent under the 6-cent fare. No dividends have ever been declared by the company. There had been no material growth in the territory for many years and the company had been adversely affected by reduced rate tickets on the New Haven system between Stoughton and Canton. The average local rate of fare on the main line was 1.13 cents per mile and the through fare for 12.7 miles was 1.4 cents per mile.

Mr. Pratt said that the Stone & Webster Management Association received about \$1,700 a year for administering the affairs of the Blue Hill company. The company substituted light single-truck cars a few years ago for the former double-truck equipment, with substantial reductions in operating expenses, although the seating capacity was about the same in each case. The road was willing to establish a shorter zone system on the 6-cent basis, if the board desires. With an 8-cent fare the rate per mile on the through service averages about 1.89 cents. Twenty-six and one-half per cent of the traffic was handled between 5:30 and 7:30 a.m. and between 4:30 and 6:30 p.m. Relative to lower fares for workmen in the rush hours, Mr. Pratt said that there was an apparent loss of \$4,000 per year for every cent of fare reduction in the four rush hours of the day. The hearing was closed.

New Bedford & Onset Fares.—The Massachusetts Public Service Commission will give a hearing at Boston on May 5 upon the petition of the New Bedford & Onset Street Railway for authority to increase its fares from 5 cents to 6 cents. The company proposes to sell tickets in books at the rate of twenty for \$1, and desires to increase the rate charged scholars from 2.5 cents to 3 cents. The official notice in regard to the increase was published in the *ELECTRIC RAILWAY JOURNAL* of April 24, page 819.

Spring Entertainment.—More than 500 employees of the Washington Railway & Electric Company, Washington, D. C., assembled on April 20 at Odd Fellows Hall at the annual spring meeting. William F. Ham, vice-president of the company, told of the growing popularity of the line, which he attributed largely to the division superintendents, conductors, motormen, inspectors, starters and depot clerks who are thrown into direct personal contact with the traveling public. Clarence P. King, president of the company, outlining the growth of the company and praising its employees, predicted that at an early date the transportation facilities of Washington will be enlarged. John S. Barbour, general attorney, made a short address. An attractive vaudeville bill was presented.

Service Order Case Before Court.—Decision on an order to show cause why the State Public Service Commission of Washington should not be permanently enjoined from enforcing a recent mandate directing the Puget Sound Traction, Light & Power Company, Seattle, to make extensive service changes on its Alki, Fauntleroy and Ballard Beach lines has been taken under advisement by three judges sitting en banc in the Federal Court. The temporary restraining order will remain in force until the decision is handed down. The commission's order sought to compel the company to operate the Alki and Fauntleroy cars around the Virginia Street loop and also to provide practically every passenger with a seat on these lines. It further directed it to discontinue the shuttle service on the Ballard Beach route. Argument in the case was heard by Circuit Judge W. B. Gilbert, Portland, and District Judges F. S. Rudkin, Spokane, and Jeremiah Neterer, Seattle.

First House Under St. Louis Loan Plan.—A mail car motorman in the employ of the United Railways, St. Louis, Mo., has completed negotiations with the Savings & Loan Association affiliated with the company for the building of the first home under the auspices of the association. The plans, specifications and description of the house were drawn by Martin Arhelger, superintendent of the United Railways building department. The approximate cost of the building is \$2,500. A loan from the association of \$2,400, or enough to build such a house, would require that a member be the owner of twelve shares of stock upon which \$1 a month a share must be paid, or \$12 plus 6 per cent interest per annum upon the loan, which amounts to \$12 a month. Adding to this about \$4.50 a month for taxes, water license and insurance, would aggregate \$28.50 a month. The \$12 a month paid into the association as dues each month together with the dividends earned thereon will be applied to the stock and when this value reaches \$2,400 it will equal the loan and the debt will be cleared.

Increase in Service Ordered.—Upon the report of Commissioner William Hayward the Public Service Commission for the First District of New York has adopted an order after rehearing directing the New York & Queens County Railway to increase its service. Some time ago the commission adopted an order directing the company to make certain increases in service which would require the acquisition of fifty-eight or sixty additional cars. The company leased twenty additional cars which were placed in service, and then applied to the commission for a rehearing and modification of the order. The rehearing was held by Commissioner Hayward, who reported the original order with modifications only as to the time in which the company must comply. This time is extended to Oct. 1, 1915, but meanwhile the company must operate as many open cars as the largest number of closed cars operated last March after the addition of the twenty new cars to the service. The company has ten days in which to notify the commission whether it will accept the order.

Personal Mention

Mr. J. C. Marquardt has been appointed general superintendent of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.

Mr. Martin Evans has resigned as superintendent of transportation of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.

Mr. Elmer Veley, who has been master mechanic of the Cedar Rapids & Marion City Railway, Cedar Rapids, Ia., for a number of years, has resigned to engage in a private business.

Mr. J. P. Verner, superintendent of the Brantford (Ont.) Municipal Railway System since it was taken over by the municipality, has resigned. Mr. Verner was previously manager of the company that controlled the system.

Mr. J. V. Sullivan, formerly general supervisor of the Chicago (Ill.) Railways and a member of President Leonard A. Busby's personal staff since the unification of that company and the Chicago City Railway, has been appointed statistician of the executive department of the Chicago Surface Lines.

Mr. James O. Carr, of Schenectady, N. Y., nominated by Governor Whitman of New York to succeed Mr. Martin S. Decker as a member of the New York Public Service Commission of the Second District, has been confirmed. Mr. Carr has been one of the attorneys for the General Electric Company, stationed at Schenectady.

Mr. E. F. Winslow, formerly assistant superintendent of the railway department of the Iowa Railway & Light Company, Cedar Rapids, Ia., has been appointed superintendent of this company's Cedar Rapids-Iowa City and Cedar Rapids-Mt. Vernon lines. Mr. J. D. Wardle, formerly superintendent of the railway department and chief engineer, will continue in the latter capacity, in which he is engaged in an extensive construction program.

Mr. Henry D. Capitain, the newly appointed chairman of the local transportation committee of the Chicago City Council, has served on this committee for more than four years. He was born in England in 1862 and was educated in the schools of England and Germany. He came to Chicago in 1879. His first important political position was that of alderman of the Chicago City Council. Mr. Capitain has large private business interests, being president of the Western Leather Manufacturing Company, Chicago. His record as a member of the local transportation committee has gained for him the confidence of both the public and railway companies. The properties with which the local transportation committee deals include the Chicago Surface Lines, operating about 900 miles of line, and the Chicago Elevated Railways, controlling about 200 miles of line.



H. D. CAPITAIN

trade between South America and Europe caused by the war is only temporary, but affords an opportunity to get started and make much more rapid progress than would be possible under normal conditions.

OBITUARY

J. Benson Foraker, son of former United States Senator J. B. Foraker, of Ohio, died in New York on April 24. Mr. Foraker was born in Norwood, a suburb of Cincinnati, forty-four years ago. He entered Wesleyan University at Delaware, Ohio, and later attended Cornell University, of which he was an alumnus of 1893. He entered the Cincinnati Law School as a member of the class of 1895 and became an associate of his father in the active work of the profession and remained with him until 1898. In that year President McKinley appointed him Assistant Adjutant-General on the staff of Major-General James F. Wade, for service in the Spanish-American war. In 1901, when the Cincinnati Traction Company was organized, Mr. Foraker was elected vice-president of the company. Later on he became a director of the Cincinnati Gas & Electric Company and of the United States Lithograph Company. About eighteen months ago ill health compelled him to resign the vice-presidency of the Cincinnati Traction Company.

Herbert John Somerset, who had lived in Canada for the last three years, died in Toronto on April 11 after an illness of three weeks. Mr. Somerset was born in St. Catharines, Can., in 1870. He was graduated from the Worcester Polytechnic Institute in 1891 with the degree of B. Sc. in mechanical engineering. The following year he took an expert course with the Canadian General Electric Company at Peterboro. In 1894 he received an appointment with the Winnipeg (Man.) Electric Street Railway, and served with that company until 1899, part of the time as general manager. He then went to Australia and for the next thirteen years was manager, engineer and local director of the Perth Electric Tramways, Ltd. During this time he was also consulting engineer for the Calgoorlie Tramways, Ltd., Calgoorlie Power & Light Company, and the North Melbourne Tramway & Lighting Company, Ltd. After successfully negotiating the sale of the Perth tramways to the government of West Australia for his London directors, Mr. Somerset spent a few months in London and then returned to Canada. He is survived by a widow and two daughters.

LIVE STOCK SHIPMENTS ON INTERURBAN

The freight traffic of the Louisville & Interurban Railway has been seriously interfered with by the quarantine regulations which have been in effect as a result of an epidemic of the foot and mouth disease. Where the lines of the Louisville & Interurban Railway cross the county line, as they do to Lagrange and to Shelbyville, there is some freedom of incoming shipments and cattle shippers have shown preference for the electric line in view of the more rapid service. A recent order establishing an inspection station in South Louisville, however, ostensibly required that this stock, after being received at the Brook and Green Street station, be driven through the streets to that point. A precedent was created the other day by the visit of an inspector of the federal service to the traction depot, whence the stock is taken to the stockyards in disinfected wagons, and it is presumed that this system will prevail hereafter. One order threatened the interest of the railway because it has no line running into the yards, but the authorities modified the ruling when R. H. Wyatt, general freight agent of the company, insisted that there was no real difference between a disinfected steam railroad car and a disinfected wagon which was loaded from a disinfected electric railway car. According to Mr. Wyatt the restrictions placed on all this character of business have been growing more and more involved, and the company never accepts a shipment of live stock for Louisville with any assurance that the shipment can ever be delivered to consignee. One day recently, before the ruling was modified, the company had a carload of cattle on its hands which technically it could not unload, could not return to point of origin and could not keep on its car. Finally the officials permitted the company to unload the shipment.

Construction News

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

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

RECENT INCORPORATIONS

***Georgia Electric Company, Atlanta, Ga.**—Chartered in Georgia to build electric railways and other public utilities in Georgia. Capital stock, \$5,000. Incorporators: B. O. Bittick and W. M. Bennett.

***Petersburg & James River Railway, Petersburg, Va.**—Incorporated in Virginia to build an 11-mile electric railway from Petersburg to City Point. Headquarters: Petersburg. Capital stock, \$25,000. J. Walter Long, 801 Real Estate Trust Building, Washington, D. C., president; B. B. Wilson, vice-president, and Bestor R. Walters, Washington, D. C., secretary and treasurer.

FRANCHISES

Corona, Cal.—The Pacific Electric Railway has received a franchise from the City Council to extend its lines in Corona.

Fresno, Cal.—The Fresno Interurban Railway has received a franchise from the Council for a double track line from Belmont Avenue and Fresno Avenue along Belmont, Valeria, Merced and L Avenues to the southeastern city limits of Fresno. Work on this line will be begun at once.

Lynn, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway has received a fifty-year franchise from the Council for an extension in Lynn.

Riverside, Cal.—The Southern Pacific Company has asked the Council for an abandonment of its franchise rights on Market Street, Riverside, with the idea of turning the entire rights over to the Pacific Electric Company under the parallel franchise recently granted the latter company.

Methuen, Mass.—The Bay State Street Railway has asked the Council for a franchise to alter, relocate and extend some of its tracks in Methuen.

Mayville, N. Y.—The Columbus & Mayville Railroad has asked the Council for a franchise in Mayville. C. P. Northup, Corry, Pa., president. [Feb. 6, '15.]

Poland, N. Y.—The Town Board of Poland, Chautauqua County, has authorized the town superintendent of highways to sign the franchise for the Hamburg-Falconer Electric Railway. This is the first franchise secured for this proposed line, which will connect Jamestown and Buffalo. Work must be started within one year from the date the franchise is secured for the entire distance. [April 29, '13.]

Durham, N. C.—The Durham Traction Company has asked the Council for a franchise for an extension on Holloway Street in Durham.

***Linnton, Ore.**—O. M. Clark, Richard Shepard and J. B. Holbrook, Linnton, have asked the County Commissioners for a franchise to operate an electric railway between Nicolai Street and the northern limits of Linnton and to extend it to Portland. This is part of a plan to build an electric railway, financed by residents of Linnton and points between Linnton and Portland, to be operated over the right-of-way given up by the United Railways on April 1.

Dallas, Tex.—A petition asking extension of the Dallas Northwestern Traction Company and Dallas Southwestern Traction Company franchises for a period of six months was filed with the Board of Commissioners recently by E. P. Turner and S. P. Cochran, present holders of the franchises. The franchises cover contemplated interurban lines to Denton on the north and Glen Rose on the south. Financial conditions have been such that the holders of the franchises have been unable to finance operations, but they expect within the next six months to sell bonds which will insure the construction of 20 miles of interurban line. This would be completed under the terms of the extension by May 10, 1916. [Feb. 27, '15.]

Petersburg, Va.—The Petersburg & Appomattox Railway has received a franchise from the Council in Petersburg. This is part of a plan to build a 12-mile line between Petersburg and City Point. T. M. Wortham, Richmond, Va., president. [March 27, '15.]

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company is asked to consider plans to extend its Monroe Street loop east to Fourth Street, and thence south to Washington, and to build a new line down Fourth Street from Roosevelt Street, thus abandoning its entire line on First Street in Phoenix.

Columbus, Ark.—Plans are being made to resume work on the proposed electric railway between Columbus and Washington, Ark. About 4½ miles of grading have been completed and are now ready for rails. Work was suspended last fall on account of financial conditions. Rufus S. Stout, Pine Bluff, promoter.

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company announces that it has appropriated \$60,000 to rebuild several of its lines in Fort Smith. The line from the carhouse to Electric Park will be repaired first. The grade will be reduced and the adjoining road raised. The present track will be used again. The North Thirteenth Street line will be rebuilt, as will a portion of the Grand Avenue line. New track will be used on the former. The entire system between Fort Smith and Arkoma, Okla., will be rebuilt and new track will be used.

Jacksonville & Florida Railway, Jacksonville, Fla.—Preliminary arrangements are being made by this company for its proposed interurban line between Jacksonville and Middleburg. The company owns water power which will develop 10,000 hp, enabling it to generate current sufficient to not only operate its trains but to provide light for all the surrounding towns. Sayville H. Thorpe, Jacksonville, is interested. [Feb. 27, '15.]

***Aurora, Midland & Western Railway, Aurora, Ill.**—This company has been organized to finance a new electric interurban railway to connect Aurora, Mendota, Somonauk, Sandwich, Plano, Bristol and Meriden.

Centralia (Ill.) Traction Company.—This company has extended its line 1 mile in Wamac.

Kankakee-Lafayette Electric Railway, Kankakee, Ill.—Preliminary arrangements are being made by this company to build the proposed electric railway to connect Kankakee and Lafayette. O. L. Brown, general manager. [Jan. 30, '15.]

La Salle (Ill.) Railway.—Surveys are being made and right-of-way secured by this company for its electric and steam line between Oglesby and La Salle. J. B. McCoffrey, La Salle, president; J. H. Ellis, Chicago, vice-president; B. M. McDonald, Chicago, secretary, and R. W. Thompson, La Salle, treasurer. [May 2, '14.]

Moline, Rock Island & Eastern Traction Company, Moline, Ill.—During the next few weeks this company expects to repave and double track its line on Seventeenth Avenue between First Street and Seventh Street in the city of East Moline.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—This company has begun construction of the first section of its proposed line. The work is being done along the route from Peoria to Banner in Fulton County and is under the direction of Webster Bushnell, chief engineer. The route of the first section of the line extends from Peoria to Hollis over the Peoria Terminal tracks and from Hollis to Banner through Orchard Mines, Mapleton and Kingston Mines. The second section of the line extends from Banner to Lewistown and a branch is to extend from Banner to Canton, a few miles away. Terminals on the main line will be at Astoria, Rushville, Mt. Sterling, Columbus and Quincy. Instructions to begin work were issued on April 21 following a meeting of the board of directors. Stock in the company is finding a ready sale. [March 13, '15.]

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.—This company has under construction 8½ miles of track rehabilitations and extensions in Cedar Rapids. This track is all being laid with 70-lb. 7-in. T-rail on wooden ties with a 6-in. tamped ballast foundation. Reconstructions and extensions of the overhead trolley lines also form a part of this year's construction schedule.

Union Electric Company, Dubuque, Ia.—Plans are being made by this company to rebuild 2 miles of track, including overhead and special work. This work has been undertaken on account of repaving and extensions in Dubuque.

Arkansas Valley Interurban Railway Company, Wichita, Kans.—Orders for materials are being placed by this company to build its extension from Halstead to Hutchinson.

Brandon (Man.) Municipal Railway.—The City Council contemplates laying new tracks on Thirteenth Street, Fourteenth Street and College Street in Brandon, to cost about \$14,000. All material is in stock. R. E. Speakman, engineer.

***Transcona, Man.**—Plans are being made to construct an electric line from the corner of Oxford Street and Regent Street, Transcona, to the western limits of the town, to connect with the Winnipeg Street Railway on Talbot Avenue, Elmwood. W. J. Christie, Union Bank Building, Winnipeg, is interested.

Battle Creek, Coldwater & Southern Railway, Coldwater, Mich.—This company advises that it expects soon to close a contract to build its line between Battle Creek, Coldwater and Girard. T. A. Hilton, president. [Nov. 14, '14.]

Muskegon, Casanovia & Saginaw Interurban Railway, Muskegon, Mich.—Surveys are being made by this company for its 92-mile line between Muskegon and Ithaca. James L. Smith, secretary. [April 17, '15.]

Saginaw-Bay City Railway, Saginaw, Mich.—During the next two weeks this company expects to award contracts to double track about 1 mile of its line in Saginaw.

Electric Short Line Railway, Minneapolis, Minn.—A contract has been signed by this company and the city of Park Rapids assuring the extension of this line to Park Rapids, thereby making that city its northern terminal.

United Railways Company, St. Louis, Mo.—Plans are being contemplated by this company for an extension of its lines in the northwestern section of St. Louis in the Walnut Park District.

Brooklyn, N. Y.—Bids are desired until May 18 by the Public Service Commission, First District, 154 Nassau Street, New York, N. Y., for the construction of Section No. 2 of Route No. 49, being a part of the Culver Rapid Transit Railroad, a three-track elevated railroad in Brooklyn, beginning at a point in Gravesend Avenue, about 525 feet south of Bay Parkway and extending southerly over Gravesend Avenue and Shell Road to a point about 525 ft. south of Avenue X.

Corona, N. Y.—Right-of-way between Corona and Lakeville for a new electric railway to be built by interests connected with the New York Central Railroad, is understood to have been secured, and it is believed that contracts for that portion of the line in Queen's Borough will be let soon. The Lakeville Holding & Development Company is said to be interested.

Orange County Traction Company, Newburgh, N. Y.—This company is rebuilding its track on the Newburgh and Cohecton Turnpike, using 107-lb. Lorain Trilby rail. Creosoted ties and single 4/0 Ohio pin-driven bonds are being used. Track will be concreted in, also concrete pavement, one course, reinforced with No. 7 American Steel & Wire Company's mesh about 2-in. from top.

New York, N. Y.—The Public Service Commission, First District, has awarded two rapid transit contracts during the last week. One was for Section No. 4 of Routes Nos. 4 and 36, for the construction of that part of the Broadway subway in Manhattan lying in Seventh Avenue, between Fifty-first and Fifty-ninth Streets. This went to the Litchfield Construction Company, the lowest bidder, for \$1,937,509. The other was for the construction of Section No. 2 of Route No. 12, that part of the Eastern Parkway subway in Brooklyn lying between Prospect Park Plaza and a point about 600 ft. east of Nostrand Avenue. This award was made to the Inter-Continental Construction Corporation, the lowest bidder, for \$2,744,263.

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—This company is now building a 7-mile line from Chauncey, Ohio, to Athens, Ohio, and plans to have this branch in operation about May 15.

***Niagara Falls, Ont.**—The Department of Public Works has under consideration plans, drawings and specifications for a sight-seeing electric railway, which a private corporation wishes to construct across the Whirlpool Rapids.

Toronto (Ont.) Railway.—Plans are being made by this company to rebuild its line on College Street from Bathurst Street westward, in Toronto.

Portland & Oregon City Railway, Portland, Ore.—Track has been laid by this company through Milwaukie from the south side to Witte's Park on the north side. From Milwaukie toward Portland considerable grading has been done. Toward the southeast the line has been graded to and beyond Clackamas Station, nearly to Baker's Bridge across the Clackamas River, the terminus of the line for this year.

Portland Railway, Light & Power Company, Portland, Ore.—Plans are being considered by this company for the extension of one of its lines out of Portland, either the Mount Hood, Cazadero or Boring lines beyond Sandy for a distance of 8 miles.

Butler & Grove City Railway, Grove City, Pa.—Material has been received and plans are being made to begin work at once by this company on its line between Grove City and Slippery Rock. Eventually this line will extend from Grove City to Conneaut Lake via Sandy Lake.

Hanover & McSherrystown Street Railway, Hanover, Pa.—During the next thirty days this company expects to buy 41,000 ft. of 7-ft. girder rails to rebuild some of its track in Hanover.

Hershey (Pa.) Transit Company.—It is reported that this company plans to begin work about May 15 on its extension from Hershey to Jonestown.

Johnstown & Somerset Street Railway, Johnstown, Pa.—Surveys are being made by this company for its proposed line between Johnstown and Rockwood. It is the intention of this new company to connect its system with that of the Johnstown Traction Company at Kelso, about 5 miles south of Johnstown, and to enter Johnstown over these lines. The traffic agreement with the Johnstown Traction Company, however, has not been signed. [March 27, '15.]

Beaver Valley Traction Company, New Brighton, Pa.—During the next few weeks this company plans to rebuild 3600 ft. of new track in New Brighton.

Scranton & Binghamton Traction Company, Scranton, Pa.—This company is operating its line from Binghamton and Scranton as far as Brooklyn, Pa., and grading has been completed to within 3 miles of Montrose. It is expected to have the line in operation to Montrose this summer.

Sioux Falls (S. D.) Traction System.—This company reports that it expects to pave about 2 miles of track this season, part of which is already contracted for.

***Bristol, Tenn.**—An electric railroad from Bristol to Kingsport, to connect at that point with the Carolina, Clinchfield & Ohio Railway and a new electric line to be built from Kingsport to Newport is being promoted. The construction of the electric line from Newport to Kingsport is already assured.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company is rebuilding 3000 ft. of track on Yale Avenue and has completed double tracking the Fountain City line, which doubles that line except for a short distance in Knoxville. Shopwork is nearly completed on the open cars.

Dallas (Texas) Southwestern Traction Company.—This company will enter Dallas over the proposed Commerce Street viaduct which will bridge the numerous tracks of the Union Terminal Company on the east bank of the Trinity River, if negotiations which were begun April 21 are successful. Plans for the viaduct have already been drawn, but if the electric line uses this entrance to Dallas new plans for heavier construction will have to be made. The officials of the traction company have proposed to the railroad committee of the Chamber of Commerce and City Commissioners that the traction company pay the increased cost of heavier construction for the use of the viaduct.

***Marfa, Tex.**—B. Q. Musgrave, Fort Worth, and associates are making plans to build an 18-mile electric interurban railway from Marfa to Fort Davis.

Ogden, Logan & Idaho Railway, Ogden, Utah.—Work will be begun at once by this company on its Brigham-Wellsville extension a distance of 35 miles. [April 10, '15.]

Ogden Rapid Transit Company, Ogden, Utah.—An extension of this company's line from Idlewild in Ogden Canyon to Huntsville will be built at once by the Utah Construction Company.

Ogden, Logan & Idaho Railway, Ogden, Utah.—This company has placed in operation its line to Preston.

Morgantown & Wheeling Railway, Morgantown, W. Va.—Grading has been completed by this company from Morgantown to Blacksville, via Cassville, Core and Pemtress, 24 miles, and track has been laid for half the distance. Bridges are being erected along the line.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—During the next eight weeks this company will award contracts to build an extension of about ½ mile in the city of Sheboygan.

Janesville & Madison Traction Company, Madison, Wis.—The Wisconsin Railroad Commission has issued an order authorizing this company, which proposes to build an interurban line from Madison to Janesville, to issue \$22,000 in bonds. The revenue from these bonds and from the \$8,000 of stock which the company was last week authorized to issue, will be used to build that part of the line extending from Madison to the town hall in Blooming Grove, 2½ miles. [April 24, '15.]

SHOPS AND BUILDINGS

Tri-City Railway, Davenport, Ia.—Plans are being made by this company to build a new carhouse in Davenport.

Boston (Mass.) Elevated Railway.—Plans are being made by this company to build a new depot on Commonwealth Avenue and Beacon Street in Boston. The structure will be of brick and concrete construction.

Boston & Worcester Street Railway, Worcester, Mass.—Official announcement of the proposed concentration of its entire operating force in Framingham has been made by this company. A new carhouse will be built in Framingham to replace the one burned about three months ago in Westboro. A machine shop and foundry will also be erected and repair shops and paint shops of the company will be built in Framingham. The new carhouse will have a capacity of twenty-four cars and will be of brick and concrete. The machine, repair and paint shops will be of similar construction. The carhouse in Wellesley will be used only for storage.

Otsego & Herkimer Railroad, Cooperstown, N. Y.—Plans are being made by this company to build a new passenger station in Richfield Springs. The structure will have a frontage of 63 ft. and will be about the depth of the present quarters. It will contain the offices of the company and also the offices of the Colliers' Heat, Light & Power Company, and a restaurant.

Hudson Valley Railway, Glens Falls, N. Y.—Work will be begun at once by this company on the construction of its new passenger station in Saratoga Springs. It is estimated to cost about \$25,000.

Niagara Gorge Railroad, Niagara Falls, N. Y.—This company has completed its new carhouse in Niagara Falls.

Slate Belt Electric Street Railway, Penn Argyl, Pa.—Preliminary arrangements are being made by this company to build a new carhouse and repair shop in Wind Gap, Pa. Work will be begun about July 1.

POWER HOUSES AND SUBSTATIONS

Fort Smith Light & Traction Company, Fort Smith, Ark.—This company has awarded a contract for one 500-kw motor generator with 700-kva motor for its power house in Fort Smith.

San Joaquin Light & Power Company, Bakersfield, Cal.—Plans are being made by this company to construct a new hydroelectric power plant at Merced Falls. The power line from Merced Falls to Merced will be raised from 30,000 volts to 60,000 volts. This plant will supply Merced County, mines of Mariposa County and gold dredgers working on the Merced Falls.

Joliet & Eastern Traction Company, Joliet, Ill.—During the next ten weeks this company plans to award contracts to build a new power plant with an initial installation of 1000 kw.

Columbus, Delaware & Marion Electric Railway, Cincinnati, Ohio.—A new substation will be erected in the near future by this company at Bellefontaine and Davids Streets in Marion.

Manufactures and Supplies

ROLLING STOCK

Dayton (Ohio) Street Railway expects to purchase within the next two weeks one snow sweeper.

Saginaw-Bay City Railway, Saginaw, Mich., has ordered one work car from the St. Louis Car Company.

Cincinnati & Columbus Traction Company, Norwood, Ohio, is in the market for two center-dump ballast cars.

Chicago & Interurban Traction Company, Chicago, Ill., expects to be in the market shortly for four interurban car bodies.

Michigan Railway, Kalamazoo, Mich., has ordered eight 50-ft. all-steel freight trailers from the St. Louis Car Company.

Columbus Railway & Light Company, Columbus, Ohio, expects to purchase a car designed especially for street cleaning purposes.

Jackson Light & Traction Company, Jackson, Miss., is in the market for five very light single-truck double-end one-man cars, including small wheels and motors.

Union Traction Company, Coffeyville, Kan., has ordered one locomotive baggage car from the St. Louis Car Company, to be equipped with St. Louis No. 61 trucks.

Beaumont (Tex.) Traction Company is reported as having been authorized by the Beaumont City Council to replace seven of its cars with seven new single-truck cars.

Anniston Electric & Gas Company, Anniston, Ala., has ordered, through the Phoenix Construction Company, New York, two 21-ft. thirty-two-passenger steel car bodies from the Southern Car Company, to be equipped with Brill 21-E single trucks.

Carolina Power & Light Company, Raleigh, N. C., has ordered, through the Phoenix Construction Company, New York, three 21-ft. thirty-two-passenger steel car bodies from the Southern Car Company, to be equipped with Brill 21-E single trucks.

Huntsville Railway, Light & Power Company, Huntsville, Ala., has ordered through the Phoenix Construction Company, New York, four 16-ft. twenty-four-passenger steel car bodies from the Southern Car Company, to be equipped with Brill 74-M2 single trucks.

Ogden, Logan & Idaho Railway, Ogden, Utah, is having built by The J. G. Brill Company twelve large all-steel interurban cars. Two of this type were built a year ago. These twelve cars have been on option for a year. This railway company is in the market for six 64-ft. steel trailer coaches of a design which later, if desired, would be suitable for motor operation.

New York & Queens County Railway, New York, N. Y., has been instructed by the Public Service Commission, First District of New York, to contract by June 1, 1915, for additional car equipment for its various lines in order to provide this equipment not later than Oct. 1, 1915. The railway company is further instructed to notify the commission by May 4 whether the terms of this order are accepted.

Manhattan & Queens Traction Corporation, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of April 10 as considering the purchase of ten new cars, has assigned the purchasing agency of these cars to H. L. Doherty & Company, New York. Bids have been received from the car-builders. Though the actual type, as to center or end entrance, has not yet been decided, the cars will be considerably lighter than those now in operation on the line.

TRADE NOTES

Western Electric Company, New York, N. Y., has located its distributing house in Kansas City in new quarters at 608-610 Wyandotte street, opposite the old building which served as its headquarters for the past ten years.

Esterline Company, Indianapolis, Ind., has received an order from the city of Regina, Regina, Sask., for 28 SE-95 "Golden Glow" headlights to be used on the cars of the municipal railway. This order was placed through Dawson & Company of Winnipeg.

Curtain Supply Company, Chicago, Ill., has received an order to equip with ring fixtures and Rex all-metal rollers the Pantasote curtains of the 478 car bodies recently ordered by the Interborough Rapid Transit Company, New York, from the Pullman Company.

Mark D. Batchelder, president of the Mark D. Batchelder Company, Peoria, Ill., has resigned to become president of the Traction Advertising Company, also of Peoria. Mr. Batchelder organized this new company and will continue to engage in handling car advertising.

Ohio Brass Company, Mansfield, Ohio, has received an order for the catenary construction of the Kansas City, Kaw Valley & Western Railway's new 23-mile extension, and another order for 12 miles of d.c. bracket construction line material from the St. Tammany-New Orleans Railway & Ferry Company, Mandeville, La.

Johnson Fare Box Company, Chicago, Ill., has received an order from the United Railways of St. Louis for 160 fare boxes for immediate delivery. Additional orders have also been received from the Jacksonville (Fla.) Traction Company, Houston (Tex.) Electric Company and Puget Sound Traction, Light & Power Company, Seattle, Wash.

Western Electric Company, New York, N. Y., has shipped to the Greek government three boatloads of telephone poles. The shipments were made in forty-five carloads from the concentration yard of this company at Toledo, Ohio, and consisted of 15,000 4-in. top, 20 ft., and 2000 5-in. top, 25 ft. northern cedar poles. The entire shipment weighed 2,000,000 lb.

H. McL. Harding, consulting engineer, New York, has moved his office from 17 Battery Place to 52 Vanderbilt Avenue at the corner of East Forty-fifth street. Mr. Harding for many years was connected with the electric railway industry and recently has been giving his attention to terminal equipment and freight-handling machinery as well as location designs and plans for marine and railway terminals.

Hart Manufacturing Company, Hartford, Conn., manufacturer of "Diamond H" products, including push button switches, rotary flush and rotary surface switches, remote control switches, automatic door switches, ground clamps, etc., has removed its New York office to Room 1034, 30 Church Street, the Hudson Terminal Building, with the old telephone number Cortland 487. Frank E. Watts is district manager of the company at New York.

Joseph Dixon Crucible Company, Jersey City, N. J., at its annual meeting on April 19 elected the following directors: George T. Smith, Robert E. Jennings, George E. Long, E. L. Young, William G. Bumsted, J. H. Schermerhorn and Harry Dailey. The officers elected by the board of directors are: president, George T. Smith; vice-president, George E. Long; treasurer, J. H. Schermerhorn; secretary, Harry Dailey; assistant secretary and assistant treasurer, Albert Norris.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received orders for portable meters from a number of electric railways in Illinois, which are purchasing this material in compliance with orders from the Illinois State Utilities Commission. The Illinois Traction System ordered nineteen Type U graphic voltmeters, twenty portable standard watt-hour meters, nineteen portable voltmeters, together with a number of other miscellaneous portable instruments of the laboratory type. The Southern Illinois Light & Power Company, Hillsborough, Ill., has also ordered eight portable graphic voltmeters and two ammeters of the same type, four portable wattmeters, two portable voltmeters and ammeters, two portable current transformers, and two each of the switchboard type graphic voltmeters and voltmeters, together with a varied assortment of other types of laboratory instruments. This manufacturing company has also received an order from the Chicago & Milwaukee Electric Railroad for fifteen quadruple equipments of Type No. 557-A, 140-hp motors with double-end Type "HLF" control. These equipments are to be placed in high-speed passenger express service between Chicago and Milwaukee. The cars will be arranged for train operation.

ADVERTISING LITERATURE

Union Spring & Manufacturing Company, Pittsburgh, Pa., has removed its Pittsburgh office from the Oliver Building to the First National Bank Building.

E. W. Clark & Company, Philadelphia, have issued loose-leaf sheets, to be bound with their periodical financial statements, describing the location, mileage, physical property, inter-corporate relations, franchises and population of territory served for the different electric railways in which the company is interested. The capitalization of each company is also stated.

Transmission Engineering Company, Pittsburgh, Pa., has issued a folder describing its electrical steel work and outdoor substations for all voltages and capacities. The folder contains a number of illustrations of structures of various designs, applied to differing demands of local conditions, built by this company for high-voltage transmission, distribution and substation work.

American Creosoting Company, New York, N. Y., has issued a bulletin describing its Brownie wood block for pavements in city streets and for interior work, as heavy traffic floors in machine shops. This flooring is especially recommended because of its durability. The wear, coming on the end of the grain of the wood, is said merely to compress and harden the surface. In addition, wood blocks are clean, waterproof, sanitary and warm under foot. Unlike cement floors, they furnish a warm and resilient footing for workmen. This company is also prepared to take orders for creosote ties in any quantity.

Harvey Fisk & Sons, New York, have prepared a valuable 46-page illustrated pamphlet concerning the property, operations and finances of the Hudson & Manhattan Railroad. Among other matters the text covers such subjects as the route, the strategic location of the terminal, the capacity of the tunnels, the provision for safe operation and the welfare work of the company. Copies of the latest financial statements are included, and the securities of the company as well as the amortization bonds and franchises are lucidly described. Well-chosen halftones show the construction of the tubes, the safety devices used and the special features of the Hudson Terminal building, while the connecting subway lines in New York City and the connecting steam railroad and trolley lines in New Jersey are indicated on maps. In short, the pamphlet will be found to contain a reply to almost any question that can be raised by investors about the affairs of this company.

Lord Manufacturing Company, New York, N. Y., has issued a catalog covering the following hand power brakes: Giant perfected brake, Lord differential staffless brake, Giant brake and Sterling safety brake. The publication will be of special interest to the electric railway trade by reason of the section devoted to data pertaining to the determination of the proper braking pressure through the hand power brake. There are numerous illustrations of both common incorrect as well as correct car-body and foundation truck rigging, followed with a valuable discussion leading up to formulas which accompany each illustration showing how to determine the percentage of braking pressure on practically every type of electric car equipment. This publication being the combination of a catalog and a manual on hand brake equipment, prepared in simple and practical form, should form a convenient, ready reference to car equipment engineers, superintendents of equipment, master mechanics and car foremen.

Simmen Automatic Railway Signal Company, Buffalo, N. Y., has issued an interestingly compiled catalog which contains a general description of its signaling system. This system, several installations of which are described in the catalog, embodies the following fundamental units: (a) continuous cab signals; (b) central control of these signals by interlocking signal control levers; (c) automatic recording of train movement; (d) a novel method of combining dispatching and signaling in one system; (e) automatic open switch protection. The equipment for each motive power unit in this system consists of the signal lamp, a relay, a portable storage battery and a contact shoe mounted on the truck in such a way that it makes a contact with, and is raised by short third-rail or ramps, placed at convenient signal points along the tracks. These third-rails are connected to the dispatcher's office into line wires and signal control switches. The installations shown in the catalog includes those of the Toronto & York Radial Railway, Indianapolis & Cincinnati Traction Company, Mesaba Railway and the New York Municipal Railway.