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WIDENING OF THE STOCK MARKET

Although in the last two weeks the bond market has continued to broaden and develop increasing strength, the tendency is just now overshadowed by the rapidly advancing activities and prices of the stock market. "War specialties," or the stocks of companies that have already benefited from the war, seem to be the controlling and leading factors in the market, and concentrated buying is being carried on in the stocks of large structural steel, railroad equipment and other similarly constructive enterprises. The chief cause for satisfaction, however, is not that certain stock issues have advanced in price with unusual rapidity, but that the whole undertone of the market appears to have strengthened to such a degree that a reversal of sentiment in the more speculative issues would probably be insufficient to create a serious general setback. Advices are to the effect that during the last few days the investing public has shown a greater interest in public utilities securities than for months, and that there are other indications that business is entering upon a period of recuperation. While mere expressions of optimism are still more numerous than acts based on optimism, and while we do not look for an unrestricted business rejuvenation in this country until the end of the European struggle is in sight and the mania for adverse business legislation has worn itself out, yet we believe that the turning point has been reached and that progress, while undoubtedly slow, may henceforth be confidently expected.

STANDARD SAFETY RULES

Now is the time for electric railways to have their "say" in regard to the code of safety rules which the United States bureau of standards has in preparation. To be sure the contents of the code are not yet generally known, but they will be very shortly, and there will be a general conference of all interests held in Washington early in July to approve the tentative draft for preliminary publication. The American Electric Railway Association has received due consideration in the conferences held so far and will be officially a participant in the Washington conference. It is urgent that the association delegates be prepared adequately to represent the views of their constituents. While it is true that the rules to be published early in the summer are to be considered preliminary, they will have great weight with public service commissions and other regulatory bodies. These semi-transient boards will, and should, hold in great respect the recommendations of a permanent scientific-industrial bureau like the bureau of standards, especially if the recommendations are backed by official representatives of many national organizations. Hence we urge active and intelligent co-operation. Intelligent criticism now will do more good than denunciation hereafter, and, as the bureau has gone out of its way to request suggestions, there should be no lack of them from the electric railways, which have assumed a place of leadership in the safety movement.

MAIL VERSUS EXPRESS PAY

Still the controversy regarding railway mail pay—or, as might be more fittingly said, still Postmaster-General Burleson—rages. This official now publicly accuses the carriers of being insincere in asserting that they are under-paid for carrying mail, because they receive for this service much more than they have long willingly accepted for carrying express. Such a statement is irrelevant. What the railways receive for express traffic has no limiting relation upon what they should receive for mail carriage. Even if Mr. Burleson does not know this as a matter of common sense and common law, as a government official he can hardly be complimented for his non-recognition of the recent United States Supreme Court decisions in the North Dakota and the West Virginia rate cases, in which it was held that each class of railroad traffic must bear its own direct costs and its proportionate share of the overhead expenses, and that carriers cannot be compelled to do a certain class of business at non-compensatory rates. These authoritative decisions show the irremediable weakness of Mr. Burleson's argument. It is worthy of notice, however, that his statement is as incorrect as it is irrelevant. The joint congressional committee on railroad mail pay which reported last August spent two years investigating this subject and concluded emphatically that it was "compelled to reject the (postal) department's attempt to show higher relative earnings from mail as reckless and misleading."

UNITED STATES DEPARTMENT OF TRANSPORTATION

Howard Elliott, president New York, New Haven & Hartford Railroad, last week before the Norwich Chamber of Commerce made a recommendation which should have the widest publicity. In short, it was to the effect that the transportation business, by means of a federal department and representation in the President's cabinet, should receive the same recognition that has heretofore been accorded to the financial, agricultural, industrial and labor interests. No one will deny that in importance, in volume and in

effect upon national welfare, the transportation industry compares favorably with any of these other forms of activity. A department representing such an industry would serve as an accredited clearing house for all matters relating to the rights and privileges of common carriers. It would have a stabilizing effect upon the demands of the public and the commissions on the one hand and the policies and the acts of carriers on the other; in other words, it would be of inestimable worth in fostering better public relations from a point of vantage secured by governmental power and prestige. It would also be of service in helping to bring about a unification of state and national laws on the subject of transportation. It would enable the railways to have an advocate in the councils of the nation, as we presume the Secretary of Railroads, like the Secretary of Agriculture, the Secretary of the Navy and the Secretary of War, would direct his efforts toward improving the condition of his particular field. If so, the benefit of his services would be enormous, and while it would be confined directly to the interstate carriers, the intrastate electric railroads should receive indirectly a great deal of assistance through the influence of such a department on the public mind.

OBSOLESCENCE ON A LARGE SCALE

The changes now under way in the Seventy-fourth Street power house of the Interborough Rapid Transit Company in New York form an epitome of fifteen years' progress in electric power generating apparatus. The eight great engines installed during 1900 are now relegated to the scrap heap or to the job of occasional helper over extra high load peaks. Those still retained are like aged veterans who are given sinecures to enable them to keep their self-respect. These prime movers, when built, were the last word in reciprocating engine design. They were in good physical condition when retired. Those displaced were broken up because no one wanted them as engines. In the boiler house the tubes and settings were retained, to be sure, but only because they were adaptable to the new conditions of forced firing and superheat. The boilers are like the old jacknife with two new blades and a new handle. The ubiquitous turbine displaces not only the big engines on the main floor, but also, in smaller sizes, the motors which formerly drove one auxiliary or another. And as for the reciprocating pump, a few samples are preserved but only for a highly specialized duty. The secret of it all is speed; high speed of the turbine and the centrifugal pump, high velocity of air and fuel through the furnaces, rapid circulation of water in the boiler and high steam speed in the pipes. High velocity means light weight, small floor space, low cost, small radiation loss and all of the incidentals which go with these desiderata, without serious compensating disadvantages. The slow-moving power station is obsolescent because expensive to operate, the new apparatus being able to generate energy more cheaply even if required to earn interest on the difference between the first cost and scrap value of its predecessors.

SCHEDULE SPEED—A NEGLECTED FACTOR

It is significant that whenever an expert study of electric railway service is made in a large city, suggestions leading towards a more rapid movement of cars are almost invariably included. This is true of the traffic reports published in this paper during the past two years on Detroit, Fall River, Pittsburgh, Philadelphia, Providence and other places.

The increase in schedule speed thus sought is not obtained by increasing the maximum speed of the cars, a course to which there are a number of obvious objections. On the contrary, higher average speed is obtained by reducing the waste time of a run, and the result is beneficial not only to the public in more rapid transit but also to the company, as it means fewer platform men, fewer cars and fewer kilowatt-hours to perform the same service. The possibilities of this plan seem hardly to have been generally realized, but with the competition of the jitney, whose only claim for merit lies in its "non-stop" service, the question assumes possibly a new and an added importance.

Various methods are available for accomplishing this increase in schedule speed. They can logically be divided into two classes, i. e., (1) those designed to reduce the time lost in stops to receive and discharge passengers, and (2) those designed to reduce the delays not connected directly with the operation of the cars but caused by street congestion. The latter class includes methods of rerouting to reduce track crowding or to eliminate congested crossings, methods of dispatching cars across congested crossings, regulation of vehicular traffic, etc. It is not the intention here to consider particularly this latter class of delays, but rather the first class. To this, perhaps, less attention has been directed, although, on most railways, the time spent by a car outside of the congested district is usually very much greater than that spent within the congested district, hence the opportunity for time saving would seem to be considerable. That this is so is indicated by the recently published records of a thirty-four-minute city run in which the stops for passengers took twelve minutes and the free running time only twenty-two minutes, a result which may be more typical than is generally believed.

Delays to cars outside the congested district are divisible into two sections, namely, (1) the time lost by slowing down to make a stop and accelerating after a stop, and (2) the time taken by the passengers to board and leave the car. The first section is directly proportional to the number of stops that are made. The second section varies with the number of passengers who board or leave the car, in other words, with the total number of passengers per trip although the ratio is not absolutely proportional because the time of passenger interchange depends somewhat upon the number of passengers boarding or leaving at each stop, decreasing as the number of passengers increases. It is evident, then, that the problem can be attacked in two ways, by reducing the number of stops and by reducing the time of passenger interchange.

The skip-stop plan undoubtedly is the best known of the various methods which have been introduced for reducing the number of stops, and considerable stress is laid upon its advantages in the recently-published Detroit report, it being recommended for four of the main city lines. The estimated saving in Detroit is a reduction in the number of stops per mile from twelve to eight. This reduction is estimated to give an increase in the schedule speed of 10 per cent, notwithstanding the proposed use of trailers after the skip-stop has been inaugurated. Obviously this increase in schedule speed means that each unit will be 10 per cent more effective and that its capacity for transporting passengers will be increased by that amount. As evidence of the effectiveness of the plan the Detroit report cites the practice on the Superior Avenue line in Cleveland, where, in spite of the introduction of two-car units, the number of stops was reduced from fifteen to nine per mile. Forty per cent more passengers are now being carried, with the capacity of the line still well under the limit, and, in Detroit it is estimated that equally good results will be obtained. Still another suggestion for reducing the number of stops in the Detroit report is the establishment of a certain number of non-stop cars through the factory loading districts at certain times of the day to take care of the general travel at points beyond the factories.

The possibilities thus intimated in the Detroit report and shown in the Cleveland practice are too great to be ignored. The number of cities where the skip-stop has been introduced can be counted on the fingers of two hands, and possibly on the fingers of one hand, but any method which means an increase of 50 per cent in the carrying capacity of existing tracks, as well as better transit facilities and lower operating expenses, is certainly worth investigation.

But the possibilities of increasing the schedule speed without increasing the maximum speed for sections of the run outside of the congested district are not confined entirely to reducing the number of stops. The rate of passenger interchange, or the second division mentioned above, also has appreciable effects. In this there are three factors. The first is the number of passengers boarding or alighting. As the rate per passenger on a single car decreases slightly with the number of passengers per stop, a reduction in the number of stops will add a further increment to the schedule speed by increasing the average number of passengers boarding or leaving the car per stop. The second factor in the schedule speed is the habit of the people in different communities, as it has been found that the rate of passenger interchange varies in different cities. Hence the schedule speed will be increased if the railway companies can induce the passengers to move more quickly. The third factor relates to the arrangements at the stopping points and on the car for receiving and discharging passengers rapidly. This is affected by the size, number and location of exits and entrances, by the extent of the reservoir capacity for boarding passengers on the car and for waiting passengers outside of the car, by whether stopping points are distinctly marked, by the use of extra front-end collectors at crowded terminals, etc.

These methods of increasing the carrying capacity of a crowded electric railway line differ radically from the usual popular remedy, which is to add more cars, a plan which on most city lines which are near their capacity would be a detriment rather than an advantage. In fact, the Detroit report already mentioned brings out this point very clearly by its apt statement that "increasing the number of cars to reduce crowding only tends to make conditions worse unless running time, stops and crossing delays can be reduced."

PUBLICATION OF COST FIGURES

When an engineer is requested to point out wherein the paper of his profession can be improved, he is most likely to say: "You ought to publish more costs." Whereupon the editor smiles a weary smile, not of disdain but of ineffable sadness. It is a fact that nothing is more keenly sought by technical papers than costs first, costs second and costs last. But few engineers are willing to make public this information in detail, and still fewer executives will sanction such a course by a broad-minded subordinate.

A stock objection raised by the operator, when costs are requested, is that such figures would be of no use as a guide to others. And then our old bugaboo "local conditions" is trotted forth with all the impressiveness of the stuffed lion in a Christmas pantomime. Of course, it is not pretended that figures are everything. In fact, figures offer only a starting point; but a starting point we must have.

The objection to giving out costs has lost much of its force in view of the detailed accounting data that must now be filed with public utility commissions. Many of these data are available to anyone who cares to copy them; but unless the corporation is willing to aid in their interpretation, the most misleading conclusions may be drawn, for in the broadest sense the word "costs" must be understood to include an explanation of accounting practices and engineering standards. To illustrate: One company includes the service cars in its "maintenance of cars" account; a second does not; and a third charges the car equipment department for the use of service cars at a car-mile rate, which includes a charge for energy and other items usually ignored. As these diverse practices do not appear in the reports as published, the most efficient operator might well seem to be the least efficient.

Apropos of misinterpreted figures, a certain engineer protested quite vehemently at a published comparison with his costs as taken from a government publication. Yet a few months before the same engineer refused to permit the publication of a descriptive article, with costs, that would have placed the practices of his company in a more desirable light.

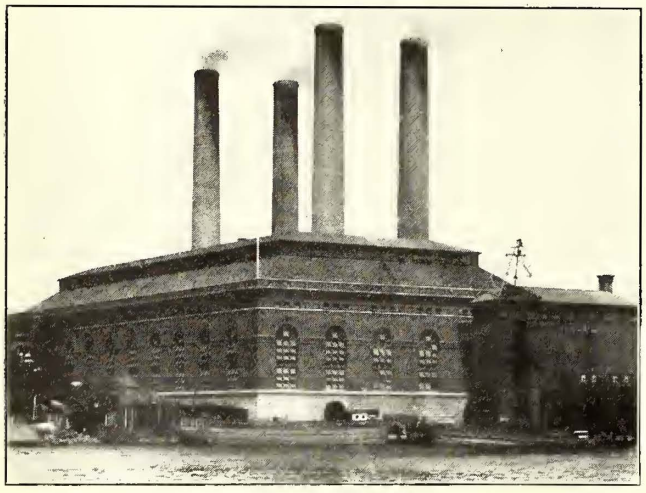
In short, engineers and executives should give up the idea that they lay themselves open to attack when they permit costs to be published. The unmistakable trend of the times is toward publicity; and as with liberty, the evils of publicity are curable by still more publicity.

Interborough Power Plant Enlargement

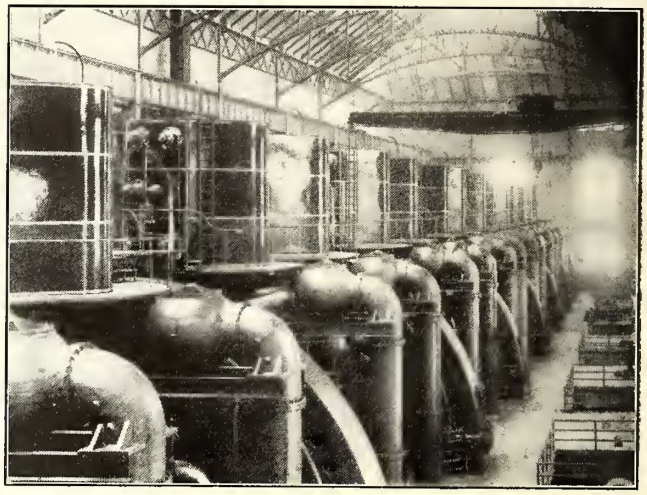
One-Half of the Seventy-Fourth Street Power Station, Which Supplies Power to the Elevated Railways, Is Being Remodeled, Increasing Its Capacity by 300 Per Cent on the Same Floor Space

On account of the prospective increase in the demand upon the power-generating plants of the Interborough Rapid Transit Company in New York, due to the third-tracking of the elevated lines, the Seventy-fourth Street station is being remodeled. The changes are now approaching completion, two out of three new 30,000-kw turbo-generator units being in operation, and carrying all of the load except during the peaks when the remaining 7500-kw turbine and four reciprocating engines are sometimes called upon for assistance. One unit, shown in Fig. 3, is finished complete, and the second is undergoing an exhaustive series of tests. The foundations for the third unit are under construction.

The remodeling, which is being done with a view to the ultimate installation of a total of eight 30,000-kw units, is being carried on within the original building. For the present it involves principally the substitution of three turbine generators for four engine generators (see Figs. 4 and 5); the making over of one-half of the boiler plant opposite the turbines by replacing Roney stokers with Taylor underfeed stokers, adding superheaters and removing the economizers; the partial replacement of motor-driven triplex, with turbine-driven centrifugal boiler-feed pumps, and the complete rearrangement of the electrical switching system with the addition of current-limiting reactors.



INTERBOROUGH POWER PLANT—FIG. 1—VIEW OF SEVENTY-FOURTH STREET STATION

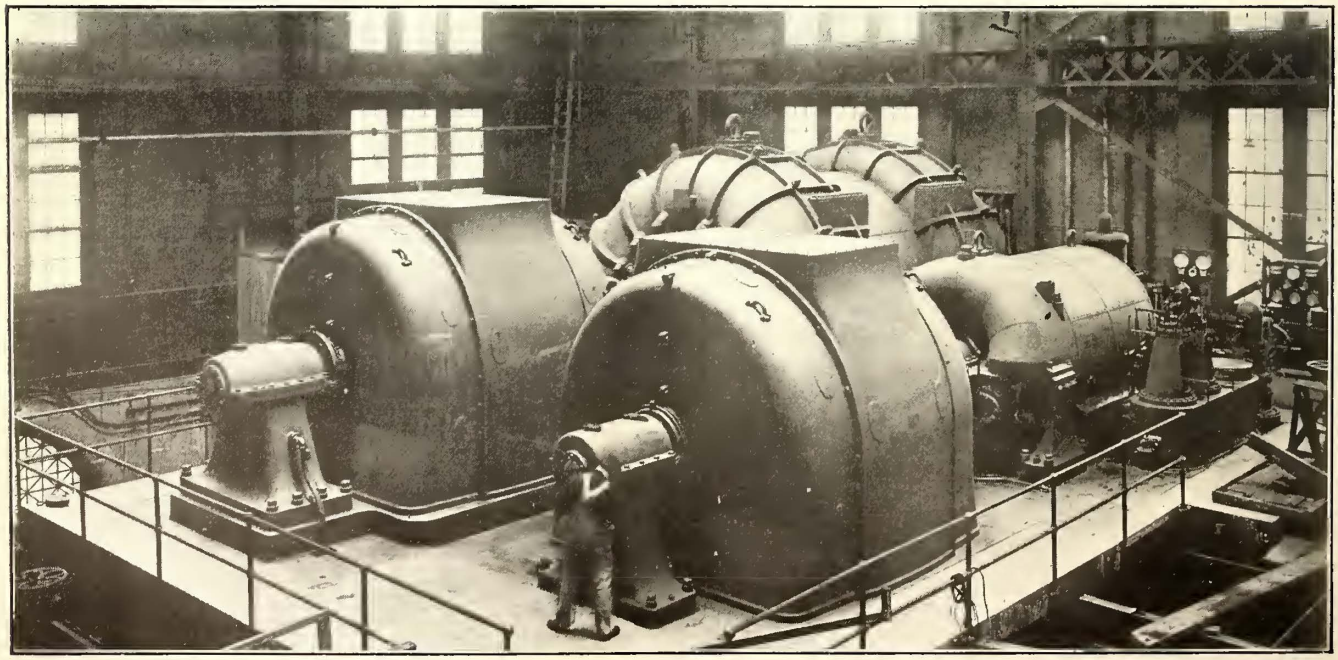


INTERBOROUGH POWER PLANT—FIG. 2—INTERIOR BEFORE ALTERATIONS

The Power Plant of 1901

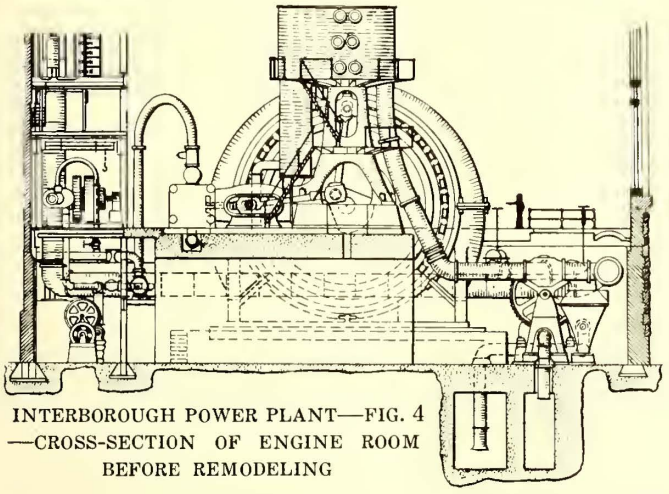
The old power plant,* built during 1901, was the model steam power plant of that time. Its appearance

*This plant was fully described in the issue of the Street Railway Journal for Jan. 5, 1901.



INTERBOROUGH POWER PLANT—FIG. 3—NEW TURBINE UNIT

is shown in Fig. 2. It contained eight Reynolds, Allis-Chalmers double, horizontal-vertical, cross-compound engines of 12,000-hp actual or 8000-hp normal rating each, driving 11,000-volt, revolving-field Westinghouse alternators, the largest built to 1901. Each engine unit was essentially two separate compound engines at the ends of the shaft, each having a 44-in. high-pressure cylinder and an 88-in. low-pressure cylinder and of 60-in. stroke, the speed being 75 r.p.m. By the 135-



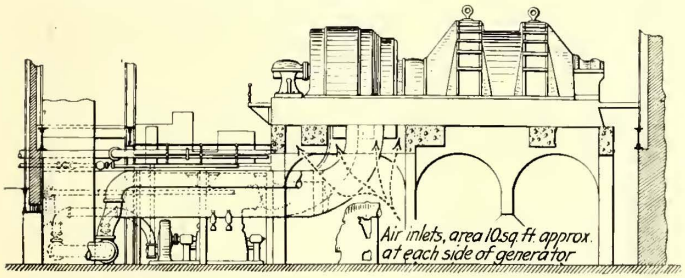
INTERBOROUGH POWER PLANT—FIG. 4—CROSS-SECTION OF ENGINE ROOM BEFORE REMODELING

deg. setting of the cranks eight impulses per revolution were obtained.

The revolving weight on the bearings of each of the engines was 439,000 lb., and an allowance of 70,000 lb. more was made to provide for magnetic pull between field magnet and armature. The shaft itself weighed 63,000 lb. On account of the great mass of the revolving field magnet it was possible to dispense with the flywheel, a notable advance in slow-speed generating-unit design. To these engines was later added a 7500-kw Westinghouse turbine unit.

The engines exhausted into Worthington jet condensers with triplex motor-driven circulating pumps. These were changed, about 1903, to the barometric type.

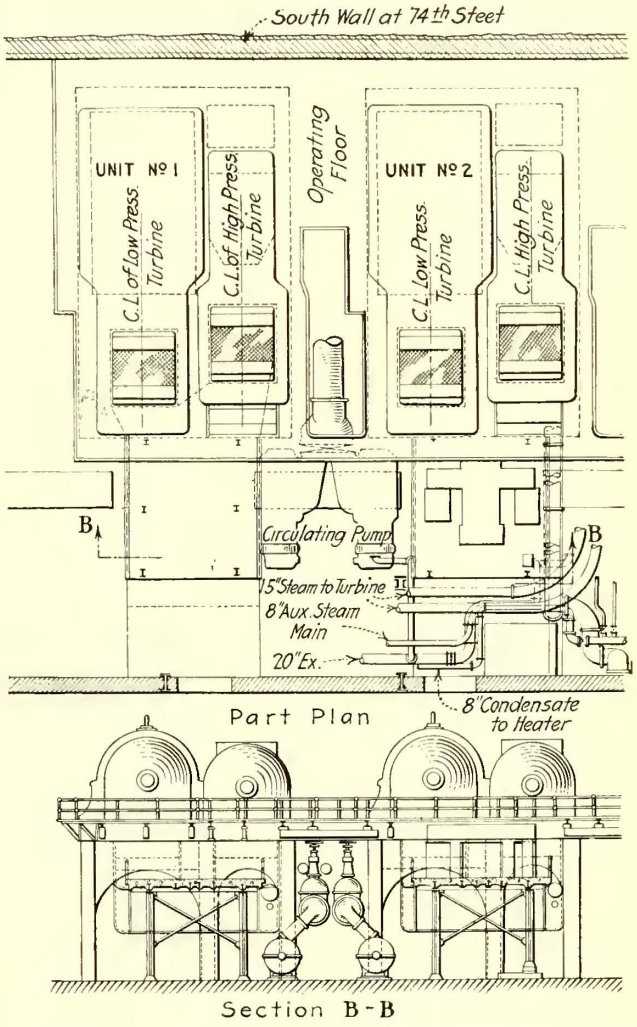
The boiler house consisted of a basement, two boiler floors and a row of coal bunkers, the height from the basement to the top of the monitor being 128 ft. The basement was divided into three longitudinal compartments for the purpose of protecting the pumps from the dust produced by the ash-handling machinery. On each boiler floor were thirty-two B. & W. boilers, with



INTERBOROUGH POWER PLANT—FIG. 5—CROSS-SECTION OF ENGINE ROOM AFTER REMODELING

Roney stokers, each rated at 520 nominal horse-power and containing 5200 sq. ft. of heating surface. These were arranged in batteries of two, eight boilers to an engine, the whole forming a generating unit. The boiler house was provided with four Custodis brick stacks of 17-ft. flue diameter at the top and 18 ft. at the bottom, 278 ft. high above the basement floor, the tallest stacks of the kind constructed in this country to that time. A Green economizer was provided for each four boilers, as it was deemed necessary to have these to heat the feed water, all of the auxiliaries being electrically driven. Each unit was served by an electrically-driven Goulds triplex boiler feed pump. Above the boiler floors was a row of three coal bunkers, separated by 35-ft. spaces for fire protection, having a total capacity of 7500 tons, a ten-day supply.

The building housing this plant, seen in Fig. 1, extends from Seventy-fourth to Seventy-fifth Street along the East River, with a width of 204 ft. 4 in. and an average length of 404 ft. It is divided by a longitudinal wall into engine and boiler houses, respectively 93 ft. 6 in. and 104 ft. 2 in. wide. The basements of these are on the same level, 4 ft. 6 in. above high water

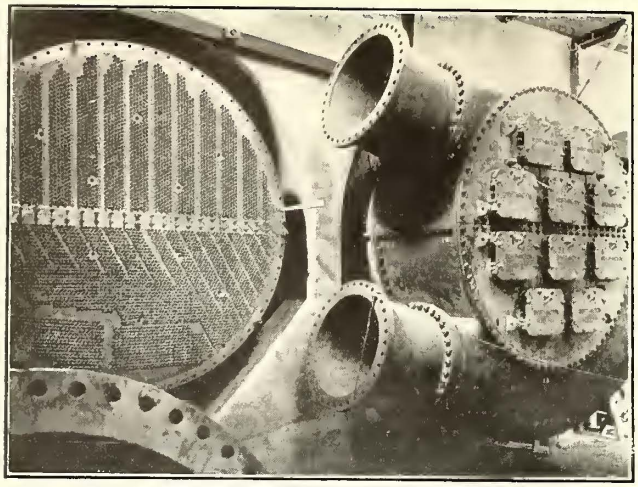


INTERBOROUGH POWER PLANT—FIG. 6—GENERAL LAYOUT OF TURBINE UNIT

and 2 ft. 6 in. below Exterior Street, which lies between the plant and the river. Extending across the west end of the building is a vault 18 ft. wide divided into two parts, one for oil storage and the other for switch control storage batteries. The roof of this vault serves as a roadway from street to street on the level of the lower boiler-room floor.

The coal and ash-handling plant consists of two towers on the river bank for unloading coal and storing ashes, connected by bucket and belt conveyors with the power plant, distributing and collecting in the manner now standard in such plants. A feature of the tower design was the provision for hoisting coal from barges with a 1½-ton shovel just high enough to give the fall necessary for passing it through the crushers and weighing hoppers.

In the engine house were the basement, 21 ft. 6 in.



INTERBOROUGH POWER PLANT—FIG. 7—CONDENSER AND SECTIONS OF PIPING

high, the operating floor, 107 ft. to the roof, and on one side three switchboard galleries, under the lowermost of which the engine-driven exciter sets were placed. A 50-ton electric crane traversed the length of this house.

The important features of the switching apparatus were the layout of group switches and the use of General Electric motor-operated switches. There were two complete sets of busbars connected by bus junction switches to permit of the operation of the alternators in either two or four batteries. The feeders from one substation formed one group controlled by a group switch in addition to the individual feeder switches. On the benchboard dummy busbars were placed to give the operator a graphic representation of the connections.

THE POWER PLANT OF 1915

The changes listed in the second paragraph, together with incidental changes, will be discussed in the order therein followed. The turbines, fully lagged, will appear as shown in Figs. 3 and 5. They have been rather fully described in the technical press so that only a few salient features need be mentioned. Each cross-compound unit consists of two turbines, a 1500-r.p.m. single-flow reaction turbine, and a 750-r.p.m. double-flow reaction turbine connected as a compound machine with a large receiver between elements. This novel arrangement was chosen to simplify design problems, particularly those relating to temperature range, blade speeds and steam congestion. At the same time the reliability of comparatively small units was secured. The efficiency guaranteed is higher than any heretofore obtained. Taking the amount of heat available in the steam between the conditions of admission and exhaust as a basis, the engines will deliver in electrical form 75.75 per cent of this energy. The total weight of the complete unit is 1,500,000 lb.

The turbine rests upon a foundation consisting of a steel frame encased in concrete, leaving most of the space below available for condensers, receiver and pumps.

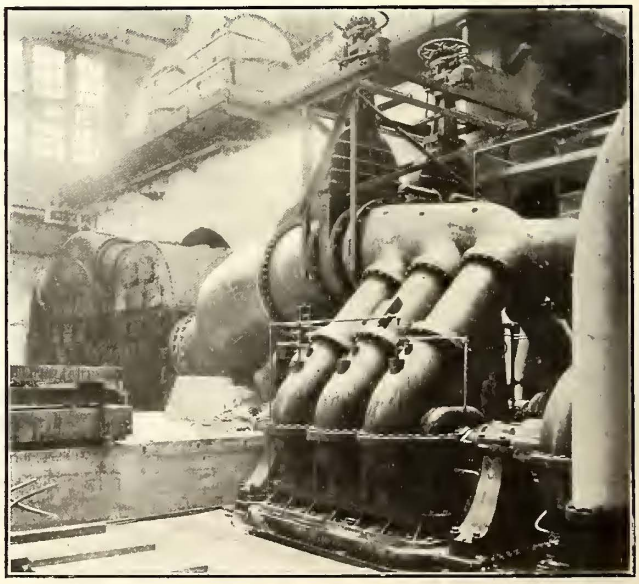
The Worthington surface condenser, of 50,000 sq. ft. cooling surface for each unit, is of the twin-shell type, of simple construction and practically self-contained. The tube arrangement is as shown in Fig. 7, passages being provided by "gashing" to give the freest possible access of the steam to the tubes. The condensers are hung directly from the turbine bedplates, a novel arrangement but one conducive to the elimination of stresses due to temperature changes. The weight of the condenser is, however, not carried by the turbine foundation, but upon a number of spring jacks, adjusted to properly share the load. The receiver is a vertical cylinder, of 7 ft. 9 in. inside diameter and 21 ft. long inside, placed symmetrically with respect to the condenser shells as shown in an accompanying plan. This is as large a receiver as could be accommodated in the available space.

Below each condenser shell and forming an integral part of it is a sump 4 ft. in diameter and about 4 ft. high, into which the condensate drains. This is designated as a "hot well" on the drawing, but there is no hot well in the new plant, using the term in its usually-accepted sense, that function being performed by the feed-water heater.

The piping to and from the condenser is of unusual construction, designed to minimize the number of bends. As shown in Figs. 7 and 9, the water enters the condenser at the bottom through a 60-in. pipe, which dips under the nearer shell to reach the farther one. A baffle inside deflects a share of the circulating water into its proper channel. A similar outlet pipe above takes care of the discharge flow. This is the simplest possible piping layout for a twin shell condenser. Short rubber sleeve expansion joints are inserted in the intake and discharge pipes near each shell. These joints consist of tubes of ½-in., 5-ply-insertion rubber, 12 in. long and of 42-in. and 60-in. inside diameter, each clamped between an outer flange and an inner ring.

Circulating water for each pair of condensers is supplied, as shown in several illustrations, through a pair of tri-rotor, centrifugal pumps having a combined capacity of 75,000 gal. per minute. These discharge through separate motor-operated gate valves, the discharge pipes uniting beyond the valves. The full capacity of the pumps will be required in summer when the circulating water temperature is high, but one pump will be sufficient in winter.

The pumps are driven by steam turbines rated at 240 hp each. The pumps draw from a new tunnel 12 ft. 6 in. x 12 ft. 6 in. in section. They discharge into two tunnels, one 8 ft. 6 in. x 12 ft. 3 in., and one, 5 ft. x 12 ft. 3 in., which is the combination of the original intake and discharge tunnels. These will supply condensing water for eight units. The mouth of the intake tunnel is about 150 ft. upstream from the nearer discharge tunnel. New motor-driven revolving screens of the type shown in one of the illustrations have been installed near the river end of the intake

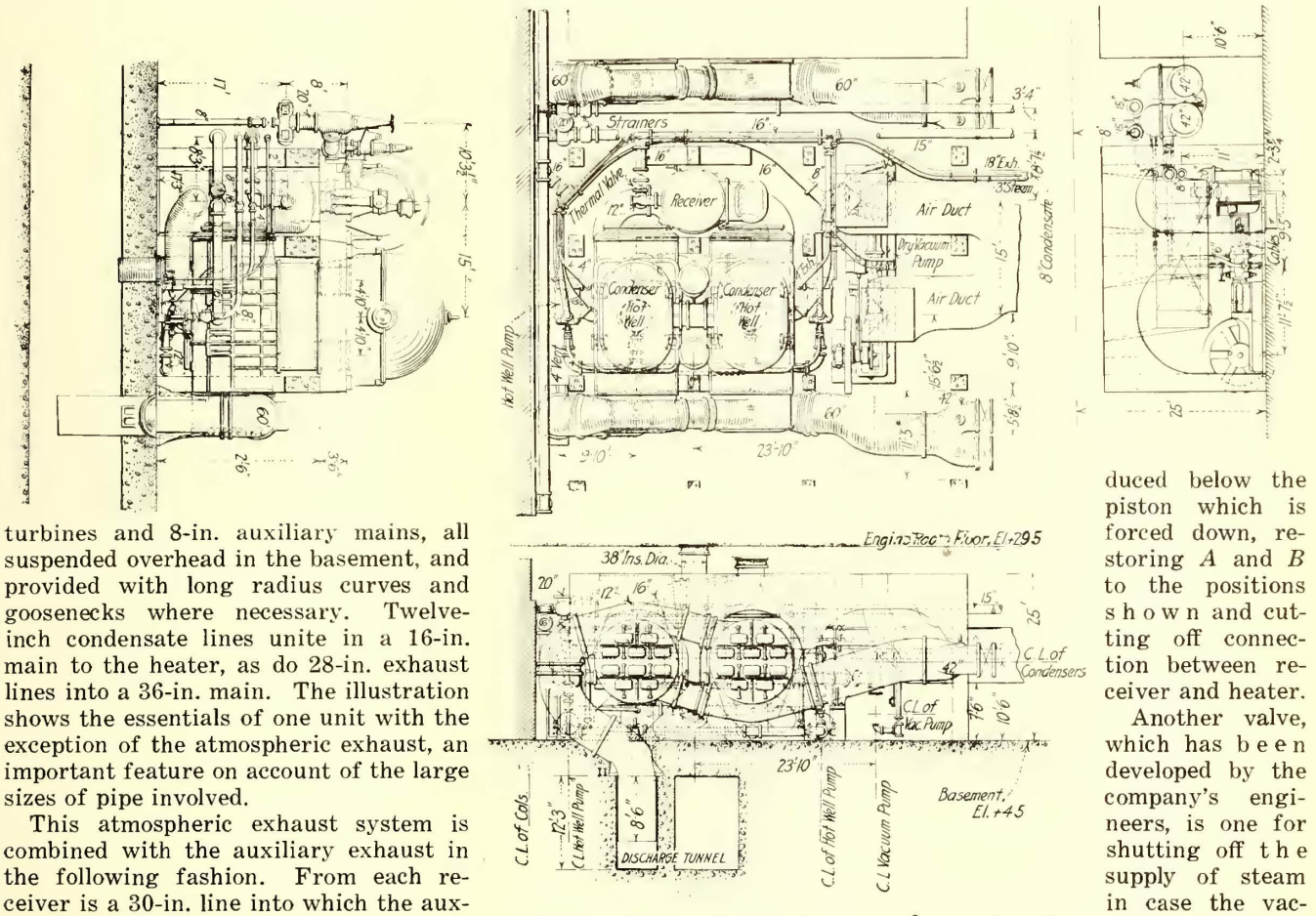


INTERBOROUGH POWER PLANT—FIG. 8—TRI-ROTOR CIRCULATING PUMPS

tunnel, the driving motor being housed in a small building at the right, not shown. The screens are rotated for cleaning purposes daily. The location of the condensers with respect to the river level makes it possible to circulate the condensing water readily, the power required being only that necessary to overcome a small amount of friction, principally the friction head of the condenser and piping.

The condensate pumps for each unit are of the centrifugal type, turbine driven and of 800-gal. per minute capacity each. One pump is sufficient, the second being a reserve. One reciprocating dry vacuum pump is provided for each unit, with a capacity for two. The vacuum pumps are cross-connected between units.

The general turbine-room piping scheme is shown in Fig. 10. It comprises duplicate 15-in. mains for the



INTERBOROUGH POWER PLANT—FIG. 9—PLAN AND ELEVATIONS OF CONDENSER

turbines and 8-in. auxiliary mains, all suspended overhead in the basement, and provided with long radius curves and goosenecks where necessary. Twelve-inch condensate lines unite in a 16-in. main to the heater, as do 28-in. exhaust lines into a 36-in. main. The illustration shows the essentials of one unit with the exception of the atmospheric exhaust, an important feature on account of the large sizes of pipe involved.

This atmospheric exhaust system is combined with the auxiliary exhaust in the following fashion. From each receiver is a 30-in. line into which the auxiliary exhaust lines are connected. An atmospheric relief valve is in each line near the receiver. This is a standard relief valve weighted to open on about 28 lb. per square inch absolute pressure by means of a hydraulic piston and standpipe accumulator. The three lines lead into a tapered header, from which two 30-in. risers, sealed with back pressure valves, extend above the roof. From the header a 42-in. pipe leads to the feed-water heater. This is also protected with a riser and valve.

Between the receiver and the feed-water heater is a "thermal" or "heat-balance" valve for equalizing the distribution of heat in the system. This valve is shown in cross-section in Fig. 11. Its function is to bleed steam from the receiver into the heater when there is a deficiency of supply to the latter from the auxiliaries, or vice versa. At about 27,000 kw the receiver pressure reaches atmospheric pressure, continuing to rise until at 32,000 kw it is about 3-lb. gage.

In the figure the left-hand opening in the chamber leads to the heater, the right-hand one to the receiver. There are two piston valves, *A* and *B*. When heater pressure is above atmospheric, the latter being applied to the upper side through a pipe connection, *A* rises and bleeds steam through port *C* to the receiver. Whenever the receiver pressure is higher than that of the heater, *B* rises, admitting steam through port *D* to the heater. A dashpot at the top of the upper valve chamber prevents sudden acceleration of *A*, and through *A* provides a cushion for *B*. In action the valves do not lift very high off their seats.

Above the valve is an auxiliary cylinder *E* with live steam above its piston and with pressure controlled by the turbine automatic stop governor below. The piston is loosely packed and leaky and ordinarily floats. When the automatic stop governor operates, pressure is reduced below the piston which is forced down, restoring *A* and *B* to the positions shown and cutting off connection between receiver and heater.

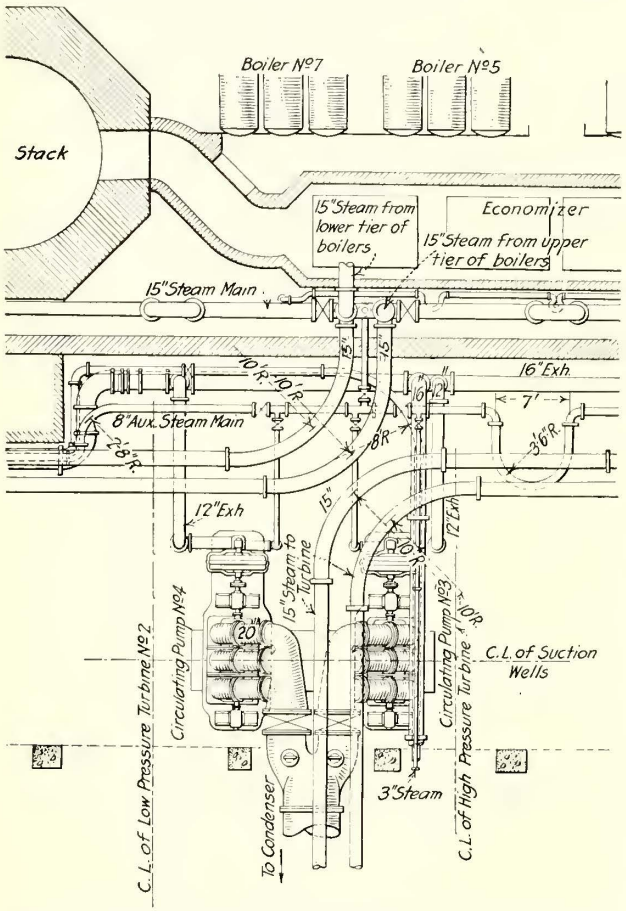
Another valve, which has been developed by the company's engineers, is one for shutting off the supply of steam in case the vacuum falls below a predetermined value. It consists of a float, the level of which is controlled by the height of a mercury column connected to the condenser. The valve is adjusted to trip the pilot valve of the actuating piston on the main throttle when the vacuum falls to, say, 15 in.

In the boiler house the original boilers are being retained, but one-half are being rebuilt to the extent of adding standard B. & W. superheaters to give 200 deg. of superheat when the boilers are delivering three times their rated output. The Taylor underfeed stokers which are being installed under one-half of the boilers are standard, but on four of the boilers air tuyeres have been installed along the side walls, directing jets over the fires and protecting the side walls.

One Hoppes open-type feed-water heater 9 ft. in diameter and 21 ft. long. with a capacity of 1,600,000 lb. per hour has been added to do the work of the displaced economizers, there being now a good supply of

steam from the turbine-driven auxiliaries. It contains 240 pans, each 4 ft. long, having a total area of 3400 sq. ft. In this heater the surplus heat is being absorbed to such an extent that an occasional gentle puff of steam from the relief valve on the heater indicates how little heat is wasted in this part of the system.

As the remodeled boiler plant provides only superheated steam, provision had to be made for the auxiliary supply of saturated steam for the reciprocating engines. In the line connecting the old and new boiler plants is connected a receiver from one of the old engines. This is placed in a vertical position and the superheated steam is led in at the top, passing downward nearly to the bottom through a 15-in. tube. Near the top water is sprayed into the steam through a

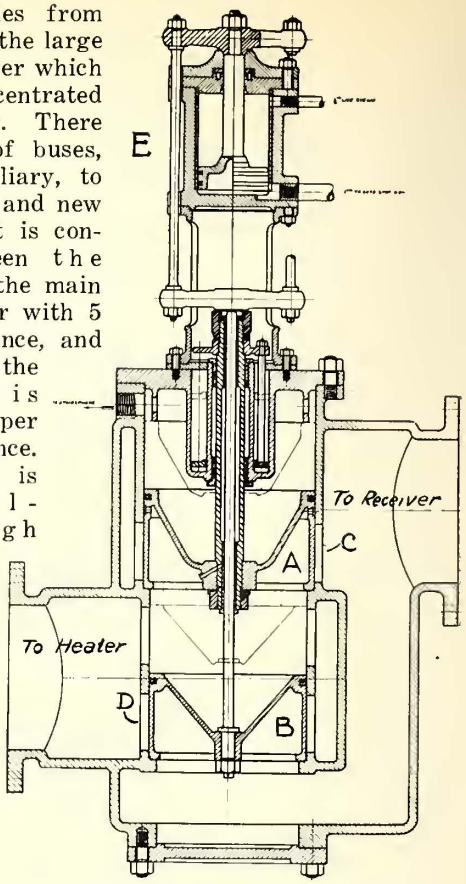


INTERBOROUGH POWER PLANT—FIG. 10—PIPING FOR ONE UNIT

spraying nozzle, the surplus collecting in the bottom from whence it is returned to the water system. The wet steam rises in the space between the tube and the casing, drying as it rises, and saturated steam is taken off near the top. This device is known as an "attemperator."

In the boiler-room basement much space has been saved by the removal of four triplex pumps, accommodating three turbine-driven centrifugal pumps sufficient in capacity for the entire plant, and the stoker fans and turbines. For each pair of boilers there is one turbine driving two stoker fans direct and the stokers also through helical reduction gears from the blower shafts. In the ashpit section of the basement, ashpits of expanded metal plastered with cement have been recently put in.

The electrical distribution of the plant has been entirely remodeled with a view to providing adequately large switches, feeders, etc., and to protecting the underground cables from damage due to the large amounts of power which will now be concentrated on short-circuit. There are two sets of buses, main and auxiliary, to which each old and new generating unit is connected. Between the generator and the main bus is a reactor with 5 per cent reactance, and between it and the auxiliary bus is one with 2 per cent reactance. The main bus is sectionalized through oil switches, groups of feeders being taken off from each section.

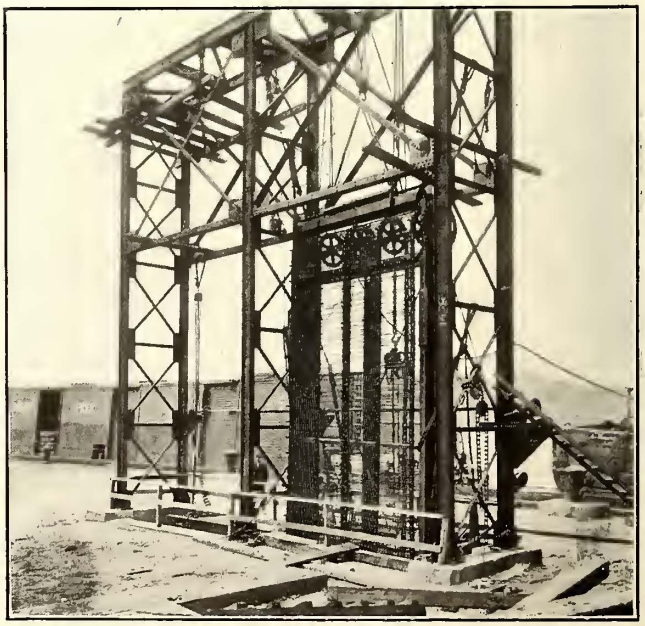


INTERBOROUGH POWER PLANT—FIG. 11—HEAT-BALANCE VALVE

The reactance coils are placed on the exciter gallery conveniently located with respect to the generators. The 5 per cent coil is about 4 ft. 6 in. in diameter and 8 ft. 6 in. long, and the 2 per cent coil is about 4 ft. 6 in. in diameter by 3 ft. 6 in. long.

The oil switches are of standard General Electric manufacture, type H6, with 10-in. pots.

The generators have been designed for their rated capacity, 30,000 kw, with 55 deg. Cent. temperature rise. They are ventilated by means of fans which form part of the revolving field. The air is taken in through the openings below the bedplates, shown in Fig. 5, and is



INTERBOROUGH POWER PLANT—FIG. 12—REVOLVING INTAKE SCREEN

discharged through ducts to the boiler house, eventually reaching the stoker fans. The generators have about 8 per cent reactance, and the armature windings are braced with extraordinary firmness to withstand the mechanical effects of short-circuits.

The changes described in this article were designed and carried out by the engineers of the Interborough Rapid Transit Company, under the direction of Henry G. Stott, superintendent of motive power. Those in responsible detail charge were Reginald J. S. Pigott, mechanical construction engineer, and Gaylord C. Hall, electrical engineer.

Safety First for You and Me

An Account of Chicago's Safety Work, Particularly the Use of Moving Pictures in Parks and Schools—Accidents to Children Have Been Reduced 80 Per Cent

BY H. L. BROWNELL, SAFETY INSPECTOR CHICAGO SURFACE LINES

In these "safety first" days where we see "safety first" banks, "safety first" politicians, etc., we must not lose sight of the fact that "safety first" means simply "We are our brothers' keepers." During more than twenty-five years of traction work I never could become "hardened" to the necessity of accidents, even in a large city like Chicago. The idea was always with me there must be some way to prevent them. About three years ago the "way to prevent" presented itself. I was relieved of all my other duties and was requested to investigate the safety work of other companies and start a safety movement with our company. I thus became acquainted with such noted safety men as A. H. Young, supervisor of labor and safety, South Works, Illinois Steel Company, South Chicago, and R. C. Richard, of the Chicago & Northwestern Railroad, the "father" of the safety movement on railroads. These men gave me my first ideas on practical safety work, yet I found that none had done anything directly with the public, although their work with the employees naturally affected the public, although indirectly.

I conceived the idea of a practical education of the public with moving picture films and was allowed to try it, after much protest from the company as to the cost and practicability of educating 3,000,000 people. Nearly six months elapsed before I could secure the moving picture films and slides I wanted to start the work. I began first in the city parks and then went to the schools. I have given 600 moving picture lectures during the past eighteen months, principally in Chicago, yet I have spent week-ends in some twenty other cities in ten different states to start safety campaigns elsewhere. I have always been glad to give my time to work of this kind.

Three trips stand clearly in my mind, especially one made to Youngstown, Ohio, about a year ago to start the campaign. Youngstown had a local council of National Council Safety but had not been able to start the work actively. Dudley Kennedy, of the Youngstown Sheet Steel & Tube Company, reported to me at the time of our safety congress in Chicago in November, 1914, that the work of the hospital and undertaker had since been cut down 50 per cent. A second trip was that to St. Louis, Mo., last summer. I learned that the municipal moving pictures in the parks were drawing larger crowds than the near-by band concerts. My offer to give two lectures on a Saturday and Sunday night was accepted. I used a megaphone during the lecture and showed the films and slides to about 20,000 persons during the two nights. The third excursion was a recent week-end trip to Dayton, Ohio, where I lectured to 10,000 children and three large audiences of adults. I had one audience of 3000 children in Memorial Hall. I also gave one lecture in National Cash Register Hall.

During the summer of 1914, the second season of my lectures in the Chicago Parks, I had an audience of 20,000 one night and distributed 20,000 "safety first" pamphlets. On Christmas eve, 1913, I showed the safety films to 100,000 persons in Grant Park, Chicago, in connection with other films secured for the Christmas Tree Festival Association.

Most of my work, however, has been with the children, who have responded so quickly that fatal accidents to Chicago children have been reduced 80 per cent. I have lectured and shown my films to about 300,000 of the children in this city. During one week recently I lectured at six public schools and eleven parochial schools.

I also supplied free to the board of education 14,000 cards with two subjects; one card is 14 in. x 18 in., the other 14 in. x 22 in., to be placed in each of the 7000 school rooms in Chicago. My safety pamphlet "Safety Instructions for School Children," was first issued a year ago free to the teachers for use as a text-book. Later this pamphlet was issued to the 400,000 children at the time the speakers of the Public Safety Commission visited the schools. I had charge of that work as chairman of Safety Day in Chicago Public Schools. I reissued an enlarged pamphlet in the autumn of 1914, supplying free 10,000 copies to the board of education for the teachers. This pamphlet is now called "Safety Instructions for School Children and Grown-Ups." The ten golden rules of safety in this pamphlet have commanded much attention from the newspapers, and one of the great Chicago dailies has reprinted them.

During the month of July, 1912, there were fourteen fatalities on the line of the Chicago Railways. This was before the public safety work was begun, but in July, 1913, after starting that work no fatal accidents occurred, although we carried 10 per cent more passengers and the streets were more congested.

In February, 1914, with the consolidation of all the street railways under the Chicago Surface Lines, carrying more than 3,000,000 passengers daily, I changed my working territory for several months from the north and west sides to the south side of the city. During the month of June, 1913, there had been eight fatalities in that section of the city, but in June, 1914, there were none. The coroner of Cook County, in which Chicago is located, was so interested in our record that he called together the Public Safety Commission of Chicago and Cook County, the first of its kind in this country. The work of this commission was immediately felt. I helped to organize it as chairman of committees on organization. I am also chairman of the safety committee of the Illinois Manufacturer's Association and chairman of the publicity committee of Chicago local council No. 3 of National Council Safety. At our annual safety congress, last held in Chicago in November, 1914, a thousand delegates were in attendance. Miss Ida M. Tarbell, who is writing safety articles in the *American Magazine*, was one of the noted speakers at this congress. At a round table meeting the delegates voted to stop all drinking of liquor by their employees during service hours, well knowing the relation of liquor drinking to accidents.

My second lecture on safety before the Illinois Manufacturing Association related to loss of time by factory employees on account of injuries received outside of the factory. My first lecture was on safety in the street.

The coroner's records issued under date of Jan. 20, 1915, show a reduction of 464 deaths in the year 1914. Undoubtedly this was due in large part to the safety work undertaken.

National Electrical Safety Rules

United States Bureau of Standards Is Completing the Preliminary Edition of a Set of Rules Somewhat Along the Lines of the Code of the National Fire Protection Association—The Railway Association Is Participating in Its Preparation

Dr. E. B. Rosa, chief physicist of the bureau of standards, has prepared a digest and analysis of the contents of the forthcoming National Electrical Safety Code. As electric railways are vitally concerned in this and have taken a leading part in the safety movement an extended abstract of the analysis is given herewith.

The proposed code consists of four principal parts, preceded by a group of definitions and followed by two appendices. The rules on stations are divided into nine sections, and ten numbers are reserved for each section, although there are fewer than ten rules in most sections. For convenience of the different administrative authorities they had to be dealt with separately. Each of the four parts is as nearly complete in itself as possible.

Distinction Between Station and Utilization Equipment

In a paragraph introductory to the rules for stations it is stated that the rules apply to the electrical supply equipments of indoor and outdoor stations and substations, and also to similar equipment, including generators, motors, storage batteries, transformers and lightning arresters when in factories, mercantile establishments or elsewhere, provided they are in separate rooms or inclosures, under the control of properly qualified persons, when such rooms or inclosures are inaccessible to others. Thus, the room or rooms in which the transformers, high-tension switches and distributing switchboard are installed in a factory are regarded as a substation, if under the charge of a qualified person, and subject to the rules for stations. On the other hand, the electrical wiring, motors, switches and other equipment distributed about a factory or other building where employees generally have more or less access to them are regarded as utilization equipment.

The rules for utilization equipment have been prepared for circuits and apparatus at not over 750 volts. Anything inclosed in rooms not accessible to employees generally will come under the rules for stations. Anything of higher voltage than 750 not so inclosed, and remaining accessible to others than properly qualified electrical operators, must, in addition to complying with the rules for stations and such of the utilization rules as apply, have all live parts incased in permanently grounded metal conduit or cases or otherwise guarded to prevent access or unsafe approach by any person to the live parts.

Overhead Lines

The most difficult section of the rules to prepare has been that on overhead lines. There is so much difference of opinion and of practice, and so much of the printed material has been proved not to be suitable for use in these safety rules, that it was necessary to study the subject thoroughly and start afresh on many points. The rules for crossings of energy-transmission and signal lines over railways and other transmission lines, for conflicting lines, for clearances between conductors on the same lines, for climbing space, attachments to poles, etc., have been studied and discussed in conferences very thoroughly and while they are not as yet in all respects satisfactory, they have met general approval from many very competent engineers who have examined them.

No restriction is placed on the voltages that may be carried on overhead wires, either in the country or in cities, but higher grades of construction and greater precautions are specified for high voltage wires. Probably the greater number of accidents from 2300 volts on the streets is partly due to the fact that the line construction concerned is inferior to that usually provided for 6600 volts or 13,000 volts.

The danger from fallen wires due to breaking of the wires or failure of the poles makes it very necessary to require something definite respecting the strength of construction of overhead lines in cities and congested communities, apart from the requirements made for crossings and conflicting lines. But the requirements

SECTIONS OF THE FOUR PARTS OF THE PROPOSED NATIONAL ELECTRICAL SAFETY CODE

Part 1. Stations and Substations (Sixty-five Rules)

Part 2. Electrical Supply and Signal Lines (Forty-nine Rules)

Overhead Lines

Underground Lines

Part 3. Utilization Equipment (Sixty-two Rules)

Part 3 (Concluded)

Part 4. Operation of Electrical Equipment (116 Rules)

Rules for Employers

General Rules for Employees

Special Rules for Employees

Appendix A—Grounding Circuits, Equipment and Lighting Arresters.

Appendix B—Sag Tables for Hard-Drawn Copper and Aluminum Conductors.

are not so high as for crossings over railroads or for crossings or conflicts with signal lines. Hence two grades of construction are specified, these being designated as *A* and *B*, and they differ only with respect to the factors of safety specified for the supporting structures. For steel structures and reinforced-concrete poles and cross-arms the factors of safety are three and two for grades *A* and *B* respectively; for wood poles they are four and two respectively.

Those who are familiar with crossing specifications that specify a factor of safety of six for wood poles may regard four for the highest grade of construction as too low. But careful consideration of the question seems to indicate that six is an excessive factor of safety even for new poles, when reckoned on the basis adopted, which is the same as that usually taken, namely, assuming all wires loaded with ice to a radial thickness of 0.5 in. and a wind pressure of 8 lb. per square foot on the sectional area of the wires and on the poles. This corresponds to a wind velocity of about 60 m.p.h. When a high factor of safety is assumed it is generally in part to provide for extreme conditions, but in this case, because of their known though rare occurrence, fairly extreme conditions are assumed as the basis of calculations of the wind pressure, and a factor of safety of four requires considerable guying of poles when as many as twelve No. 2 wires are carried on a 40-ft. pole line.

It is provided that wood poles and cross-arms shall be replaced when their factors of safety have decreased to one-half that required when new. This is not a severe requirement where poles are guyed, as the support of the guys is included in the calculation of strength. But in cities it happens frequently that guys cannot be used, and in such cases this requirement makes it necessary to keep careful account of the depreciation of the poles. There is much need of experimental work to determine more accurately the extent to which guyed poles support unguyed poles one or more span lengths away and other quantities that enter into the calculation of factors of safety of overhead lines. It is hoped that before the rules are revised in 1916 much additional information will be available that will be useful in line construction as well as in making the requirements more precise and treatment more adequate in this section of the safety rules.

Sag tables are given for hard-drawn copper, and aluminum wire and minimum sags are specified, so that a factor of safety of two will be obtained for the conductors under the extreme conditions specified. It is specified that the sags in the case of soft-drawn copper be at least double those for hard-drawn copper, the ultimate strength of soft-drawn wire being only one-half that of hard-drawn wire. Under this rule soft-copper conductors under heavy loading of ice and wind will stretch and the sag will increase. This serves as a safety measure to prevent breaking, but makes it necessary to tighten up the wires frequently after severe storms to keep the clearances normal, and to prevent blowing together. Most companies prefer to do this rather than use hard copper for distribution lines.

One important difference from some specifications previously proposed is that in the present rules clearances are specified for normal temperatures and without ice loading or wind, so that the company or inspector can tell by examining the crossing or line under normal conditions whether it meets the rule. Some of the previous specifications have provided that the clearance should be a certain amount under the most severe conditions of wind and of ice-loading. This made it practically impossible, when the line was inspected under normal conditions, to tell whether the requirement had been complied with or not, since the exact conditions are not stated and so many varying factors enter into the problem.

In general the rules have been so drawn as to specify the results to be attained and often the method, leaving as much as possible of the details to the discretion of the companies.

EXISTING INSTALLATIONS

The rules of Parts 1, 2 and 3 apply, of course, to all new installations, unless modified for special reasons by the proper administrative authority. The question as to what extent they should apply to existing installations has been considered carefully. Obviously, if they did not apply at all to existing installations, they would have comparatively little useful influence for many years to come.

The statement made in the introduction to the rules in regard to this question is as follows:

"The rules apply to existing installations: (*a*) in extensions and reconstruction, except where for special reasons this is impracticable; (*b*) in cases of serious danger that can be obviated by conforming to the rules; (*c*) in the placing of guards and grounding of parts for the protection of employees and others where the expense is not substantially greater than would be required for providing such protection for new equipment."

The time allowed for compliance with (*b*) and (*c*) will, of course, be fixed by state or municipal administrative authorities.

It is not expected that expensive changes will be made in existing equipment in order to comply with the rules except in so far as it is necessary to do so in order to remove a source of serious danger. But in most cases grounding of machine frames, instrument cases or conduits, or erecting of suitable guards (where exposed live parts require it), can be done at substantially the same expense as though it were new equipment, and in all such cases it is expected that it will be done within some reasonable time.

INTRODUCTION OF THE CODE

It is the hope of the bureau of standards that when the code has been revised once more and approved by the Washington conference and republished, it may be adopted very generally and with the minimum changes by individual states and cities. It is suggested, however, that the first year may be made a trial year, during which the companies, inspectors and commissions may become thoroughly acquainted with its practical operation, and that it be not inforced in any strict sense until after the first year. We believe that if the utilities and other companies coming under it are invited to "try out" the code, to comply as well as they can, to report wherein it is not satisfactory, and to assist in the effort to remedy its defects by revision at the end of the first year, far better results will be attained in the end than if it were made compulsory at the start. Some commissions and municipalities might delay adopting it formally if a strict inforcement were expected from the beginning, whereas they might be entirely willing to adopt it at once in the experimental way suggested. It is believed that this plan will secure the full co-operation which is much to be desired.

A copy of the preliminary edition of the first three parts of the code will be sent on request to anyone wishing to receive it, as well as a copy of the revised operating rules, which will shortly be issued as the second edition of Circular No. 49. When the first three parts are republished after approval by the Washington conference, the operating rules will be added and the whole will constitute the complete National Electrical Safety Code.

Rochester Train Operation

Operation of Motor and Trailer Combinations Has Relieved Traffic Congestion in Downtown Section — Descriptions of the Service and the Trailers Used are Presented

Since October, 1913, the New York Railways—Rochester Lines has been operating a rush-hour train service comprising a total of twenty-five units, each made up of a sixty-four seat center-entrance trailer and a forty-four seat end-entrance motor car. As yet the company has made no detailed studies of loading speeds, but it does know that the increase of 145 per cent in the seating capacity per train has relieved the congested portion of Main Street far more than would have been possible with an equivalent seating addition in individual motor cars. The adjustment for trailer service was made by cutting down by one-third the number of scheduled stops on all prepayment lines, and these are the only ones on which trailers are operated. This change eliminated stops as short as 250 ft. and lengthened a number to, say, 500 ft.

Trailer Service

Owing to the large proportion of factory business, the morning rush in Rochester begins as early as 6 o'clock and ends with the high school service at 9 a.m. The evening rush ranges from 4:30 to 7 o'clock. The number of trains per line is now as follows:

Main and West	seven morning, seven evening
Parsells and Genesee	six morning, seven evening
North and South Clinton	six morning, seven evenmg
University and Lyell	one morning with two from Genesee
Lake Avenue (Kodak Plant)	two morning, two evening

In some cases, as that of the Parsells and Genesee run, the trains are run as extras on one line and then as regulars on another.

The effect of trailer operation on relieving congestion on Main Street between State and Clinton Streets is well indicated by stating what the headways are now and what they would have to be if single cars were operated. In the case of the Main and West and the Parsells and Genesee lines the headway would have to be three minutes instead of five minutes, and the cars so operated would have to find a place among cars of non-trailer lines with the following schedules: Park and Dewey, two minutes; Lake and Monroe, two minutes, and Portland and Plymouth, three minutes. It must be appreciated, too, that the portion of Main Street used by all of these lines is the business heart of Rochester, with heavy passenger loading and plenty of interference from other traffic. It may be added that before rerouting its downtown lines in 1913 the company was trying to operate 160 cars in each direction every hour over Main Street between State and Clinton Streets. After rerouting, but before trailer service was begun, the number was cut to 110. The company now operates the same number of cars but with fewer train units, because of trailers, and with greater seating capacity.

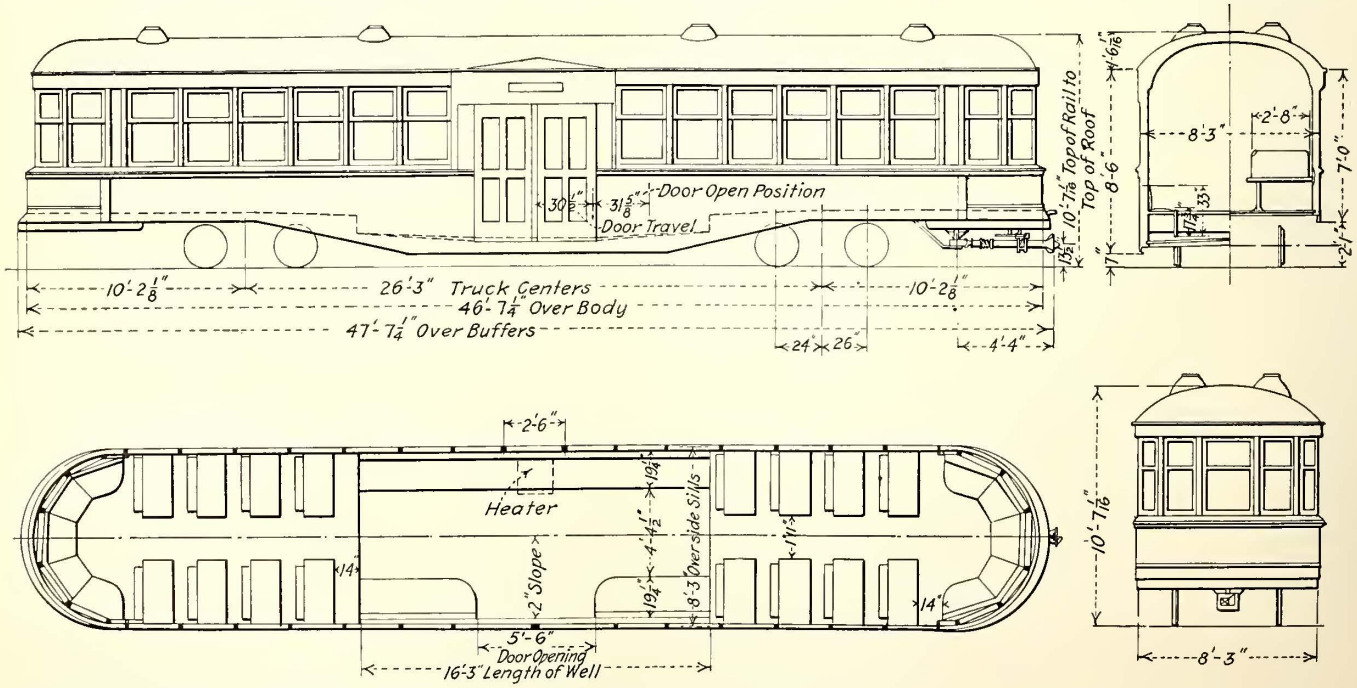
Electro-Mechanical Features

Each trailer is hauled by a 24-ton motor car which carries four 50-hp motors. The company has forty motor cars of this type in service, and as they are really over-motored for Rochester conditions they serve their present purpose admirably.

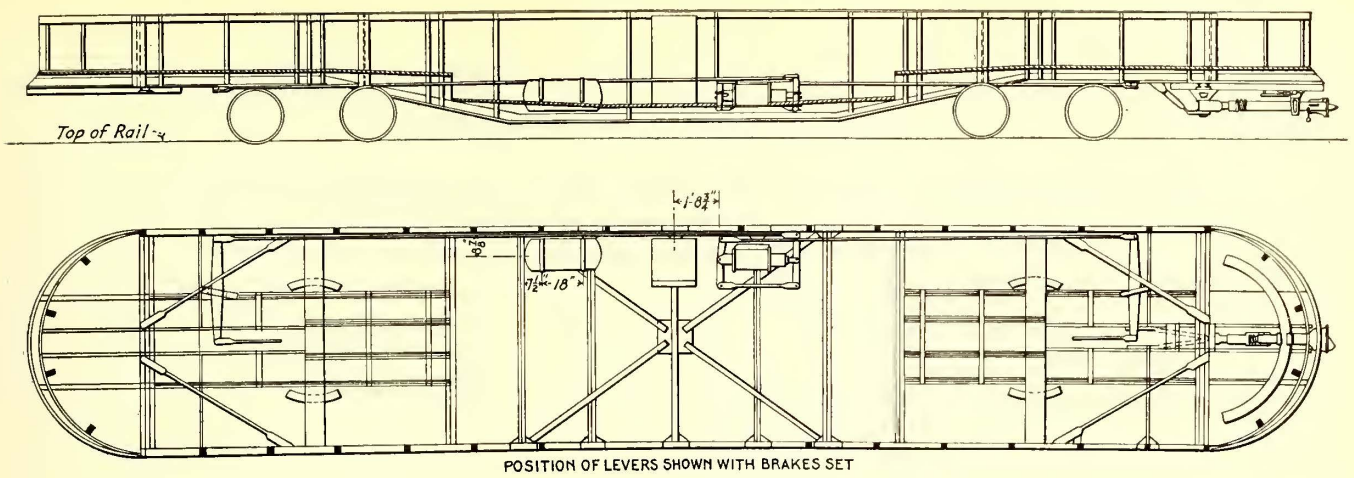
The trailer itself is so designed that eventually it may be used as a two-motor car. In this case one of the panels at the motorman's end would be replaced with a door, and 26-in. wheels with suitable motors would be substituted for the 24-in. wheels. The height of the first step would be changed from 13 in. to 15 in.

The trailer as furnished by The J. G. Brill Company is built up of ⅛-in. plate with angle-iron underframe, but in future cars a channel-iron underframe would be used to save weight over the present equipment, which was built under emergency conditions. The sides are stiffened by a dropper bar 3 7/16 in. x 1 in. x ⅜ in. which is carried all the way around the car. This car is 46 ft. 7¼ in. over the body and weighs, completely equipped, 28,200 lb.

A striking innovation is that the well extends far beyond the door opening, its length being 16 ft. 3 in. com-



ROCHESTER TRAIN OPERATION—ELEVATION AND PLAN O F TRAILER, SHOWING HOW THE WELL EXTENDS GREATLY BEYOND THE DOOR WIDTH



ROCHESTER TRAIN OPERATION—UNUSUAL UNDERSEAT LAYOUT OF AIR-BRAKE EQUIPMENT AND BRAKE LEVERS TO OPERATE LOW-FLOOR TRAILER

pared with 5 ft. 6 in. for the doors. This construction was introduced to hasten the loading and unloading of the car. If the riser is in line with the door opening it is thought the sudden change in level hinders maximum entrance speed and quick starting where, say, more than ten passengers are taken on. The Rochester arrangement permits a large number of people to enter the well at one time before any one of them has to take a step upward. The less agile passengers tend to seek the longitudinal seats of the well while the others hasten to the cross-seats on the higher level. The cross-seats are 36 in. over all, with an aisle space of 23 in.

The height at the doorway edge of the well is 13 in. The floor of the well is first inclined 2 in. upward toward the center and then another 3 in. in a longitudinal distance of 8 ft. 6 in. Next a riser of 11 in. is met, followed by a slope of 2 in. in 5 ft. to the bolster line, where the maximum height of the car floor above the rails, 2 ft. 7 in., is attained.

The doorway is served by two clear glass sliding doors which are operated by Consolidated mechanism. During very cold days in the winter of 1913-1914 some trouble was experienced from sticking doors. This was first thought to be due to failure of the air supply, but it was finally traced to the freezing of oil. This trouble was readily corrected.

The exceptional width of the well and consequent scant clearance to the pavement beneath led to a special arrangement of the air-brake equipment which, except for the compressor, includes the usual appurtenances of a Westinghouse straight air system with automatic emergency features. As it was necessary to get both the brake cylinder and reservoir under the seating, holes were cut out in the floor for them accordingly. Further, the brake cylinder is installed at an angle. Its levers are below the floor level, while the pull-rods, located in this instance on the opposite side of the cylinder, are above the floor level. The by-passing of the pull-rods is effected under the car seats as shown, one rod being a little longer than the other. Each of these pull-rods is carried beyond the trucks to a lever which has a short pull-rod extending backward to the corresponding truck, as indicated on the drawing.

The trailer is attached to the motor car with Tomlinson couplers, and a jumper crossing is provided to supply energy to the door motor, the forced draft heater motor, the lamps and the light signal which is displayed in the motorman's cab when all doors of a train are closed.

The trucks are of Baldwin design built with off-center bolsters in accordance with the suggestion of G. M. Cameron, master mechanic of the Rochester Lines. This construction will permit the trailer trucks to be used eventually as motor trucks with the same distribution of tractive effort now standard on Rochester maximum traction equipment.

Economy in Stationery Forms

I. A. May, comptroller of The Connecticut Company, New Haven, Conn., has recently issued a notice to the department heads of that company giving some suggestions as to ways and means in which they can practice economy in ordering stationery forms. The notice calls attention to the stock sizes in which paper is manufactured, cut and sold. These sizes are usually 17 in. x 22 in., or 34 in. x 22 in., and all forms used by different departments should be ordered in some such multiple of these sizes. The notice says therefore: "Order all paper blanks or forms 8½ in. x 11 in., or some exact multiple, sub-multiple or division of these dimensions. Study the form you are about to order and if it is not some multiple of 8½ in. x 11 in. then draft out a new blank that is. The department using the form is in a better position to make changes than the printer or multigraph clerk. One exception to the above may be paper or forms 8½ in. x 14 in., this being regular legal cap.

"Why not save money? Paper is heavy and costs from 6 cents to 13 cents per pound; there should be no odd sizes and no waste. The employees can save for the company a substantial sum in one year by studying standardization as outlined above. Protect your stationery from dirt and dust. Do not use new envelopes for telephone messages, etc. Use scratch pads. Saving first should be given a place with safety first."

Compensation Law Figures for First Six Months

Some interesting figures are reported by the New York State Compensation Commission on the operation of the workmen's compensation law for the first half year of its enforcement. Claims numbering 18,930 were allowed, on which compensation totaling $1,576,801 was paid, the average sum paid in each case being $83. During the period from July 1, 1914, to Jan. 1, 1915, a total of 130,723 workmen were injured, but only 22,221 claims for compensation were made. The disparity is due to the fact that compensation is allowed only for injuries resulting in disability for more than fourteen days, and also that many injuries occurred in employments not included under the law.

The law covers 180,000 industries, which employ

2,000,000 workmen. On Dec. 31, 1914, there were 7119 policies in force, on which the semi-annual premiums amounted to $692,583.64. Dividends ranging from 15 per cent to 50 per cent have been allowed to policyholders on the first six months' experience.

Transportation in the Fair Grounds

Intramural Railway, Auto Trains, Rolling Chairs and Moving Platform at the Panama-Pacific International Exposition

In laying out the Panama-Pacific International Exposition grounds the designers made special effort so to locate the various structures that chief points of interest would be as close together as consistent with the desired architectural effect. This has been accomplished with marked success, but owing to the imposing height of the facades and the consequent width of avenues required, considerable distances have to be covered in visiting even a few of the palaces. The total length of the aisles between exhibits in the main group of palaces alone is more than 42 miles, and as the Marina, or ocean boulevard, is 2½ miles in length, the absolute necessity of an efficient system of intramural transportation is at once evident. Recognizing this, the exposition has granted concessions for three independent means of transportation; by steam railroad, by auto train and by wheel chairs.

The "Overfair Railway"

The steam line, known as the "Overfair Railway," operates over 2½ miles of double-track line, running practically the entire length of the grounds. The locomotives which have been built for this railway correspond in every respect with the standard Pacific type engines, except that all dimensions are only one-third full size. The same scale has been carried out in all the rolling stock, only the seats for the passengers being full size. The track gage is 19 in. Passenger cars are 42 in. wide and 20 ft. long, being equipped with full-width cross-seats and canopy tops.

The system has a total of seven stations, including two terminals, and, when operating ten-car trains, the total carrying capacity is about 1600 passengers. The trains travel at a normal rate of 10 m.p.h. Each station is provided with turnstiles and pay-as-you-enter coin boxes, so that no fares are collected on the trains. In addition to the trackage there have been built within the exposition grounds repair shops, roundhouses, turntables and depots. The rolling stock has all been built at the machine shops of the concessionaire at Oakland, Cal., and the total investment in the system, including all equipment, is placed at $150,000.

Six Pacific-type locomotives and one switch engine have been built. The former are 17 ft. long and weigh 21,000 lb. each. They operate under a steam pressure of 200 lb. per square inch, although the boilers withstood a water test of 460 lb. per square inch without developing any leaks. At present anthracite coal is the fuel used, but since the system was put in operation it has been decided to convert the locomotives to oil burners. The locomotives have the regulation air-brake equipment, and a complete block-signal system is being installed under the supervision of Southern Pacific signal engineers. The concession is held by L. M. MacDermot of Oakland, Cal., who personally designed and supervised the construction of all the rolling stock.

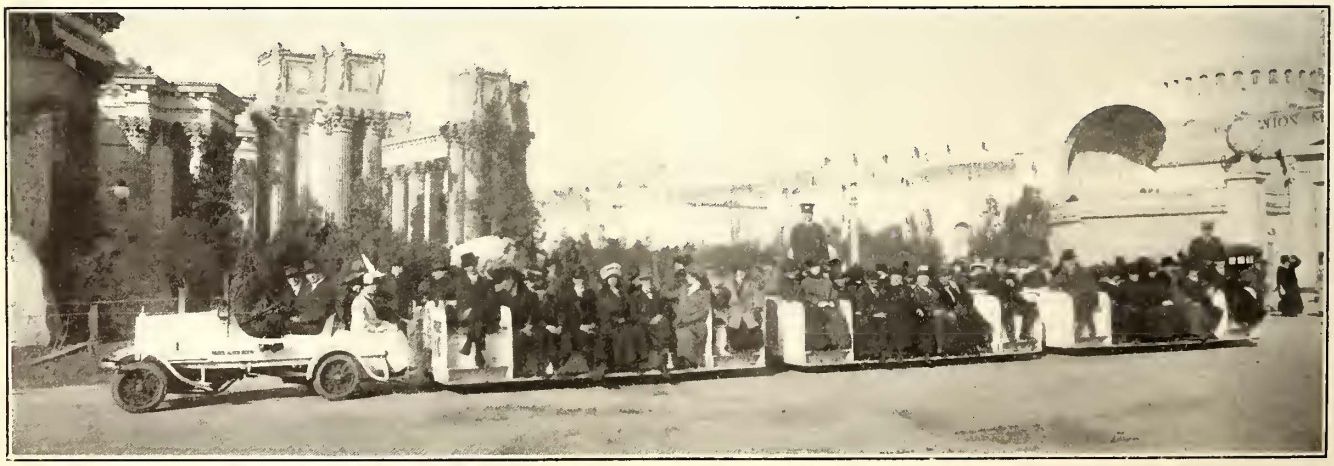
Auto Trains

To provide access to various parts of the grounds not reached by the "Overfair Railway" a concession has been granted for the operation of auto trains. These are made up of two or three open trailers attached to a small auto tractor whose normal rate of travel is about 5½ m.p.h. Seventeen of these trains are in service, and they make a circuit through the grounds about 2.2 miles in length. The cars each have a seating capacity of twenty, so that with all trains in operation the total carrying capacity is about 1020.

The auto trucks are equipped with 26-hp Ford engines geared down so that for five revolutions of the flywheel the rear axle turns once. They are mounted on special chasses with 21-in. x 5-in. wheels with solid rubber tires. The trailers are built with longitudinal seats facing outward and flanking the central aisle used by the conductor in collecting fares. The trailers have 24-in. x 3½-in. wheels, also equipped with solid rubber tires. The braking system consists of a shoe connected midway in the drawbar which is automatically forced downward when the tractive pull is slackened. The step from pavement to footrest, which overhangs the wheels by 17 in. on each side, is about 6 in. The design of a coupling that would make the trailers track effectively has been the chief problem in the working out of the details of these trains. A coupling of entirely original design was finally developed, but the details have not been made public pending a decision on patent applications.

Wheel Chairs

The two methods of transportation already described do not take visitors inside any of the palaces, although it is to be noted that most of the time spent on foot is in visiting the exhibits and covering the many miles



AUTO TRUCK AND THREE TRAILERS AT THE PANAMA-PACIFIC EXPOSITION

of interior aisles. To meet requirements in this direction wheel chairs, resembling those used at Atlantic City, are provided to be rented by the hour to visitors. Three types are available: the ordinary wheel chair for one or two passengers to be pushed by an attendant; the same chair with a bicycle attachment which the attendant rides, and the electric storage-battery chair for two, which is operated by one of the passengers, the maximum rate of travel for the latter being about 3 m. p. h. The wheel chairs are allowed within the main palaces at certain hours, and as there are practically no stairways on the grounds it is possible to cover the entire exposition without any considerable amount of walking.

A 1147-Foot Moving Platform

Although not to be classified as a feature of the general transportation scheme, there is within the grounds what is said to be the largest moving platform yet built. This encircles the 200-ft. x 565-ft. oval amphitheater of the Panama Canal concession on the Zone. The platform is 1147 ft. in length and has a seating capacity of 6000. It is divided into 8-ft. sections so it can move freely around the curves, and each section is inclosed by a 2-in. pipe railing. Electric motors are used for operating the platform, on either side of which a rack-and-pinion drive is arranged beneath the floor. It moves continuously at a speed of 47 ft. per minute, making its complete circuit once in twenty-four minutes. Each seat on this moving platform is provided with a telephone receiver and each spectator receives his own independent lecture on the points of interest in the course of his journey along the Canal Zone. The relay-telephone system in use was recently developed for this purpose in the laboratory of Thomas A. Edison.

New Special Work Standards

New standards recently adopted by the Manganese Track Society and the Manganese Steel Foundries Society have just been issued in booklet form. A standard contour for grooves in crossings and frogs and a standard flare in the guards of solid manganese steel crossing arms and wings of solid frogs were adopted by these societies and are illustrated in this booklet. Standard specifications for manganese steel in castings for track work have also been adopted by the joint standardization committee and include the following elements in chemical composition:

	Percentages	
Elementts	Not less than	Not more than
Manganese	10.00	14.00
Carbon	1.00	1.40
Phosphorus	....	.10

The specifications also provide that drillings from the finished articles shall be furnished to the inspector from time to time on request for check analysis. A rough cast specimen ¾ in. x ½ in. in size shall bend cold on the flat side around a diameter of 1 in. to an angle of 180 deg. without breaking. The bending may be accomplished by pressure or by blows. Bending test demonstrations from test bars poured from the same heat as the castings, when required, shall be made in the presence of the inspector at the foundry where the castings are made.

The employees of the Ottumwa Railway & Light Company, Ottumwa, Ia., have organized an employees' club. The company has turned over a portion of the basement of the office building for the club's quarters and this will be fitted up with billiard and pool tables, etc.

Statistics of Steam Railways

Report of the Interstate Commerce Commission Gives Interesting Comparative Figures for the Years 1913 and 1914

According to a preliminary abstract of the twenty-seventh annual statistical report of the Interstate Commerce Commission covering the fiscal year ended June 30, 1914, made from the annual reports of carriers having operating revenues above $100,000 and of carriers operated under agreement or lease by these companies, the steam roads in the United States on June 30, 1914, represented 247,397.59 miles of line operated, including 11,298.88 miles used under trackage rights. The aggregate mileage of railroad tracks of all kinds covered by operating returns for these roads was 377,102.45 miles. There were 64,760 locomotives in service on June 30, 1914, an increase of 1382 over the previous year. The total number of cars of all classes was 2,503,822 (or 58,314 more than on June 30, 1913), which equipment was thus assigned: Passenger service, 53,466 cars; freight service, 2,325,647; company's service, 124,709. The total number of persons reported as on the payrolls was 1,695,483, or an average of 685 per 100 miles of line. As compared with corresponding returns for June 30, 1913, there was a decrease of 119,756 in the total number of such railway employees. The total amount of wages and salaries reported as paid to railroad employees during the year was $1,373,422,472.

On June 30, 1914, the par value of the railroad capital outstanding was $20,247,301,257. This amount includes capital held by the railroads concerned, as well as by the public. Of the total amount of such capital outstanding, there existed as stock $8,680,759,704. Of the total capital stock outstanding $3,019,020,981, or 34.78 per cent, paid no dividends. The amount of dividends declared during the year was $451,263,197, being equivalent to 7.97 per cent on the dividend-paying stock. The average rate of dividends paid on all stocks outstanding was 5.2 per cent. No interest was paid on $1,331,581,452, or 11.94 per cent, of the total amount of funded debt outstanding (other than equipment trust obligations).

The figures presented below include the expenditures for new lines and extensions during the fiscal year 1914: Investments to June 30, 1914, (236,706.60 miles of line represented) $16,936,697,840; investment to June 30, 1913 (234,220.06 miles of line represented) $16,424,359,514—increase over 1913, $512,388,326. This increase was divided: Expenditures for additions and betterments, $516,061,290; expenditures for new lines and extensions, $121,705,678, and miscellaneous charges unclassified, $851,008, less credits, $126,279,650.

The number of passengers carried during the year ended June 30, 1914, was 1,053,138,718, the increase over 1913 being 19,459,038. The average receipts per passenger per mile for 1914 were 1.982 cents; the average receipts per ton-mile, 0.733 cent. The average operating revenues per train-mile were $2.45, and the average operating expenses per train-mile, $1.76. The ratio of operating expenses to operating revenues was 72.21 per cent.

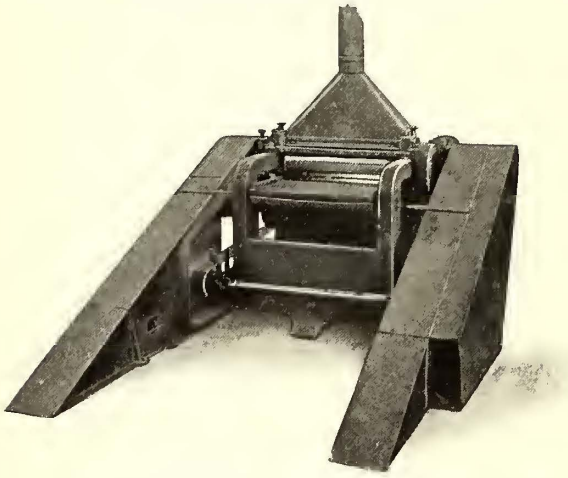
The operating revenues for the year ended June 30, 1914, were $3,047,019,908 and the operating expenses, $2,200,313,159. The corresponding returns for 1913 were: Operating revenues, $3,125,135,798, and operating expenses, $2,169,968,924. The operating revenues per mile of line operated (including line operated under trackage rights) averaged $12,400 and the operating expenses $8,955 for the year.

Reducing Accidents in the Milwaukee Shops

All Machines Are Covered with Guards to Insure Greatest Safety to the Employees

In line with the safety movement on The Milwaukee Electric Railway & Light Company's property, the general repair shops during their construction and since their completion have received much thought in regard to safe operation. All machine tools were purchased with a clause in the specifications requiring that they be guarded in accordance with the regulations of the Industrial Commission of Wisconsin. Before the company moved into its new shops at Cold Springs, practically all the old machines were fitted with guards to attain the greatest safety consistent with practical operation.

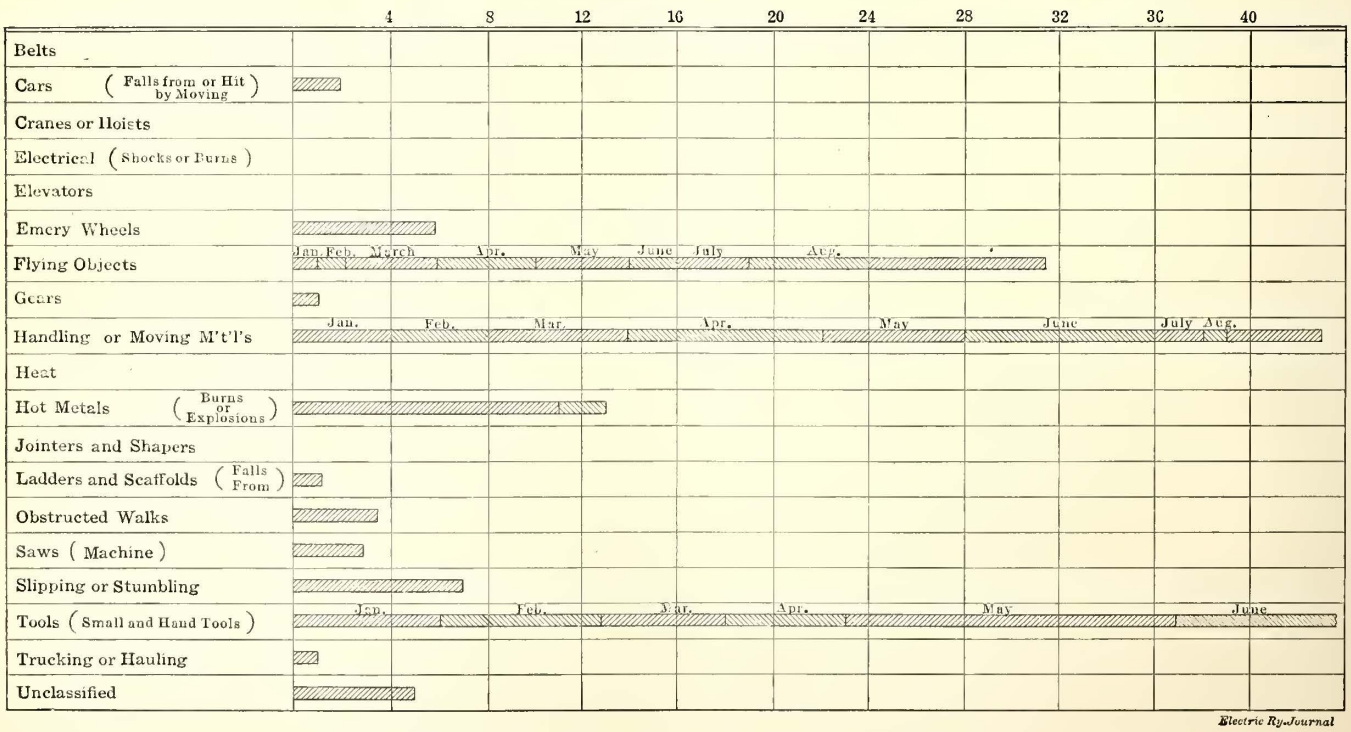
From time to time numerous special devices have been added to the safety equipment. Thus the car transfer tables have been supplied with bells which signal automatically as the table is moved; all emery wheels are supplied with safety collars while the operators of all grinders are furnished with goggles. Following reports of accidents or in anticipation of them, guards of various kinds have been added to the machine tools, or other precautionary measures have been taken to eliminate the recurrence of certain types of accidents.



MILWAUKEE SHOPS—VIEW OF GUARDED PLANER

For the past year the enforcement of regulations for safety in the shop has been placed largely in the hands of special committees which are under the general supervision of the shop inspector. The personnel of these committees includes gang leaders, or rank and file employees who have suitable qualifications for such work. There are one or more representatives of the committee in each department of the shop, and they are accordingly charged in a general way with the safety of their fellow employees. It is the duty of each committeeman to make a detailed report of and comment on all accidents in his department. Suggestions for any device or improvement to remove the cause of the accident described are also included in such reports. These reports are filed with the chairman of the committee, who personally investigates the accident, notes its cause and effect, and makes a record on the monthly accident summary.

In order to impress the employees in the various departments with the importance of this work and to give them some line on the most hazardous occupations, a summary of all accidents is prepared on a large-scale chart which is posted in conspicuous places in each department. This summary classifies the accidents as to causes and allocates them to the various shop departments. In order to set forth more clearly the causes of the accidents which are most hazardous, a graphic comparison of accidents is made a part of this chart. A graphic chart is shown in one of the accompanying illustrations. It is believed that the moral effect of disseminating this accident information has also tended to reduce shop accidents. Although accidents continue to occur after one year's operation, it is apparent that serious accidents have been appreciably reduced in number and that very little working time is lost because of minor casualties. Records for previous years also show that the average number of accidents per month in the shops was about fifty, while the average shown for the year 1913 has been lowered to twenty per month. This accident percentage is based on the employment of approximately 350 men.



MILWAUKEE SHOPS—GRAPHIC COMPARISON OF ACCIDENTS

Note—Tool accidents on original record are carried out to August and show a total of 116.

COMMUNICATIONS

The Jitney Bus in Los Angeles

LOS ANGELES RAILWAY
LOS ANGELES, CAL., April 8, 1915.

To the Editors:

The first jitney bus was operated in Los Angeles on July 1, 1914, over a route 4.33 miles in length. This was a five-passenger automobile. It continued to operate for two or three weeks alone and attracted little attention. Then, one by one, other machines of a similar character entered the work. On Sept. 22 twelve of them were operating on the original line, and on Oct. 16 twenty-seven autos were operating on two lines. About this time a local paper espoused the cause of the bus drivers in such a way as to lead the people to believe that there was great profit in the work. This resulted in the rapid increase of the jitney-bus service.

Careful checks were made from time to time from the beginning of this service, accurate records being kept of the license number of each automobile found in the service. The number of buses found in service on the various dates is shown in the following table:

Oct. 26, 1914	71	Jan. 4, 1915	556
Nov. 6, 1914	251	Jan. 11, 1915	501
Nov. 10, 1914	304	Jan. 28, 1915	452
Nov. 16, 1914	433	Feb. 4, 1915	466
Nov. 30, 1914	543	Feb. 7, 1915	349
Dec. 3, 1914	747	March 1, 1915	486
Dec. 31, 1914	761	March 18, 1915	492

Sixty-six of the buses found in the check made on March 1 were not found operating on March 18, but there were seventy-two new ones on March 18 that had not been operating on March 1. Buses are now operated over nine routes in competition with the cars of the Los Angeles railway, making the following one-way mileages: 3.52, 3.58, 4.10, 4.33, 4.68, 5.03, 5.04, 5.14. 5.82.

The unreliability of the jitney-bus service, as compared to that furnished by the street cars, is well illustrated in the number of revenue trips into and out of the city made by the buses between 6 a.m. and 6 p.m. on certain dates as follows:

Date of Check	Round Trips	Date of Check	Round Trips
Nov. 30, 1914 (clear)	2657	Jan. 4, 1915 (clear)	2492
Dec. 3, 1914 (clear)	3315	Jan. 11, 1915 (clear)	2987
Dec. 4, 1914 (raining)	2994	Jan. 28, 1915 (raining)	1563
Dec. 10, 1914 (raining)	2179	Feb. 4, 1915 (clear)	3482
Dec. 31, 1914 (clear)	3200	Feb. 7, 1915 (Sunday)	1526

On the mornings when a hard rain was falling not 5 per cent of the jitney buses went into service, but they would all be in service within an hour after the rain stopped. On Jan. 28 it rained more or less all day, and about 5 p.m. the rain set in with great violence and continued all night. The checkers found that by 6 p.m. the jitney buses had practically disappeared from the streets. During all of these rains the street cars made every scheduled trip.

The City Council in Los Angeles has passed an ordinance in relation to the jitney-bus service of which the vital portions are that each driver must carry an identification card and at the time of making application for his license must furnish two photographs of himself, taken within thirty days of that date, one to attach to the identification card and one to his application. He must be examined regarding traffic regulations and must demonstrate his ability to drive the motor bus he intends to operate.

The permit to operate a bus sets forth the route over which it must operate and the terminal points of such route, but the route may be changed at any time by filing a written application with the Police Commission and the payment of a fee of 50 cents. A fee of $1 is charged at the time of the issuance of the original license. Buses are not allowed to discharge passengers within 50 ft. of a cross street in the business section of the city nor within 75 ft. of a cross street where street car tracks turn. Each bus must carry a sign showing the fare charged, the route traversed, the terminals of the route and the license number.

No more than one passenger or one passenger with child in arms is permitted upon the front seat, nor to occupy any portion of the bus forward of the back of the driver's seat. Each driver must file in the office of the city clerk a bond in the sum of $5,000, which shall inure to the benefit of the city of Los Angeles, and shall provide for faithful observance of the ordinance, or for the benefit of any passenger or other person who may be injured on account of the misconduct or negligence of the driver of the bus.

The Los Angeles jitney-bus operators have heretofore been paying $15 per quarter as license fee, but through a ruling of the city attorney, effective April 1, 1915, they are being charged only $7.50 per quarter. This is in addition to the $1 referred to in the regulatory ordinance. However, the jitney-bus operators consider the conditions laid down in the ordinance as onerous, and have filed with the city clerk a referendum against the ordinance. This, under the law, prohibits the ordinance from being put in effect until it has been submitted to the people at an election.

The following clipping from a Los Angeles daily paper of April 2 indicates that there may not be very much protection to any one injured in connection with the operation of one of these jitney buses, even if the bond which is offered is in force:

"A joker that has appeared in the insurance policies offered to jitney-bus drivers may cause the Los Angeles City Council to emulate the example of Oakland in dealing with the jitney-bus question. It also may further complicate proceedings surrounding Council action, it is said.

"The joker—so called because it is situated far down in the liability policy—relieves the insurance company of the responsibility of payment of damages until after the bus owner himself has paid them. The company then reimburses the bus owner. It has been pointed out that if the bus owner is financially irresponsible the persons injured might never receive damages. The insurance company, it is said, could withhold payment to the bus owner until he had recompensed the injured parties.

"The Oakland Council, in adopting an ordinance concerning the operation of jitney buses, is said on good authority to have inserted a proviso making it compulsory for the insurance company to make good the damages whether or not the bus owner they have insured can do so. The companies immediately increased their rates."

In the checks made since Jan. 1, 1915, the record shows that 802 buses have worked in the jitney service; but on March 18 only 492 of these were operating, a decrease of 38.6 per cent. From the best information that we can secure, the cheapest operated five-passenger auto bus costs nearly 5 cents per mile to operate exclusive of wages, but including depreciation. The average earnings of these machines, however, do not exceed 5 cents per mile. In fact, from the checks made of the passengers carried, with 20 per cent added for short riders who did not pass the checkers, it was found on four different days that the average earnings were 4 cents, 4.9 cents, 4.6 cents and 4.8 cents per mile.

The fact that so many of these drivers are constantly retiring from the work proves that the above calculation is very nearly right. The average period for a driver to stick at the work is about sixty days. It requires that length of time for him to learn that

he is not taking in money enough to keep up his repairs, and that his wages come out of the machine.

In California the State derives its revenue exclusively from taxation of the gross incomes of corporations. This gives the State a vital interest in the revenues of corporations. In a recent hearing before the revenue and taxation committee of the Legislature at Sacramento, with a view of arriving at some basis by which the State could levy a license on jitney-bus operators to make up for the loss from the reduction of the income of the railways, the representative of the jitney-bus interests pleaded that no regulation should be levied by the State for the reason that the operators of these buses were poor men and could not afford to pay a license to the State. A member of the committee took the position that from the very fact that the operators of these buses were poor men they were, therefore, incompetent to assume the obligations incident to the public-carrying business.

From the experience in Los Angeles it appears likely that the jitney-bus business will continue on the present basis until such time as full responsibility is placed upon persons engaging in this business. The fact that it is unprofitable does not deter persons from entering the service, as there will always be some who do not believe the reports they hear and others who are willing to operate at a loss, as they may be out of employment and need the money they can take in daily by this simple means.

In general, five-passenger automobiles constitute probably more than 90 per cent of the machines in this work, although no careful check has been made of this. Checks for short periods show the percentage of seven-passenger cars and others with semi-bus bodies averaged about 7 per cent of those passing the checkers.

E. L. Lewis, Superintendent.

Bay State Arbitration

Bay State Street Railway Company
Boston, Mass., April 12, 1915.

To the Editors:

In response to your request for further information as to the basis of my statements of ratio of wages to revenues in my testimony before the board arbitration in Boston last week, I give herewith the table of original data.

Ratio of Wages of Trainmen to Transportation Revenue

	Total Revenue for Transportation	Wages Conductors and Motormen	Wages as per cent of Revenue
(1) Bay State Street Railway Company	$9,276,882	$2,035,657	21.9
(2) All street railways in Massachusetts	38,908,061	8,428,720	21.7
(3) All street railways in New England	54,130,142	10,819,328	19.98
(4) All street railways in United States	520,184,773	95,451,625	18.35

In the table items Nos. 1 and 2 give data for year ending June 30, 1914, as reported to the Massachusetts Public Service Commission and given under the headings, "Total Revenue from Transportation" and "Wages of Conductors, Motormen and Trainmen."

Items Nos. 3 and 4 are from Bulletin No. 124 of the bureau of the census, which is the latest census report on "Central Electric Light and Power Stations and Street and Electric Railways, 1912." $520,184,773 in the total of the following revenues: Passenger, parlor, chair and special cars, freight, mail, baggage, express and milk, and other transportation revenue, as shown on page 98, table 16 of this bulletin. $95,451,625 is the total wages of conductors and motormen, from page 83, table 10.

Albert S. Richey.

Bureau of Standards Safety Rules

Allen & Peck, Inc.
Syracuse, N. Y., April 9, 1915.

To the Editors:

I note in your issue of April 3 an abstract of an article appearing in the *Electrical World* of that date by Dr. E. B. Rosa, chief physicist of the United States bureau of standards, regarding the safety rules now in course of preparation by the bureau. I hope that the full import of these rules will be realized by the electric railway companies.

The bureau has done an enormous amount of work on this code of safety rules, and is endeavoring by all means in its power to produce a set of rules which will make for the safety of those engaged in the electric industry by preventing danger to both life and property. A glance at the representation on the proposed committee which the bureau hopes to form for the purpose of discussion and action on the draft of the rules next July, will give some idea of the scope of the work as undertaken. It also indicates quite positively the attitude of the bureau with regard to its desire to promulgate an entirely practicable and workable code. The bureau, through its representatives, has expressed very clearly in informal conference, as well as by circular letter, its desire for the full co-operation of companies and individuals interested in the various industries whose requirements call for operation of electrical apparatus and lines. It has frankly asked for suggestions and constructive criticism of those sections of the rules which thus far have been sent out in tentative form. This has naturally resulted in redrafts, simplified and improved.

Electric railways are as much interested in this matter as are lighting and power companies and industrial consumers of power. The electric railways, through the American Association and its affiliated associations, and the sectional associations, should make it their business to become advised of the status of the work being done and interest themselves in assisting the bureau as much as possible. It must be recognized that a set of safety rules covering, as this will, the safe operation and construction of electrical apparatus and supply lines, would assist greatly in standardizing the practice of electric companies in all parts of the country. To accomplish this, however, the rules must be simple and practical, suitable for inserting in the instruction book of any operating company. It is for this reason that the bureau should have the fullest co-operation of the association and its membership.

Any company which has undertaken to produce an instruction or rule book for the guidance of its electric operating and construction forces will readily admit that the task of making clear, concise, complete and "foolproof" safety rules is a prodigious one, and will realize the advantage of having available an adequate set of safety rules bearing the stamp of a country-wide standard. It is, of course, conceivable that it may be necessary and advisable to revise these from time to time and that tentative adoption in the first instance may be very advisable. In any case, the step must be a progressive one and one which is in line with reason and logic. The American Association in the past has frequently indicated, by its activities, a progressive desire to co-operate in matters of interest to its membership, and can safely be counted on for active co-operation with the bureau.

W. J. Harvie.

[Note—An additional article by Dr. Rosa, giving a digest of the previous code, is given on page 750 of this issue. An editorial on the subject appears on page 741. —Eds.]

ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 TO 8, 1915

American Association News

ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 TO 8, 1915

Committee Activity Is Conspicuous as May 1 Approaches—President Allen to Speak in Washington Next Month—H. H. George Gives Fine Paper in Newark—Elevated Club of Chicago Considering Forming a Company Section

JOINT CLAIMS AND T. & T. COMMITTEE

The first meeting of the joint committee appointed by the Claims Association and the Transportation & Traffic Association to handle the problem of claims, was held at the Hollenden Hotel, Cleveland, Ohio, on April 12. The members present were B. B. Davis, Columbus, Ohio; E. E. Slick, Anderson, Ind.; R. P. Stevens, Youngstown, Ohio, and A. D. B. Van Zandt, Detroit. W. F. Weh, Cleveland, Ohio, was made a member of the committee, completing the Claims Association representation. The question considered was the safety-first movement, as it relates to the public, to railway employees and to school children. It was decided to formulate a set of questions to be submitted to member companies as to their experience with films and whether they can be exchanged in such a way as to broaden the knowledge of all those interested in the work that is being done to reduce the number of accidents. These questions were formulated in the rough and left in the hands of Mr. Slick to be put into shape. Mr. Stevens, chairman of the meeting, will forward them to Secretary Burritt for distribution.

COMMITTEE ON SCHEDULES AND TIME TABLES

A meeting of the committee was held at association headquarters on April 14, those in attendance being Alexander Jackson, Public Service Railway; Howard F. Fritch, Bay State Street Railway, and J. C. Nelson, Ford, Bacon & Davis. The report on the method to be recommended for making and recording periodical traffic counts was considered fully. The curves developed, showing the influence of frequency of stop on schedule speed, together with the charts showing the effects of fully-vestibuled cars on schedule speed, was also discussed. A summary of near-side stop practice has been developed, and a curve drawn showing the increase in this method of operation from 1906 to date.

WASHINGTON COMPANY SECTION

A meeting of company section No. 4 was held jointly with employees of the commercial department of the Potomac Electric Power Company on March 22. William L. Clarke, assistant secretary of the companies, presided. Milton E. Ailes, director of the Washington Railway & Electric Company, was introduced by President C. P. King. He outlined the general business conditions and gave an interesting history of the development of the local company. Van H. Manning, of the United States bureau of mines, then gave a lecture on mining. This showed the processes in the production of coal and gold and was illustrated with lantern slides and moving pictures. The speaker dwelt particularly upon mine disasters and the relief work of the bureau of mines. The addresses were followed by musical selections by the Pepco Glee Club, a piano solo, and the serving of a buffet lunch. In attendance were forty-five members of the section and thirty employees of the power company.

The next meeting will be held on April 30, when C. Loomis Allen, president of the association, will address the section on the subject "Individual Effort." This is part of the movement fostered by Mr. Allen to bind the sections closely together.

PUBLIC SERVICE SECTION

The regular meeting of company section No. 2 was held in Newark on April 15, with a large attendance. H. H. George, assistant engineer maintenance of way, gave an exhaustive paper on the organization of the engineering department of the company and gave a detailed description of its methods of working. With the aid of many lantern slides he explained the standards of construction and the construction records and described the recently acquired machinery for reducing construction and operating costs. He distributed Data Sheet No. 4 for the section loose-leaf note-book, containing comparative information of the quantities of materials entering into track construction in 1895 and 1914 and the relative costs. This sheet was made the basis of a statement of the company's track practice. Martin White, superintendent maintenance of way, sent a communication, which was read by President Maguire, contrasting track work in earlier years and to-day and his statements were emphasized by R. E. Danforth, general manager, who showed how engineering estimates are often low due to failure to take all factors of construction into account. He gave a number of personal reminiscences to prove this. Martin Schreiber, engineer maintenance of way, told the section some stories illustrating special problems of his department, showing how it had established its reputation with the company officials. He contrasted the organization of the present day with that of fifteen years ago, showing that a great deal of work was turned out then with a small force, but that engineering organizations must develop with the times. His strongest point was that engineers must be doing pioneer work if they are to progress. Being "up to snuff" to-day is no assurance for the future.

Elevated Club of Chicago

"Relations with the Public" was the topic of discussion at the fifth meeting of the Elevated Club of Chicago held on March 24. A record attendance of 126 officers and employees of the elevated railroads was reported. G. H. Pierce, statistician of the company, gave an illustrated talk on the above topic, bringing out interesting facts regarding the development of Chicago and the present service provided by the elevated railroads. His purpose was to inform the members of the part which the elevated railroads have played in the development of the city and to advise them regarding the service so that they can answer questions intelligently.

Other features of the meeting were the question-box discussion and numbers by the musical clubs. The question box takes a regular place in the programs and the timely questions contributed never fail to arouse interest. The glee and mandolin clubs have been organized recently, and they made their initial appearance at this meeting. The announcement was made also that the club will give a banquet in the near future.

As this issue of the ELECTRIC RAILWAY JOURNAL goes to press the April meeting of the club is being held. It is understood that at this meeting the club will take action upon the proposal to enroll itself as a company section of the railway association.

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.)

Types of Motor Axle Bearings—Use of Different Types for Each Half

BY "VULCAN," A.M.I.C.E., A.M.I.E.E., ENGLAND

While rolling stock superintendent on a large system, the writer carried out a series of trials of the different types of motor axle bearings.

The bearings originally fitted to the motors were of the ordinary split malleable-iron shell type, with white metal (babbitt) linings which on most systems have given reasonable satisfaction; in this case, due to the fact that the track was in very bad condition, the white metal was subjected to excessive hammering, so much so that the softer grades of this metal could not be used due to squeezing out, while the harder white metals often failed by cracking in the shells.

Another objection to anti-friction metal for this class of bearing is that the flanges wear very rapidly, due to the rubbing of the gear-wheel boss on one bearing and the thrust collar on the other. Now the clearance between the gear wheel and the side of the gear case is generally small, and if the wear referred to is considerable, rubbing will be set up between the gear and case.

The writer's experience has been that excessively worn bearing flanges very commonly are not attended to until the gear case has been badly damaged by the rubbing of the gear wheel. By the number of scored gear cases to be seen on other systems, it is evident that this trouble is very common.

For several reasons it is desirable to reduce the number of anti-friction metal parts on rolling stock, namely, from the point of view of prime cost, from the difficulty of getting the men to realize sufficiently the value of this metal to prevent wastage; also from the fact that in taking worn axle bearings out of the housings they are only too frequently dropped in the pit from a considerable height and generally thrown roughly about, so that pieces of the soft metal become detached from the shells to be cleared up eventually with the grease and dirt for cartage to the dust heap.

Axle bearings of bronze are quite a success in operation and are a great improvement over the old type; both the radial and flange wear are very small, and such bearings are now being generally adopted on new motors. To use this metal for the axle bearings of old motors, however, means that their thickness must be considerable. Such bearings are therefore very expensive. However, in making comparisons it must be borne in mind that the scrap value of a worn-out bronze bearing bears a high proportion to the original price, so that the initial cost is not so important as would at first appear.

Probably the only objection to the use of bronze axle bearings is that they constitute a strong temptation to pilfering. It is, of course, very easy to arrange some system for checking the deliveries of new bronze bearings to workmen and to depots against those returned as worn out, but whatever system is adopted it will be found impossible to prevent some of them going astray.

Many trials have been carried out on plain cast-iron axle bearings. With an unfailing oil supply they have done fairly well, but of course one cannot always depend upon having perfect lubrication, especially in winter. No matter what mixture of cast iron was used it was found in all cases that sooner or later the upper half of the bearings became badly scored. In consequence the bearings so damaged the axle journals that the latter had to be taken out and skimmed; a noticeable feature, however, was that the wear in the bottom half was negligible, and that on either of the flanges was also very small indeed.

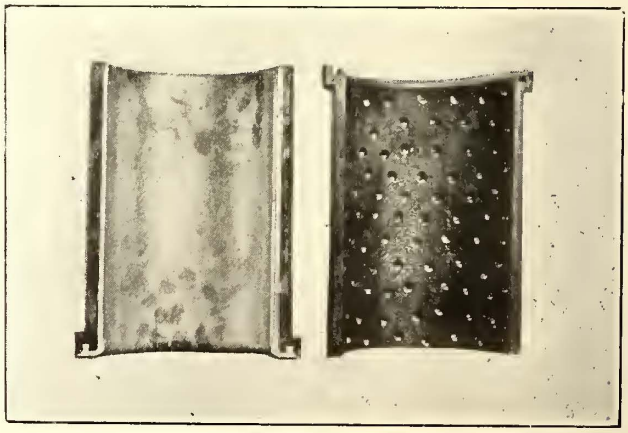
As a result of these tests a composite type of bearing was adopted which shows to great advantage as compared with others; this consists in utilizing for the top half a bronze bearing, and for the bottom half a bearing of cast iron. The arrangement has been well tried out and found perfectly satisfactory; it possesses all the advantages of an ordinary bronze bearing without any disadvantages and costs much less than the latter.

A cast-iron bottom half can of course be effectively used with an anti-friction metal top half, and in this case the saving is also great. The cast-iron half will outlast many top halves and, as compared with an ordinary soft metal type, this composite bearing will be found to reduce flange wear (and consequently also cross movement of the gear wheel in its case) to a negligible quantity.

Home-Made Cast-Iron Axle Bearing

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

For several years the Cleveland, Southwestern & Columbus Railway has been experimenting with cast-iron motor axle bearings. As a result it has adopted a ⅜-in. cast-iron babbitt-lined shell, which is giving just as satisfactory results as the bronze motor axle bearings formerly used and at a lower cost. At first much difficulty was experienced in obtaining a bond between the iron shell and the babbitt, but this was overcome by the boring of tapered holes on the inside of the shell. These holes are drilled with a special tool which makes the bottom of the hole larger than the top and thus serves to dowel



CAST-IRON AXLE BEARING, LINED AND UNLINED

the babbitt in position. In order to key the babbitt around the collar a dovetail groove is cut in the collar of the cast-iron shell. A lined and unlined shell babbitt are shown in the illustration on page 760. A pair of these cast-iron shells weigh approximately 20 lb., and the machine work necessary to prepare the shells for the babbitt costs about 80 cents. Some of these bearings have been in service for about four years, giving approximately 200,000 motor-miles before rebabbitting is necessary. No breakage of the shells has occurred. When the babbitt has worn through, the cast-iron shell produces no more serious results than a bronze shell in the same condition.

Relay Setting to Maintain Uniform Acceleration

BY P. V. SEE, SUPERINTENDENT CAR EQUIPMENT HUDSON & MANHATTAN RAILROAD, JERSEY CITY, N. J.

The uniform acceleration of all cars in a multiple-unit train is of the utmost importance, for jerking is not only annoying to the passengers but detrimental to the equipment.

On the Hudson & Manhattan Railroad, where all cars are equipped with motors and full automatic control, it has been found possible to secure this desirable uniform acceleration by the frequent adjustment of relays. The necessity for this adjustment, of course, is due to the wearing of the dashpot plungers.

Up to two years ago the relays were set by the usual method of operating a light car on an idle track. The controller would be put in the full multiple position and the relay adjusted until the last step of the contactors was secured in fifteen seconds. Notation of the current taken by the motors at each successive step was also made. This method was unsatisfactory and costly.

For instance, it proved a physical impossibility for an observer to read and call off accurately fourteen minimum current values in fifteen seconds. Furthermore, variations in grade, differences in brake adjustment and variations in line voltage made it hard to secure exact relay setting. In addition, the method called for the services of a train crew and three shopmen, and because of tunnel conditions the work had to be done during the midnight hours. Owing to these drawbacks it was decided to set the relays on a test bench.

A 4-volt, 600-amp motor-generator set was obtained. With this set the current could be raised and lowered at will, so that a relay could drop and make contact at the exact current value desired. The speed of the dashpot could then be determined by a stop watch. It was found that relays set on the bench by this method gave much more uniform results than those set on the car according to the old method.

Our cars are geared for 65 m. p. h. and have to be operated on a 4 per cent grade. It was desirable to adjust the relays on these cars so that in case one car in a two-car train had contactor trouble the good car would be able to start hauling the other car from any point on the 4 per cent grade. In order to accomplish this it was necessary to set the current element of the relay to operate at about 350 amp and to depend for starting at other times entirely on the dashpot adjustment. This setting of the relays is also accomplished on the bench with the aid of the motor-generator set.

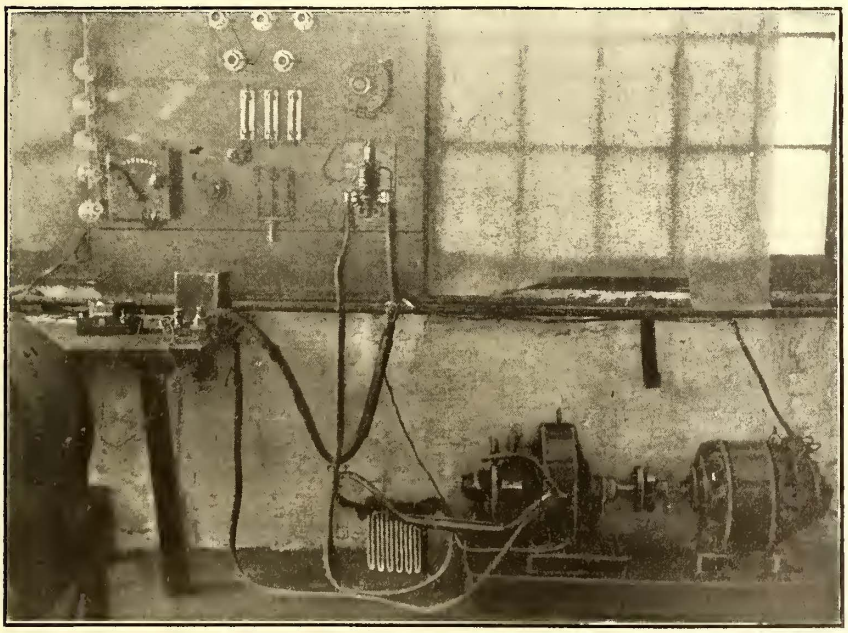
The adjustment of the dashpots is checked once a month on the inspection pit by timing full ten steps with a stop watch. Under this system of adjustment an inspector and helper can remove from a car four to five relays per day, adjust the same and replace them on the cars, thus greatly reducing the cost of the work.

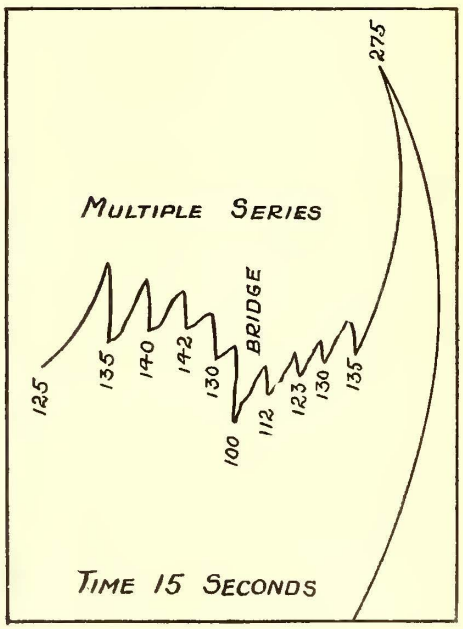
Graphic Geometrical Progression Method for Starting-Resistance Calculation

BY W. F. COORS, SCHENECTADY, N. Y.

The several interesting articles on proportioning railway motor starting resistance which have appeared in recent issues of the ELECTRIC RAILWAY JOURNAL have brought out many ideas bearing on the solution of the problem and leading to the same practical results.

While it is generally conceded that there are enough outside factors entering into the solution of this problem to upset fine calculations I feel that our old friend,



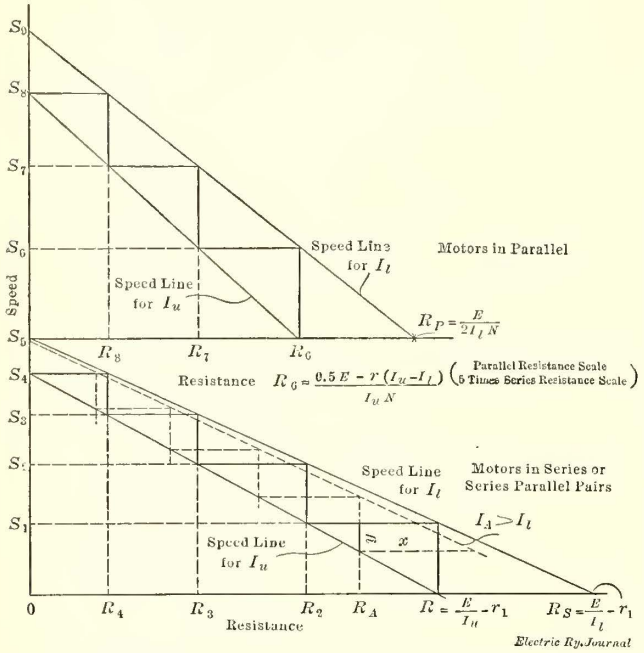


MOTOR-GENERATOR SET, CONTROL PANEL, AMMETER AND SHUNT; GRAPH OF CURRENT PASSING THROUGH THE NO. 1 MOTOR OF A CAR—IN THE GRAPH TIME PROGRESSES FROM RIGHT TO LEFT

The graph was secured from a recording ammeter. The acceleration occurred in exactly fifteen seconds from the time the controller was turned on until the last step in multiple was secured. The multiple steps on this curve show only one-half of the current consumed by the car.

geometrical progression, may still have a place in the field as one method of solution. As no one else has described this, the following plan, which is in actual use, is given without elaborate explanation.

Let I_u and I_l represent upper and lower limits of starting current, respectively; r, the resistance per motor; r_1, the collective resistance of the motors in series; R, R_2, R_3, etc., the rheostatic resistances for the respective steps; s_1, s_2, s_3, etc., the speeds corresponding to the



STARTING RESISTANCE CALCULATION—FIG. 1

different steps and values of starting current; and N, the number of motors.

MOTORS IN SERIES OR IN SERIES PARALLEL PAIRS

On a sheet of cross-section paper lay off as an abscissa, OR equal to $(E/I_u) - r_1$, and as an ordinate lay off OS_4, the speed corresponding to the current I_u on the speed-current curve for the voltage $E/2$. See Fig. 1.

The straight line S_4R represents the relation of speed and rheostatic resistance for the current I_u because the speed is proportional to the counter-emf, $E - [I_u(r + R)]$, and this is inversely proportional to the rheostatic resistance, I_u being constant.

Assume a value for I_l about 70 per cent of I_u, lay off OR_8 equal to $(E/I_l) - r_1$, and locate S_5, representing the speed corresponding to the current I_l on the speed-current curve, for the voltage $E/2$. From S_5 draw a straight line to the point R_8, corresponding to the current I_l. Then from the point S_4 draw a horizontal line intersecting the sloping line S_5R_8, and from the point of intersection draw a vertical line to the horizontal axis, determining the point R_4. Through the intersection of this vertical line and the line S_4R draw a horizontal line, determining the point S_3 and cutting the line S_5R_8. From this point of intersection draw another vertical line cutting S_4R and determining R_3. From the point of intersection with S_4R draw another horizontal line cutting S_5R_8 and determining S_2. In this manner a series of unequal, similar right triangles, representing the controller steps, may be laid out between the sloping lines corresponding to I_u and I_l.

It is not likely that the values of the current limits will have been chosen so that the last vertical line will intersect S_4R at R but an error in assumptions is easily allowed for as follows:

If the value of I_l has been chosen larger than that required (say I_a), the line RR_8 (shown as x in the figure) will fall above the horizontal axis. If the value of I_l has been chosen less than that required (say I_b), the line RR_8 will fall below the horizontal axis. (This is omitted to avoid complicating the figure.) From these two possibilities the correct value of I_l can be determined in the following manner:

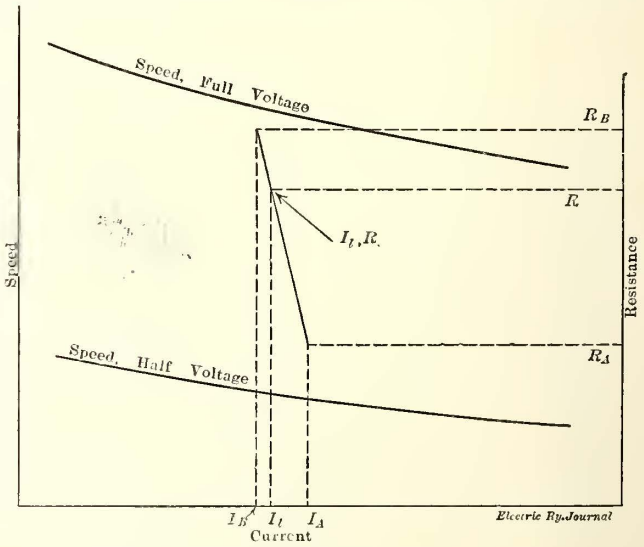
Note the values of resistance R_a and R_b where the last vertical line y cuts the sloping line drawn for I_u under these two conditions. Plot these two points, I_a, R_a and I_b, R_b, with resistance as ordinates and current as abscissas, as shown in Fig. 2, and draw a straight line between them. By noting where the given value of R lies on this line the corresponding value of I_l can be determined and the speed-resistance steps correctly drawn, using this value.

R will then represent the resistance which will limit the current to the value I_u when the voltage is first applied with the motors at standstill, and S_1 the speed when they have started and the current has fallen to the value represented by I_l. At this point the resistance $R - R_2$ should be cut out of the circuit and the current will rise again to I_u, and so forth on the succeeding steps. When $R_4 - O$ is cut out the current will rise to I_u at the speed S_4 and the latter will gradually increase to S_5 as the current decreases to value I_l. At this point with no external resistance in the circuit it is necessary to switch the motors into parallel for further increase in speed between the given limits of acceleration current.

MOTORS IN PARALLEL

On a horizontal line drawn through the point S_5 set off OR_6 equal to $\frac{0.5E - r(I_u - I_l)}{I_u N}$.

This formula expresses the fact that when the change-over from series to parallel occurs the counter-emf of the motors is equal to half line voltage at a current



STARTING RESISTANCE CALCULATION—FIG. 2

value of I_l. But as we wish to allow the current to rise to I_u there is an additional voltage drop in resistance equal to $r(I_u - I_l)$. The change from I_l to I_u also, of course, changes the counter-emf somewhat but this may be neglected in view of its small value and of the rather critical condition during the short change-over period.

From the point R_6 draw the sloping line for I_u to the point S_5, the speed corresponding to the current I_u on the speed-current curve at full voltage. Next set off R_p on this horizontal line equal to $E/(2I_lN)$ and draw the

sloping line for the current I_l to the point S_s which represents the speed at the current I_l, from the speed-current curve.

The same scale of resistance as used for the calculation while the motors were in series may be used in this case if the values of R_p, R_c, etc., per motor are desired. This is convenient when considering certain schemes of transfer connections but the values must be divided by the number of motors if the actual external line resistance is wanted. It is convenient for graphical purposes to increase this scale five times.

When the sloping lines for I_u and I_l are drawn, the required controller steps may be laid off as outlined for the series diagram, although it may be necessary to slightly alter the value of I_l in order to make the parallel diagram graphically correct.

In the diagram R_6 represents the value of the total external resistance in the line which will limit the current to the value I_u per motor at the speed S_6 when the parallel connections are made; and R_p the resistance which will limit the current to I_l per motor under the same conditions. When the motors are switched into parallel with the resistance R_6 in the line the current will rise from I_l to I_u at the speed S_5, and as the speed increases to S_6 the current will fall to I_l, when the resistance $R_6 - R_7$ should be cut out, allowing the current to rise to I_u again. In the same manner $R_7 - R_8$ and $R_8 - O$ may be cut out, and S_8 will represent the speed at the current I_u with no external resistance in the line.

This method is sufficiently accurate for ordinary purposes, the values of the resistance steps being slightly changed to allow the use of the same rheostats for series and parallel motor connections. However for locomotives, where the trailing load introduces outside factors, it becomes necessary to plot speed-current and tractive effort—current curves for the locomotive at the given acceleration for the average load for each step of the controller. Extra resistance on the first steps is necessary for switching and running light, and the steps should be proportioned in such manner that the increment of tractive effort for each step will not exceed 10,000 lb.

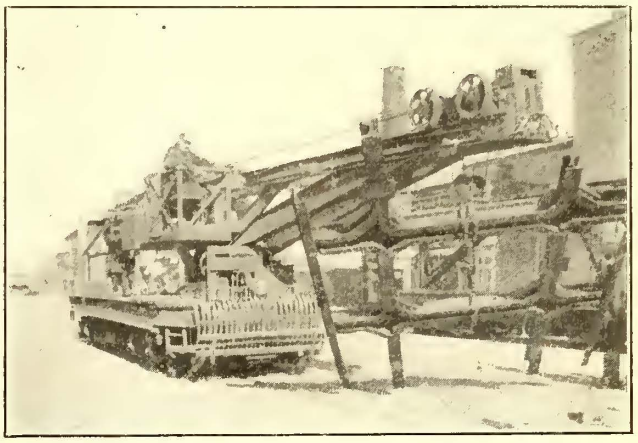
A Pillar Crane Car for Track Work

BY E. M. T. RYDER, ENGINEER MAINTENANCE OF WAY THIRD AVENUE RAILWAY SYSTEM

Before the use by the Third Avenue Railway System of the pillar crane car illustrated, very heavy and complicated underground slot special work in New York City was always installed and removed by main strength and awkwardness. As many as fifteen to thirty men were necessary to handle some of the pieces with very large risk of accident and much delay in installation.

This pillar crane car has a reach of 18 ft. and a capacity of 6 tons. It was tested by lifting ten 9-in. girder rails, 30 ft. long, in one pile. The center of the mast overhangs the center of the rear truck about 3 ft., both to increase the effective reach and to give room on the deck of the car for piling 30-ft. rails between the mast and the cab. For all that, the dimensions of the car are such that its clearance lines do not exceed those of the standard passenger car and it can go anywhere they can.

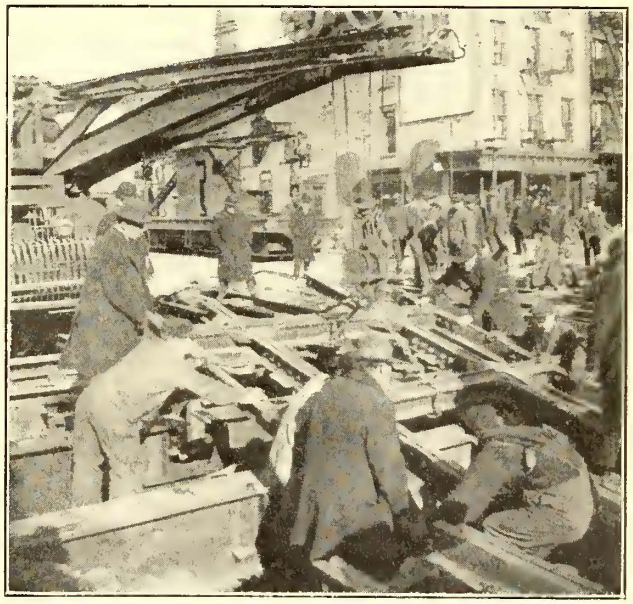
The fixed horizontal boom was chosen in preference to one that can be raised and lowered for these reasons: It is always below the level of the trolley wire and cannot be accidentally brought in contact with this wire; again, it carries the hook on the traveling carriage, which permits a considerable portion of the floor of the car to be loaded directly by the crane itself and which affords great flexibility in unloading and placing material. This is because the three motions available, rotation, horizontal and vertical movement, make it unnecessary to move the car itself in placing heavy pieces of special work. The dead load capacity of the car is rated at 20 tons. The narrow cab is about the same width as the pillar crane, so that 60-ft. rails can be loaded on each side of the car. There is an ample tool



SPECIAL PILLAR CRANE CAR OF THE THIRD AVENUE RAILWAY SYSTEM

box under the center of the car. The car is equipped to run either on the overhead trolley or the underground electric conduit system.

The crane car was furnished, complete, with crane, by the McGuire-Cummings Manufacturing Company from general designs by the Third Avenue Railway. The crane was manufactured by the Whiting Foundry Equipment Company. It was modified from that com-

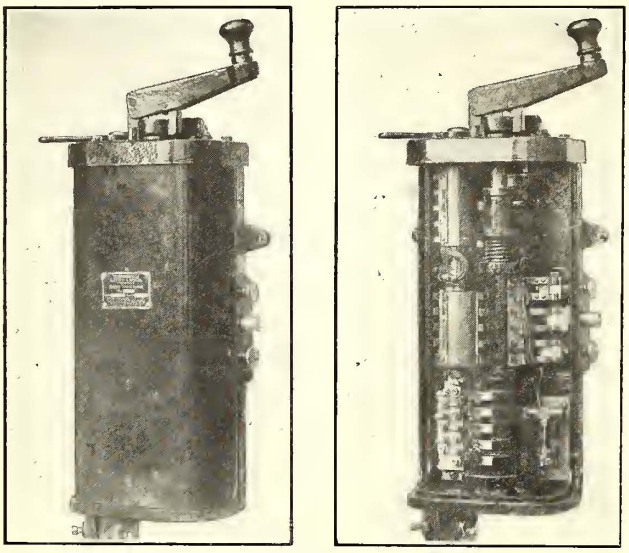


PILLAR CRANE CAR OF THE THIRD AVENUE RAILWAY SYSTEM HANDLING SPECIAL WORK

pany's standard design at the request of the Third Avenue Railway in two important particulars: First, it was heavily counterbalanced so as to be able to operate with the boom at right angles to the car without overturning; second, a special design of hoisting sheaves was conceived to enable the hook to be raised practically to the level of the boom itself in order to give working height above the floor of the car.

Electrical Equipment of Belmont Tunnel Cars

The dual subway system of New York City is the largest city transportation project ever conceived, requiring for its operation when complete about 2500 motor cars. This system will be operated by two companies, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, both of which have adopted Westinghouse electropneumatic control.



TYPE 27-A MASTER CONTROLLER COVERED AND WITH COVER REMOVED

The Belmont, or Steinway, Tunnel will be the first new section placed in operation by the Interborough Rapid Transit Company and will probably be opened about June 1. The route of the tunnel is from Lexington Avenue and Forty-second Street, in the heart of Manhattan, under Forty-second Street and the East River to Jackson Avenue in the borough of Queens. The tunnel, which is of the single-tube type, is 8375 ft. long and has a maximum grade of 4½ per cent. There is no physical connection with the present subway, but both terminals of the Steinway Tunnel will ultimately be linked with the enlarged system.

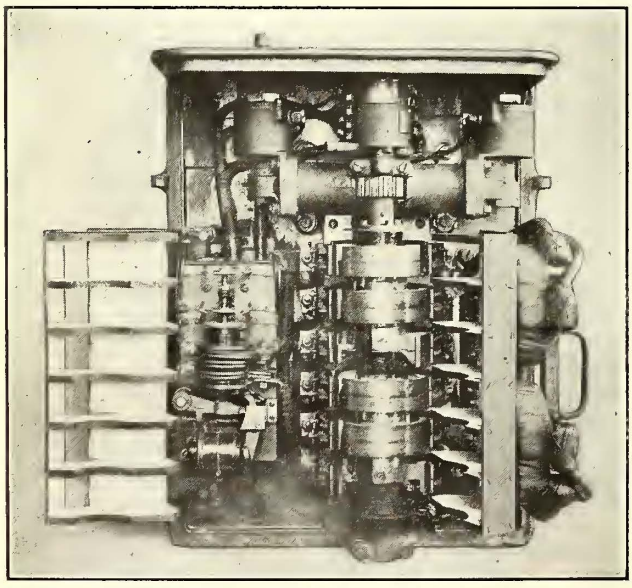
The motor cars to be used in this tube are of the same general type as the steel cars now used in the Interborough subway, and are being built by the Pressed Steel Car Company, McKees Rocks, Pa. In order to maintain a very rapid schedule the trains are equipped with automatic electric couplers and electrically-controlled air brakes.

The most important part of the Type 214-A automatic control, which is furnished on these cars, is the switch group. This combines the reverser, PK drum for cutting out resistance and for field control, and six electropneumatically operated switches, two of which act as line switches and four to function the series, bridging and multiple combinations of the motors. The PK drum is operated on the principle of an unbalanced air pressure, and is an adaptation of the PK control so successfully used by the New York Railways and the Third Avenue Railway of New York. By the use of this switch group a very compact arrangement is secured, resulting in a large reduction of weight, additional room for other apparatus, less conduit work, wiring and hangers, with a corresponding reduction in the cost of installation.

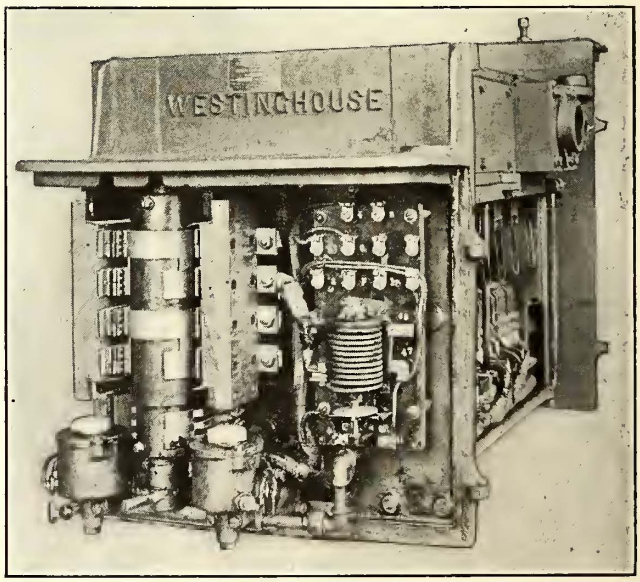
The master controller, located in the motorman's cab, is the Westinghouse Type 27-A. It is equipped with an improved form of deadman's release which acts upon the control circuit of the electrically-operated air brakes, thus obviating the necessity of any additional valves or magnets. When the handle is released in any operating position a connection is made which energizes all emergency magnets throughout the train, instantly applying the brakes. As an additional safety precaution, in case the brakes should fail, a switch is provided on the master controller to enable the motorman to stop the train by bucking the motors.

Power to operate the control circuits, air-brake valves, governor-synchronized line, emergency car lights and signal lights is furnished by a 32-volt storage battery. The batteries are connected to be charged in series with the car lights or compressor motor, whenever either or both are in operation.

A series limit switch interposed in the motor circuit is located in the central box to govern the acceleration of the train. Automatically the greatest possible acceleration is secured without exceeding a predetermined maximum value of current input to the motors.



TYPE 214 CONTROL BOX—END VIEW, SHOWING PK DRUM AND OVERLOAD TRIP



TYPE 214 CONTROL BOX—END VIEW, SHOWING PNEUMATICALLY OPERATED REVERSER AND SERIES LIMIT SWITCH

A line relay is provided to open automatically the battery circuit to the switch group in the event of power being shut off the line or while passing over a gap in the third-rail. Upon restoration of power and the closing of the line relay the switches pass through their regular cycle, depending upon the position of the master controller. The emergency lights are connected across a disk of the line relay and are lighted whenever the relay is not energized.

The train line consists of eighteen wires, seven of which are used for switch control, five for brake control and the others for the auxiliary circuits. The wires are of unusually large cross-section, being designed to operate a sixteen-car train in certain contingencies.

Each one of the motor cars is equipped with two Westinghouse No. 302-F-2 field control motors, rated at 125 kw (167 hp), at 500 volts. These motors have two separate field windings on the main poles. By connecting the two field windings in series during acceleration a relatively high tractive effort at low speed is secured with a small current. After all the resistance has been cut out, one of the field windings is disconnected, thus reducing the field flux. This gives a higher speed for any given armature current. While the full field connection is intended primarily for acceleration, it may be used to some extent for slow-speed running.

The frame is of soft steel, cast in a single piece. The projections of the frame, to which the axle caps are bolted, extend over the axle, to a large extent relieving the axle cap bolts of the weight of the motor. At each end there is a large bored opening through which the armature, pole pieces and field coils may be removed. These openings are closed by housings (securely bolted to the frame), which carry the bearings and oiling devices. Removal of the housings is made easy by the provision of tapped holes.

Both armature and axle bearings are arranged for oil-and-waste lubrication. Large waste pockets having an opening into the low-pressure side of the bearings are provided. Separate oil reservoirs permit the fresh oil to be fed and filtered up through the waste to the bearing. The depth of oil in the reservoir is easily gaged so that the most economical height may be maintained. Suitable oil guards and wiper rings prevent the oil from reaching the inside of the motor.

Insulating Composition Material

An insulating material containing boron, which is called "boro-porcelain," is being made by Fred M. Locke, Victor, N. Y. With this material a low dielectric constant and high dielectric and mechanical strength are obtained while the coefficient of expansion is almost as low, it is declared, as fused silica. According to the manufacturer, the voltage required to arc over the surface of an insulator made of this material is 20 per cent to 30 per cent more than for one of high-grade porcelain, and the dielectric strength is 50 per cent greater than that of porcelain. It is especially adapted for use with high-voltage transmission lines.

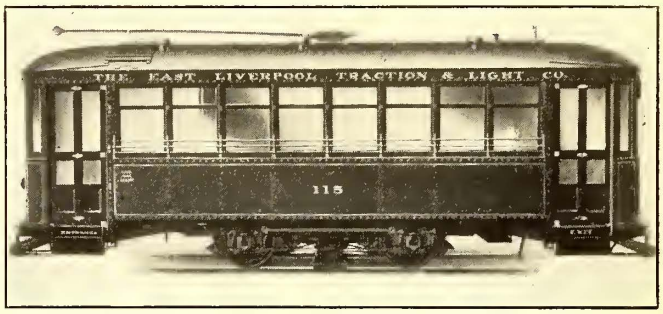
INSULATOR OF "BORO-PORCELAIN"

All-Service Cars for East Liverpool

The East Liverpool Traction & Light Company has recently received from the Niles Car & Manufacturing Company four single-truck cars of a rather unusual type. These have been designated as "all-service" cars, as they can be used for one-man or two-man operation, for near-side or far-side stops, for single-end or double-end equipment, or for either prepayment or interior collection of fares. At East Liverpool the new cars are being operated by two men, although later it is expected to use the cars in one-man service.

The control of all doors and steps is effected by removable handles convenient for the motorman or conductor. When the car is operated by one man all doors and steps are locked in closed position except those to the right-hand side of the motorman. When used as a two-man car the rear door on the right-hand side of the vestibule is opened and closed by a handle that is located on the line of the body end sill.

It is considered that the particular advantage in having a car built in this manner is that the one-man idea is more or less experimental on most electric railways, and with this car a railway is enabled to do its experimenting with different schemes of operating but without the expense of rearranging the car or of purchasing several different types. Should one-man service prove to be impracticable on any line owing to peculiar circumstances surrounding its operation two-man service could be resumed without rebuilding the equipment.



EAST LIVERPOOL ALL-SERVICE CAR—EXTERIOR VIEW SHOWING DOOR AND STEP ARRANGEMENT

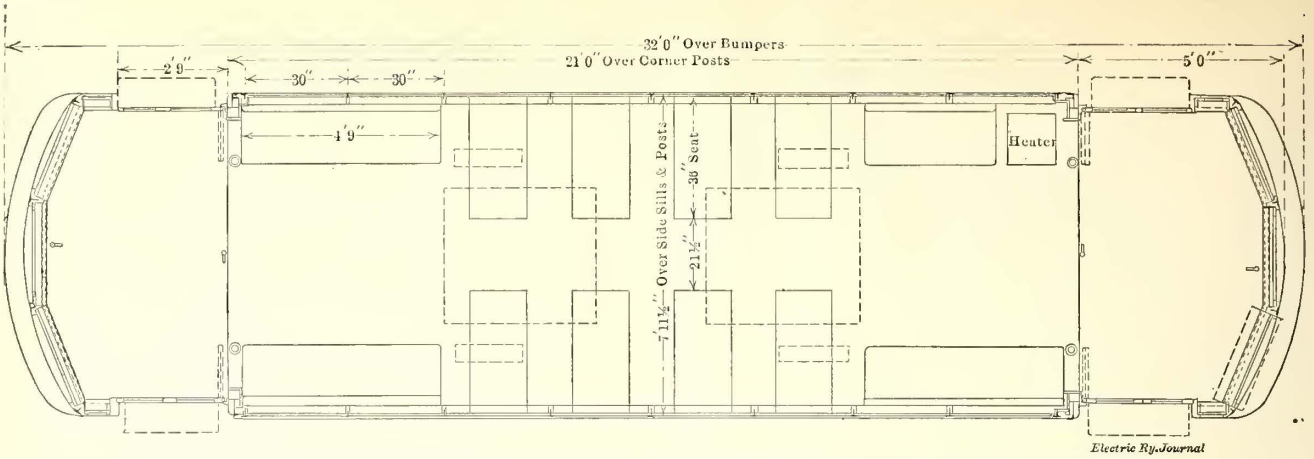
Details of Construction

The car frame is made up of standard, commercial, rolled-steel shapes and plates with sections as light as consistent with the necessary strength for service involving a maximum speed of 20 m.p.h. under ordinary operating conditions. All joints are riveted, welding having been permitted only where necessary to exclude water or where mechanical joints could not be made. Countersunk rivets are used only where round-head rivets could not be used, and no attempt has been made to conceal the rivet heads, as it was desired to advertise to the public the fact that the cars were made of steel through their different appearance from the old-style, smoothly-finished, wooden cars.

The general dimensions of the car are as follows:

Length over bumpers	32 ft.	0	in.
Length over vestibule	31 ft.	0	in.
Length over corner posts	21 ft.	0	in.
Length of platforms	5 ft.	0.	in.
Width over all	8 ft.	2	in.
Width over sills	7 ft.	10	in.
Height from bottom of sill to top of roof	8 ft.	8	in.
Height from floor to underside of ceiling	7 ft.	8	in.
Side-post spacing		30	in.
Width of door opening		33	in.
Height of floor		36½	in.
Diameter of wheels		33	in.

The floor and roof are sheathed with wood, the former being of ⅞-in. yellow pine laid longitudinally on the underframing, with the customary floor strips mounted



EAST LIVERPOOL ALL-SERVICE CAR—PLAN SHOWING SEAT AND PLATFORM ARRANGEMENT

upon it. The roof is of the turtle-deck type and is provided with six Globe ventilators. The roof sheathing is 7/16-in cypress and this is nailed to white-ash carlins which are reinforced by the steel T-irons which form the framework of the sides and roof.

A fully-inclosed vestibule is provided at each end of the car. This is depressed 9½ in. below the car floor to provide step heights of 13½ in. and 13 in. respectively. The vestibules are sheathed inside and out with No. 14 gage sheet steel, and the vestibule sash are arranged to drop into the space that is thus provided.

The posts are 2-in. x 2-in. x ¼-in. steel tees riveted to the side sills, the belt rail, the top plate and the steel side sheathing. The sheathing below the windows which forms the plate girder that carries the load is composed of No. 14 gage steel made up in three sections. The side sill and belt rails are composed of steel angles, the former having 3-in. x 4-in. legs, and the latter 2½-in. x 2½-in. x ⅜-in. legs. The top plates, which are 3-in. x 2-in. x ¼-in. angles, are riveted to the top of the side post together with a letterboard of ⅛-in. steel plate that is riveted to the side post under the vertical leg of the angle top plate and welded at the joints.

Equipment

Eight reversible Hale & Kilburn walkover cross-seats are provided, together with four longitudinal seats. This gives a total seating capacity of twenty-six. The cross-seats are spaced on 30-in. centers so that they are symmetrical with the windows. The windows are equipped with Edwards sash locks and have pantasote curtains with Curtain Supply Company's metal rollers and Forsythe ring fixtures.

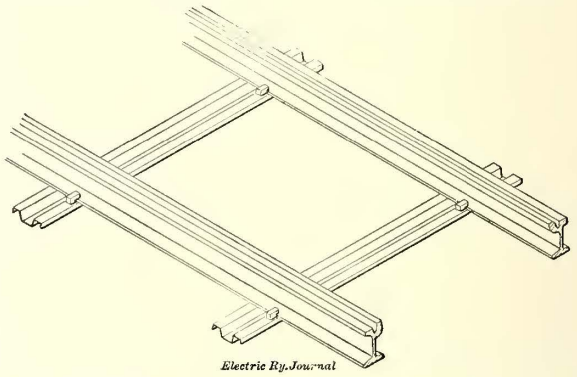
The headlining is of 3/16-in. agasote equipped with molding to relieve the monotony of the headlining, the interior finish in general being attached to wooden battens which are bolted to the steel frame. The interior finish is of natural dull cherry with sanitary finish, but the ceiling is painted cream color. The side walls below the windows are sheathed with ¾-in. compressed cork covered with ¼-in. agasote that is finished in cherry color.

Each end of the car is equipped with an Esterline "Golden Glow" headlight and also with a Peacock brake drum and a bronze ratchet handle. The lighting equipment provides for two lamps in the headlight, six in the main body of the car and two in the vestibules. These are wired five in series with No. 14 flexible wire. The lights in the body of the car are hung in Dayton shade holders equipped with Alba reflectors for 36-watt tungsten lamps. All the switches and fuses for lighting circuits are inclosed in a cherry cabinet lined with transite at one end of the car. The usual push buttons and a Consolidated signal buzzer are also provided. A Peter Smith No. 3-P forced ventilation hot-air heater is installed in one corner of the car.

The power circuits are all laid in metal conduits installed in accordance with the Underwriters' specifications. The trucks are Baldwin Locomotive Works, Class X, with an 8-ft. wheelbase and 33-in. cast-iron wheels mounted on 4½-in. axles.

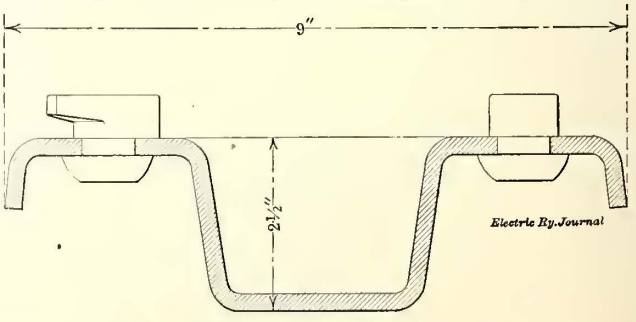
A Trough-Shaped Steel Tie

The Cambria Steel Company, Johnstown, Pa., has in wide use for mine and industrial railways the Slick rolled-steel tie which has also been made available in a



PERSPECTIVE SHOWING RAILS ON TROUGH-SHAPED TIES

larger and heavier form for street railway service. As shown in the accompanying sketches, the tie is of trough shape with broad wings or flanges, the entire construction being intended to provide ample bearing surfaces



Cross Section of Tie

SECTION OF TROUGH-SHAPED STEEL TIE, INCLUDING RAIL FASTENINGS

on the ballast or concrete. The rail fastenings are flanged buttons so attached to the ties that they cannot be misplaced or lost. It is asserted that when these fastening buttons are turned over the rail flanges and the tie bedded, they will hold the rails on the ties indefinitely.

News of Electric Railways

SUBWAY FRANCHISE TAXABLE

The Supreme Court of the United States on April 12 sustained the Court of Appeals of New York, in holding that the Interborough Rapid Transit Company must include its earnings from the subway in the amount upon which its franchise tax is paid. In its opinion, handed down by Justice Holmes, the court seemed to accept the corporation's view that the statute under which the subway was constructed amounted to a contract exempting the operator from taxes upon his interest in it, but in sustaining the lower court the federal tribunal adopted the reasoning that the franchise tax, though measured by earnings on exempted property, was not a tax on that property but merely on the privilege of operating it in a corporate way.

It was pointed out at the offices of the Interborough Rapid Transit Company that the effect of the decision of the Supreme Court with regard to the franchise tax would be merely that the company would have to resign its claim to about $1,500,000, which it has already paid to the State. According to the established practice of the company, it has paid the sum demanded each year under protest, and consequently it will not now have any heavy arrears to make up.

SYRACUSE STRIKE SETTLED

Compromise in Controversy Involving Amalgamated Association and the Brotherhood

The strike on the lines of the Empire United Railways, Syracuse, N. Y., is over. The difficulty involved, namely, the recognition of one union against another, is regarded as presenting one of the most peculiar labor situations in the history of electric railroading. For three years the Empire United Railways have had a labor contract with the Brotherhood of Locomotive Engineers and the Order of Railway Conductors. Last year the men on the Auburn & Syracuse Electric Railroad were organized by the Amalgamated Association, and a contract was made with that organization providing for the same wages as the men were then receiving. This year the Amalgamated attempted to organize on the Empire United Railways and succeeded in inducing a few men to join the organization, but the company refused to make a contract with the Amalgamated on that road, inasmuch as it had a contract with the Brotherhood. This contract the Amalgamated declined to recognize, and when the company still refused to deal with the representatives of the Amalgamated they called a strike. So far as the Empire United Railways was concerned the strike was a failure. Not a trip was lost by that company, and it is reported that it did not even have a car behind schedule. The Auburn & Syracuse road, however, was completely tied up, not a wheel turning from Thursday morning, April 8, until noon Monday, April 12.

No question of wages was involved. The only issue was the question of recognition of the Amalgamated as against the Brotherhood. If the company made a contract with the Amalgamated, it was in trouble with the Brotherhood, and vice versa. Furthermore, after the Auburn & Syracuse road was tied up, the men in the employ of the New York State Railways in Rochester, Syracuse and Utica, whose tracks the Empire United used for terminals, voted to strike if the Empire cars were permitted to run into the city. The Buffalo union threatened the International Railway with similar action in connection with the Buffalo entrance. To prevent interference with its running rights the Empire United, in behalf of its own cars and the Buffalo, Lockport & Rochester, secured a writ of injunction forbidding New York Railways—Rochester Lines, from refusing to accept the Empire cars. A similar injunction in favor of the Auburn & Syracuse was secured in Syracuse on April 9 against the Syracuse lines, after the trolley and feed wires just outside the city limits had been cut.

A conference in Chicago on April 10, between Horace E. Andrews, of the New York State Railways; W. D. Mahon, of the Amalgamated Association, and W. S. Stone, president of the Brotherhood, brought no result. Later, through the efforts of J. H. Lynch, State Commissioner of Arbitration of New York, a compromise was reached whereby the Empire United Railways agreed to recognize and make a contract with the Amalgamated substantially the same as that in existence on the Auburn & Syracuse Road, such agreement, however, not to violate or in any way affect the contracts between the company and the Brotherhood. To this the representatives of the Brotherhood acquiesced. The terms of the settlement were left to arbitration.

The Empire United Railways had beaten the union on that property and was in a strategic position which indicated a similar result on the Auburn & Syracuse. The fear of provoking a general strike all over New York State with its far-reaching consequences finally induced the management to agree to a compromise. Public sympathy was not with the men, and even such newspapers as have occasionally been hostile to the company expressed a lack of sympathy with and disapproval of the strikers.

LABOR AGITATION ON COAST

Attempted Seattle Strike—Agitators Repulsed in Portland and San Francisco

From all indications no further effort will be made to organize the employees of the Puget Sound Traction, Light & Power Company, Seattle, Wash. No demonstrations have occurred since the affair of March 31 when labor agitators stopped cars of the company and attempted to force the trainmen to join the union. A statement issued by the company follows in part:

"The disgraceful scene enacted in Seattle under the guise of a strike of street railway employees is directly traceable to the incendiary utterances of one Samuel Atkinson, a professional organizer and agitator, and William B. Fitzgerald, executive board member of the Amalgamated Association. The meeting called at the Labor Temple was for the express purpose of attempting to stampede the trainmen from their cars. The plan for the stampede has been discussed for some weeks past. The tactics employed by the agitators in this affair are the same as those employed in riotous scenes in other cities. The fact is that the crowd was assembled at the Labor Temple and the meeting was opened by officers of the temple and subsequently turned over to Atkinson and one Flyzik, aided by Fitzgerald. After haranguing the crowd and working them up to a point where they were ready for anything, word was given and they started forth on their mission of destruction, while Messrs. Atkinson, Fitzgerald and Flyzik and their assistants kept in the background and watched the result of their work.

"Atkinson and Fitzgerald canvassed the trainmen of this company for weeks and tried by every means to bring about the organization of our men. They played what they considered a trump card. The attitude of the trainmen was not a surprise to us, and the fact that they did not surrender their individuality and rights as American citizens to the domination of the hide-bound, narrow-minded organization of street car men is distinctly to their credit. That our faith in their loyalty has been more than justified is something of which this community should feel justly proud. That we are gratified goes without saying."

Samuel Atkinson, general organizer of the Amalgamated Association, is quoted in part as follows:

"The work of education will go on—we are not quitting, but we are wise enough to know when we are not wanted. We shall not again try to organize these men until we are assured that they are good union material."

Employees of the Portland Railway, Light & Power Company, Portland, Ore., have voluntarily signed a statement addressed to the officers of the company pledging their loyalty to their employers. After the disorder in Seattle, it was reported that attempts would be made to organize a strike among the men in Portland. The Portland men have an organization, the Brotherhood of Electric Railway Employees, officered and managed entirely by the men.

It was stated in San Francisco on April 5 that an

attempt by the Amalgamated similar to that made in Seattle was contemplated there. These plans were discovered well in advance and are said to have resulted in thirty men being dismissed by the United Railroads. Charles N. Black, vice-president of the company, is quoted as follows:

"It is particularly unfortunate that professional organizers from other parts of the country should select this of all times to start anything in this city. There are ten men looking for a job to every man I will let out. It is also bad for the general welfare of the city that any attempt to create a disturbance should be initiated. San Francisco is making special efforts to attract visitors from everywhere; times are hard and there are plenty of people out of work."

CANADIAN RAILWAY PROPOSALS

The Forest Hill Electric Railway, Toronto, Ont., failed on March 30 to secure another extension of time from the railway committee of the Ontario Legislature for the construction of its proposed line.

The bill of the Toronto & York Radial Railway before the railway committee of the Ontario Legislature has been defeated. The company asked permission under old charters to run lines to Oakville and Newmarket, and several lines through York Township.

The Ottawa & St. Lawrence Railway's bill before the railway committee of the Ontario Legislature has been thrown out by the committee. The plan was to build between Ottawa, Morrisburg, Smith's Falls, Arnprior and Carleton Place. The company wanted a further two years' extension in which to spend 15 per cent of the total cost of construction.

The Eastern Ontario Railway asked the Ontario Legislature for an extension of two years in which to commence construction of its line through Whitby, Ont. Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, announced before the railway committee that he was opposed to the bill as it was against the Hydro-Electric Radial interests. In consequence the committee rejected the measure.

The Toronto, Barrie & Orillia Railway asked the Ontario Legislature for five years in which to complete the line. The company has already constructed 7 miles of the line. This bill has been passed with an amendment to the effect that the 7 miles must be placed in operation before the rest of the road is proceeded with and that the Hydro-Electric Commission of Ontario be permitted to take the road over at cost.

The following resolution respecting the subsidization of hydro-radials was unanimously passed by the City Council of Toronto on April 8 and will be forwarded to Ottawa:

"Resolved, that this Council respectfully urges upon the dominion government the necessity of declaring its policy with respect to such subsidies, and that said policy be so expressed that it will allow provincial public service commissions with powers from the provinces similar to those given to the Hydro-Electric Power Commission of Ontario, to anticipate said subsidies and proceed with the immediate construction of the roads."

NEW YORK COMMISSION INVESTIGATION

Statement of Probable Recommendations of the Legislative Investigation Committee

It was stated on April 9 that the salient recommendations of the report of the Thompson legislative committee on its investigation of the Public Service Commissions of New York would be the authorization of the first district commission to supervise telephone companies in New York City; reduction of the second district commission from five to three members; insistence upon the inforcement of the law making corporation officials criminally liable for failure to obey decisions, and the appointment of deputies of the commissioners to take depositions as to facts.

It is expected that the Thompson report will be accompanied or closely followed by bills providing for the changes recommended. A majority of the committee believes that the up-State commission does too much detail work and will recommend the reduction to three members, and that deputies hereafter shall investigate complaints and take testimony of fact to be presented for the adjudication by the commissioners.

THE NEWPORT FRANCHISE

The proposed street railway franchise for Newport, Ky., was discussed at a meeting in the Mayor's office in that city on April 6, when President Cartwright and Secretary Polk Laffoon, of the Cincinnati, Newport & Covington Railway, Mayor Helmbold and members of the City Commission representing the city, and a committee from the Business Men's Club were present. The railway officials object to section No. 9, which gives the city control of the operation of the road, and to the portion relating to the settlement of labor troubles and to the 3-cent fare required within the city limits. If the company must operate within the city for 3 cents then the rate to Fort Thomas and across the bridges into Cincinnati must be more than 5 cents. It would be impossible to make a transfer arrangement with the Cincinnati lines, as the portion the latter lines would receive under a 3-cent fare would not be adequate for that company. Objections were also made to the proposed rental charge of $1,500 per route-mile per annum for the use of the streets. The city officials claimed that the company should pay no rental on the Cincinnati end of the line, but should contribute to the Kentucky cities, since the passengers were all taken into Cincinnati to transact business. It was finally agreed that the railway officials should redraft the franchise.

At a conference between city officials and representatives of the railway on April 13, all of the disputed questions on the proposed new franchise, with the exception of the rental to be paid the city, were practically cleared away. Mr. Laffoon proposed that the control of service be subject to rearrangement at the end of each five-year period in order that changing conditions may be taken into consideration. The question of rentals will be discussed by the representatives of the city and the company at a future meeting.

HEARINGS ON CINCINNATI TRANSIT BILL

A public hearing on City Solicitor Walter M. Schoenle's rapid transit bill took place at the Business Men's Club in Cincinnati, Ohio, on April 9. The draft of the bill was discussed section by section. A number of amendments of minor importance were made.

At a public meeting on April 10 the Schoenle bill was again discussed. Suggestions made at a former meeting had been incorporated in the draft. Representative Paul P. Rover expressed the belief that some of the provisions are unconstitutional and could not be enacted into law. Mr. Schoenle said that a State law would be required to secure the construction of a rapid transit loop. George Puchta of the Rapid Transit Commission said that it would be impossible to have a private corporation build the road and take city bonds in payment for it. It is understood that the bill will be brought before the Senate utilities committee at once.

On April 14 A. S. White presented a new plan to the Rapid Transit Commission by which the loop would be built in units. The commission will probably take no action on this or any other proposition until the Legislature acts on the Schoenle bill.

The Behne bill, which was passed in the Senate on April 8, may introduce a problem in this case if the House of Representatives acts favorably upon it. It provides that if a bond issue for an enterprise of this kind is to carry with it the faith and credit of the municipality, it must be submitted to a vote of the electors and receive more than two-thirds of the votes. Where Council authorizes the issue the lien is on the property alone.

Senator C. F. Bauer introduced a bill on April 6 providing for a rapid transit commission for Cincinnati. His purpose in doing this, with Mr. Schoenle's bill in course of preparation, is not clearly understood.

Plans are now being made to extend the Cincinnati approach of the Suspension Bridge from Second Street to Third Street. This will make a difference in the route that will be taken by the Cincinnati, Newport & Covington Railway and in the franchise that will be necessary for it.

TOLEDO FRANCHISE COMMITTEE DISCHARGED

A resolution offered by Councilman Redd and adopted by the City Council of Toledo, Ohio, on April 12 resulted in the discharge of the franchise committee, which has served many months, and the appointment of a new committee. The resolution provided that all the members of the new committee should be members of the Council and that four members of the old committee should be members of the new one. These provisions operated to sidetrack Mayor Keller and City Solicitor Thurstin, who had been members of the old committee. The committee appointed in conformity with the resolution consists of President Hassenzahl and Councilmen Redd, Sievert, Dotson, Hein, Brown and Ruppel, the last four having been members of the former committee. It was stated that the other two members of the old committee had not co-operated with the Council members in endeavoring to reach an agreement on the franchise question and that they were apparently unwilling to do so.

On April 8 Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, expressed his conviction to the Citizens' Franchise Association that it will be necessary to raise among Toledo people the money for any improvements that are to be made on the road. About $1,500,000 will be needed for this work. A resolution has been adopted by the Central Labor Union to the effect that the legislative committee of that organization investigate the cause of delay on the two ordinances before the Council providing for the issue of $8,000,000 bonds for the purchase of the local railway property.

QUESTIONS UP AT CLEVELAND

Opposition developed to the proposed construction of a crosstown line on 123d Street, Cleveland, Ohio, at a meeting of the street railway committee of the City Council on April 12. The matter will probably not come to a vote in the Council for some time.

The rate of fare on the Cleveland, Southwestern & Columbus Railway between Cleveland and Berea was discussed in the County Commissioners' office in Cleveland on April 15. Village Councilmen insisted that the fare be reduced from 15 cents to 10 cents, but the company officials stated that if forced to that point it would run no cars through Berea after December, 1916, when the franchise expires. The company has been asked to aid in the improvement of the streets used by it in the village and a new franchise was requested in return.

The officials of Lakewood, a suburb of Cleveland, and Peter Witt, street railway commissioner of Cleveland, have been unable to agree upon the features of the franchise which will secure for the village an extension of the West Madison route. Mr. Witt has demanded that the village so amend its regulations regarding interurban traffic that interurban cars will not be required to stop for local passengers. Mr. Witt has announced that he will ask for legislation for two more new carhouses.

REPORT OF CONNECTICUT COMMISSION

The third annual report of the Public Utilities Commission of Connecticut for the year ended June 30, 1914, is largely a volume of statistics for the corporations under the jurisdiction of the commission. These included twenty-three street railways, an increase of eight during the year. On June 30, 1914, the total amount charged by all reporting railways for construction and equipment was $91,095,017, of which $20,991,977 was for construction, $43,992,510 for equipment and $26,110,529 for miscellaneous properties outside of the street railway holdings of the Connecticut Railway & Lighting Company. The total capital stock as of June 30, 1914, was $73,055,900 and the funded debt $21,051,578. The total operating revenues of the companies for the year amounted to $15,656,593, an increase of $377,324, while the total operating expenses were $10,119,014, an increase of $546,813. The net operating revenues totaled $5,537,589, a decrease of $169,485, but the gross corporate income was $7,470,344, an increase of $74,054. The total addition to surplus by all operating companies was $269,158, a gain of $297,307. The total mileage operated in the State was 1505.87, and the total cars owned, 3530, of which 3075 are with electric equipment.

CALIFORNIA RAILROAD COMMISSION REPORT

The California Railroad Commission has just issued its annual report for the year ended June 30, 1914. The financial tables presented, however, are for the year ended June 30, 1913. On that date the total amount of capital stock outstanding for electric railways in California amounted to $244,378,952, while the funded debt totaled $162,595,342. The gross revenues were $36,077,841, and the operating expenses, $22,963,578, leaving a net revenue of $13,094,263. Taxes and interest totaled $9,487,526, so that the net income amounted to $3,606,737. The total number of passengers carried was 683,228,905, of which 526,424,880 were fare passengers, 554,570 revenue transfer passengers and 156,249,455 free transfer passengers. The total single-track mileage operated as of June 30, 1913, was 2805.25, of which 147.11 miles were constructed during the year.

Up to June 30, 1914, valuation work had been completed by the commission for twenty-eight companies, four of which were the following electric railways: Los Angeles Railway Corporation, San Francisco-Oakland Terminal Railways, Petaluma & Santa Rosa Railway and San Francisco, Napa & Calistoga Railway. A little attention in valuation matters was also devoted to the Northern Electric Railway, Oakland, Antioch & Eastern Railway, Pacific Electric Railway, Visalia Electric Railway and United Railroads of San Francisco.

HEARING ON NEW HAVEN BILL

The legislative committee on railroads gave a hearing at the State House at Hartford, Conn., on April 8 to the New York, New Haven & Hartford Railroad on its bill to amend its charter to bring about changes in the financial administration of the company, in accordance with the new policy decided upon by its directors. The bill provides that the company shall not hereafter exercise or possess any of the rights, privileges, powers, or franchises possessed by the Consolidated Railway prior to the merger of the New Haven company with and into the Consolidated Railway on May 31, 1907, except such as may be required for the operation, maintenance or improvement of any property which it now owns or operates, or for the sale, of any property, except such as may be required to generate or transmit electricity, and it shall not hereafter acquire any securities issued by any other corporation. The measure also provides that not less than two-thirds of its directors shall be citizens residing in New England.

The legislation which is being sought in Connecticut is in accordance with the effort to obtain the passage of harmonious and constructive bills so as to bring about the financial readjustments which are proposed. The trustees of the Boston & Maine Railroad are trying to secure legislation that will enable them to adopt a plan of readjustment. The bills of the New Haven company having this end in mind are now before the Legislatures of Massachusetts, Rhode Island and Connecticut. In Massachusetts the bill of the company has the unanimous approval of the Public Service Commission of that State.

Ohio Commission Resignations Asked.—Governor Frank B. Willis of Ohio has asked for the resignations of fourteen members of various state commissions, among them C. C. Marshall and Oliver H. Hughes of the Public Utilities Commission. Both Mr. Marshall and Mr. Hughes were appointed by former Governor Cox.

Ohio Bills Reported for Passage.—The Britton bill giving interurban terminal companies the same rights on the streets of municipalities as steam railroads now have was reported to the House of Representatives for passage by the public utilities committee on April 7. This committee also reported the Myers bill for passage. It authorizes interurban railways to join the railroads in the construction of union passenger depots and joint terminals.

Ohio Municipal Ownership Bill Passed.—The Behne bill, pertaining to the issue of bonds for the purchase or construction of utility plants by municipalities, was passed by the Senate of Ohio on April 7. It provides that where a municipal council authorizes a bond issue for this purpose by ordinance, the bonds shall be a lien on the utility property only. If it is desired that the faith and security of

the municipality shall stand for the bonds, the matter must be submitted to a vote and receive a majority of two-thirds of the votes. After three years a certain amount of the income of the plant must be set aside to pay the interest and as a sinking fund to retire the bonds.

Railway Men Learning to Run Electric Trains.—A class in electricity at the Pennsylvania Railroad Y. M. C. A. in Philadelphia is fitting 278 employees of the system to man electric trains to Paoli, when the new service opens on June 1. Nearly half of the class, 128 students, are engineers and firemen of steam locomotives, who want to be transferred to the new branch of the service. The class is under the general supervision of the mechanical instruction committee of the Railroad Y. M. C. A. The electric features are being taught by Clarence Roberts, assistant foreman of engines of the Philadelphia Terminal Division, and the air-brake features are in charge of Russel M. Smith, the division's air-brake instructor.

Washington Utility Law Amended.—An amendment to the public utility law of the State of Washington has been adopted recently. By it the doctrine of "regulated monopoly of public utility service" will be placed on the statutes of the State, and in addition the law places privately-owned and municipally-owned utilities on the same basis. Any new public utility under the recently amended law must secure a certificate of public convenience and necessity from the State Commission before beginning business, and this certificate may only be granted after public hearing. The law defines public utility as used to mean "every street railway, interurban railway, electric, water, gas and steam heating plant and system and vessel now or hereafter constructed and whether municipally or privately owned."

Advertising "Electrical Prosperity Week."—An appropriation which will be sufficient to insure the advertising of "Electrical Prosperity Week" in every city and town in the country, was recommended by the "Electrical Prosperity Week" committee, which met on April 7 at the Engineers' Club, New York. This recommendation will be submitted on April 19 to the directors of the Society for Electrical Development, Inc., for approval. The committee's recommendation as to plans carried with it an appropriation of $50,000 for special expenditures such as printing and extraordinary expenses. In addition to this the society will devote part of its regular appropriation to the work. This will make the society's expenditures more than $100,000. Figuring all costs, it is likely that fully $500,000 will have been spent before the close of the campaign.

Dual System Modification in Connection with Cars.—The Public Service Commission for the First District of New York has sent to the Board of Estimate & Apportionment for approval an agreement modifying the dual system contract with the Interborough Rapid Transit Company, so as to relieve that company from the necessity of paying into the depreciation fund $1,618,950 for the 478 composite cars, which the commission recently ordered removed from the subway. As the company proposes to use the trucks and motors of these cars for all-steel car bodies, the proposed modifying contract cuts down the required depreciation payment from $1,618,950 to $530,355, which represents the accrued depreciation upon trucks, motors, etc., plus $40,000, estimated as the accrued depreciation on the all-steel car bodies, prior to the beginning of permanent operation under the new contracts.

Conference of Pan-American Finance.—All the countries of the New World have indicated unofficially their desire to accept the invitation of the United States to take part in a Pan-American financial conference to be held in Washington next month. Arrangements are being made by Secretary McAdoo so that, in addition to the distinguished foreign delegates, a large number of representative bankers and financiers of the United States will attend. Aside from the unusual conditions which the war offers, it has been pointed out as an essential reason for calling the meeting that capital for the development of Central and South America for many years has been furnished by Europe, and that the great bulk of American exports has been sent to that continent. The financial and commercial relations between Europe and the western hemisphere have been developed and promoted, while commercial and financial relations among the American republics themselves have been long neglected. Means of correcting this condition will be discussed.

Public Service Commission of Pennsylvania.—Five bills embodying suggestions of counsel for the Public Service Commission of Pennsylvania for amendment of the public service company law of 1913 have been introduced into the Legislature by Mr. Forster, Philadelphia. They will be sent to the judiciary general committee, which has referred all bills of that character to a sub-committee for study. The bills presented include the following: Conferring on the commission authority to suspend rates for ninety days; empowering the commission to appoint examiners to sit at any place designated and to receive testimony from litigants, thus enabling hearings to be held anywhere in the State; doing away with the necessity of obtaining the commission's consent to making of contracts between municipalities and public service companies, but retaining the power of the commission to regulate rates and service and to prevent useless and wasteful competition by acting on franchises; abolishing the requirement of approval of contracts for joint use of poles, but retaining the right to regulate and to rule in complaints; providing for fees of witnesses before the commission.

Asks Advance of Traction Cases in Ohio.—United States District Attorney McPherson on April 9 submitted to the United States Court of Appeals at Cincinnati a motion to advance the hearings on the appeals of several electric railways against former Collector of Internal Revenue Bettman and Collector Gilligan. The suits were brought to secure the refund of taxes alleged to have been illegally assessed against the companies. United States Judge Sater found that they had exercised charter rights in purchasing property and issuing bonds during certain years for which taxes were assessed and that they are not entitled to certain of the refunds claimed. The plaintiffs in error in the cases are the Columbus, Newark & Zanesville Electric Railway, the Dayton & Western Traction Company, the Fort Wayne, Van Wert & Lima Traction Company, the Indiana, Columbus & Eastern Traction Company and the Cincinnati Street Railway. All these roads except the Cincinnati Street Railway are under lease to the Ohio Electric Railway and contend that as lessor companies they are not subject to the excise tax imposed under the federal corporation income tax law.

Seattle Bond Procedure Questioned.—Seattle's municipal street railway bond issue, authorized by the voters in 1911, in the sum of $800,000, may be held invalid, as a result of the offering for sale of $125,000 of the securities. Preparation of the transcript showing all of the preliminary steps looking to the bond issue, has developed the fact that the bill authorizing the submission of the proposition to the people was introduced at a charter meeting of the City Council on Jan. 3, 1911, and was passed at an adjourned meeting of the Council on Jan. 9, 1911. There was a week between introduction and passing, but at that time the charter provided only two charter meetings a month, on the first and third Mondays, so that the meetings on the second and fourth Mondays were adjourned meetings. In 1913 the city sold $300,000 of the securities to the State of Washington. The Supreme Court validated the bonds, the point of introduction and passage at the same charter meeting of the Council not being raised. This money was used for the construction of Division "A" of the present municipal system. It is proposed now to sell $125,000 of the railway bonds in order to pay loans made to the street railway fund from other funds. Caldwell, Masslich & Reed, New York, N. Y., have been employed to pass on the various bond issues that are to be offered for sale in May.

PROGRAM OF ASSOCIATION MEETING

Central Electric Railway Association

The next meeting of the Central Electric Railway Association will be held on June 17 and 18 on a boat which will make a forty-eight-hour round trip from Cleveland to Buffalo and return.

Financial and Corporate

ANNUAL REPORTS

Washington Railway & Electric Company

The comparative statement of income, profit and loss of the Washington Railway & Electric Company, Washington, D. C., for the years ended Dec. 31, 1913 and 1914, follows:

	1914	1913
Gross earnings from operation	$5,048,435	$4,943,315
Miscellaneous income	33,890	10,221
Total earnings	$5,082,325	$4,953,536
Operating expenses (including taxes)	*2,863,736	2,669,971
Gross income	$2,218,589	$2,283,565
Fixed charges:		
Interest	$1,147,534	$1,104,576
Miscellaneous	29,582	22,339
Total	$1,177,117	$1,126,915
Surplus	$1,041,472	$1,156,650

*Includes depreciation of equipment six months ended Dec. 31, 1914, in accordance with Interstate Commerce Commission's classification of accounts effective July 1, 1914.

In spite of the adverse business conditions of 1914 and the unusual increase in passenger earnings in 1913 on account of the presidential inauguration, the gross earnings for 1914 increased $105,130 or 2.1 per cent. Miscellaneous earnings increased twofold, while the total earnings increased $128,789 or 2.6 per cent. The explanation given for this good showing is that Washington is in no sense an industrial center and it felt little financial depression during the year in comparison with conditions that prevailed in other large cities.

The operating expenses for 1914 showed an increase of $193,765 or 7.2 per cent. These amounts are not directly comparable, however, for the 1914 total includes $43,571 for depreciation of equipment during the last six months of the year under the Interstate Commerce Commission classification effective on July 1, 1914. The gross income of the company decreased $64,976 or 2.8 per cent, the fixed charges increased $50,202 or 4.4 per cent and the surplus decreased $115,178 or 9.9 per cent.

The report states that early in the year it became necessary to decide whether a policy of retrenchment should be adopted in view of the general business depression. It would have been easy to abandon or postpone certain improvements, but the management decided to go forward on broad lines, with the result that there was disbursed or set aside for maintenance and depreciation $853,328, being nearly $50,000 more than in any previous year. The net expenditures by the railway companies for additions, extensions, betterments and new equipment amounted to $129,242. The net expenditures by the Potomac Electric Power Company for similar purposes amounted to $265,012. The total mileage of the system by an addition of 2.058 miles is now 168.78 miles, In the mechanical department the following work in part was done: 170 double-truck cars equipped with air brakes; one electric locomotive and three line cars built complete; 115 cars painted; fifty trucks and motors transformed from winter pay-as-you-enter to open summer cars, and vice versa; 152 cars equipped with new style fender and wheelguard rigging, and five standard waiting stations have been built.

During 1914 a total of 465 claims was settled at an expense of $134,112. The year's work of the medical department included: 5231 office and 1967 house calls made; 143 operations performed; 1837 surgical dressing cases; 180 consultations with outside physicians, followed by detailed reports to the claim department; 825 vaccinations of employees. Under the profit-sharing plan the amount received on Jan. 1, 1915, by trainmen, depot clerks and starters who had been in service for a year or more was $27.17. This was less than the previous payment of $42.53 on account of increased damage claims. Three accidents alone diminished the 1914 check by $30.76. It is the opinion of C. P. King, president, that general co-operation was lacking during the year. A plan has been adopted for 1915, however, which will give due recognition to the more efficient employees, both by marking them for preferment and by increasing their share under the profit-sharing system.

Delaware & Hudson Railroad

The annual report of the Delaware & Hudson Railroad, New York, N. Y., for 1914 states the following in regard to allied electric railways: The gross operating revenues of the United Traction Company, Albany, N. Y., decreased $47,272; Hudson Valley Railway, Glens Falls, N. Y., $43,508; Schenectady (N. Y.) Railway, $89,199, and Troy & New England Railway, Troy, N. Y., $940, while those of the Plattsburgh (N. Y.) Traction Company increased $1,832. The decreases in net operating revenues were as follows: United Traction Company, $201,379; Hudson Valley Railway, $48,659; Schenectady Railway, $92,294; Troy & New England Railway, $634, and the Plattsburgh Traction Company, $713.

The business depression, particularly during the latter part of the year, adversely affected the revenues of all the traction companies, while, at the same time, various causes increased cost of operation. The unusually severe weather in the earlier months of the year very greatly increased the cost of removing snow and ice. The United Traction Company's cost of power is steadily increasing, owing to operation of heavy modern steel cars and inability to purchase the additional power as cheaply as under the first contract. Effective July 1, 1914, various operating employees were granted increases in wages, amounting to about $15,000 for the last six months of the year. Similar increases were granted to employees of the Hudson Valley Railway, aggregating approximately $3,000.

The Hudson Valley Railway, after several years of continued effort, has secured the right to cross Broadway in Saratoga, which will enable it to install a belt line service in Saratoga and materially to improve the through service between Albany and Glens Falls. A new concrete viaduct has been constructed over the Hudson River, connecting Glens Falls and South Glens Falls. A new bridge over the Barge canal south of Fort Edward has been completed, and the Whitehall bridge in Fort Edward has been raised 2.4 ft. to facilitate traffic on the Barge canal.

Besides other improvements, the use of heavier cars and the increased frequency of service of the United Traction Company have necessitated the erection of a new substation in Albany, to centralize the power distribution in that city so that delays to traffic may be avoided. This substation will have an ultimate capacity of 9600 kw and be completed in the spring of 1915 at a total estimated cost of $150,000.

The report makes note of the commission order of Dec. 11, 1914, requiring the United Traction Company to make changes in its facilities and services in Albany which, if they can lawfully be required, would necessitate capital expenditures that would involve raising $1,106,580 and entail material and continuing additions to operating expenses without being productive of any additional revenue. It is stated that from Jan. 1, 1907, to Nov. 30, 1914, the company expended $1,787,977 for capital purposes, and $206,310 is still to be spent for work in progress, while a sum of $166,826 will be required for paving in Albany and Troy under present plans. The new capital expenditures required by the order are felt to be not self-sustaining, and proceedings under the order have been stayed pending judicial decision in the matter.

As compared with 1907, the rates of wages of the conductors and motormen employed by the United Traction Company show an increase of more than 27 per cent, a result of resort to arbitration in settlement of labor difficulties. The pay of other employees has increased proportionately. The total payroll for 1914 was about $240,000 higher than it would have been except for these increases.

SECURITIES AUTHORIZED IN CALIFORNIA

The annual report of the California Railroad Commission states that during the year ended June 30, 1914, 154 applications for the issuance of securities were made for a total amount of $298,679,795, of which $217,564,768 was approved. Applications for $14,749,113 were denied, applications for $3,780,111 were dismissed and applications for $67,601,271 were still pending at the end of the year. During the year the electric railways of the State made applications for securities amounting to $66,589,859, of which $6,309,828 was authorized. Applications for $268,600 were denied, while

applications covering $60,161,432 remained pending. The authorized securities were divided in class as follows: Stock, $824,058; bonds, $3,621,000; notes, $1,564,770, and certificates, $300,000. According to the purpose of issue, the new securities were divided thus: For refunding purposes, $223,000; for deposit as collateral, $1,533,000, and for additions and betterments, $4,553,828.

BIG IDAHO CONSOLIDATION

National Securities Corporation Formed to Acquire Properties in Southern Idaho and Adjacent Territory

The holders of the first and refunding mortgage bonds of the Idaho-Oregon Light & Power Company, Boise, Idaho, who had deposited their bonds with the Priest protective committee, have received from that committee a circular stating that the committee has purchased the property at a foreclosure sale and is now working on the details of the reorganization plan. The Idaho-Oregon Company has been controlled by the Idaho Railway, Light & Power Company. Now the National Securities Corporation has been organized for the purpose of acquiring properties in southern Idaho and adjacent territory, and it has acquired the interests of the Idaho Railway, Light & Power Company and the Idaho Power & Light Company and is in the process of acquiring other properties. Since the purchase of the Idaho-Oregon property by the committee, it has procured from the National Securities Corporation a proposal to purchase the bonds deposited with the committee, paying therefor in securities of the National Securities Corporation. The Committee has entered into an agreement covering the details of the proposed purchase, subject to the assent of the depositing bondholders.

The following plan is therefore submitted by the committee: Holders of Idaho-Oregon bonds, par value $1,000, will receive in exchange the following securities from the National Securities Corporation: $450 par value in thirty-year 6 per cent gold debenture bonds, $450 par value in thirty-year 6 per cent income bonds and $400 par value in common stock or voting-trust certificates. No preferred stock is to be issued now; when issued, it will be used for the conversion of the debentures and the income bonds, or for acquiring cash or property. The debentures are the senior securities of the company except a temporary issue of ten-year 6 per cent collateral-trust notes, which it is contemplated will be ultimately retired with the proceeds from the securities of the underlying companies. These collateral notes have been subscribed for at 90 with a bonus of common stock, and the right is granted to all assenting depositors to participate at the same price as the original subscribers, pro rata.

DEFAULT IN DES MOINES

Des Moines City Railway Defaults Payment of Interest on Bonds—Franchise Difficulty and Jitney Competition the Causes

The Des Moines (Ia.) City Railway has defaulted the April 1 payment of interest and sinking fund on its $2,408,000 of 5 per cent refunding bonds. The company's present position is said to be primarily caused by the fact that it has found it absolutely necessary to make very material expenditures for improvements and additions in order that its property might be well maintained and at the same time that it might carry on its franchise litigation and negotiations. Under the circumstances it could not sell bonds to reimburse it for the expenditures made for improvements and additions, and accordingly was obliged to create a floating indebtedness now amounting to $1,202,914, payment of which was demanded. Furthermore, a decrease in earnings on account of jitney competition lowered the working capital, and the default necessarily followed.

For some years the Des Moines City Railway has been in litigation with the city in connection with its franchise rights. The Supreme Court of Iowa about two years ago rendered an adverse decision to the effect that the company's franchise was not considered to be perpetual, as claimed by the company, but had in reality expired. The company was given until March 22, 1915, to secure a new franchise, and the time was later extended by the Iowa Supreme Court to June 22, 1915. During the last two years the company exerted every possible effort to obtain a new franchise, but without success. As a result of the expenditures which it was called upon to make in connection with the franchise litigation and negotiations and also with the very material expenditures for improvements and additions, the company about exhausted its credit and cash resources.

The Illinois Trust & Savings Bank, as trustee, has instituted proceedings in the United States District Court in behalf of the bondholders to establish the contention that the franchise has not expired. It is expected that a bondholders' committee will be organized in the very near future. Pending the settlement of the suit the bondholders have applied for a restraining order to prevent interference by the city. The franchise situation now seems to be improving as a result of the present situation. The Chamber of Commerce has taken active steps in investigating the jitney situation and from this point of view plans to aid the company in securing a satisfactory franchise.

According to a statement issued by Harris, Forbes & Company, New York, the strong position of the company from the point of view of earnings is shown by the following figures for 1914: gross earnings, $1,371,044; operating expenses and taxes, $934,716; net earnings, $436,328; bond interest, $141,610; and amount available for interest on floating indebtedness, depreciation, etc., $294,718. In view of the value of its physical property and its earning capacity the company is said to be conservatively capitalized with a net indebtedness of $3,941,914.

LEASES TO CITY PROPOSED

Long Island Railroad and New York & North Shore Traction Company Suggest Lease of Lines by City

Ralph Peters, president of the Long Island Railroad, has submitted to the Public Service Commission for the First District of New York a formal proposition for the leasing by the city of part of the Long Island tracks to Whitestone and Little Neck, to be used in connection with the city's rapid transit line to Corona. Mr. Peters suggests that the agreement should provide for a trackage arrangement to cover a period of ten years with the privilege of renewal for a similar period, the agreement to be terminable upon three years' notice by either party. He asks as rental $250,000 a year and in addition wants the city to pay its proportion of the cost of operation and maintenance as well as a certain percentage of the cost of additional tracks, stations and other facilities. The commission has referred the proposal to its chief engineer and counsel for reports. Under the law, as it stands at present, there is some doubt whether the commission has the right to lease privately-owned tracks for this purpose, and in order to remove this doubt the Legislature has been asked to pass an amendment to the rapid transit act. The draft of a bill for such amendment has been forwarded to Albany by the commission.

The New York & North Shore Traction Company, which operates an electric railroad in Queens County from Flushing to Whitestone and to the city line of New York at Little Neck, together with an extension in Nassau County, has made a proposition to the Public Service Commission for the First District to lease its lines to the city for use in connection with the new rapid transit system at an annual rental of $98,761.50, which represents 5 per cent on the bonds and 6 per cent on the stock of the company. The commission has the matter under consideration.

Chicago (Ill.) Railways.—The directors of the Chicago Railways have declared the full 4 per cent interest on the $2,500,000 of non-cumulative adjustment income bonds, payable on May 1 for the year ended Jan. 31, 1915.

Cleveland & Eastern Traction Company, Cleveland, Ohio.—The Cleveland & Eastern Traction Company has called a special meeting on May 3 to amend its charter so that it may sell electric current for light and power. The company purchases current at wholesale from the Cleveland Electric Illuminating Company.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The Columbus Railway, Power & Light Company has filed a new $5,000,000 first and refunding mortgage to the Girard Trust Company, Philadelphia, as trustee.

Kansas City Railway & Light Company, Kansas City, Mo.—The Dennis committee, representing a large majority of the holders of $5,478,000 of 6 per cent collateral gold notes of the Kansas City Railway & Light Company, has issued a circular urging further deposit of the notes by May 15. This is similar to the circular sent out to holders of the $10,200,000 of first lien refunding 5 per cent bonds, as noted in the ELECTRIC RAILWAY JOURNAL of April 10. The committee states that an immediate separation of the stock ownership in the street railway and electric light properties, under existing financial conditions, presents serious difficulties and it may become necessary to foreclose very promptly the various mortgages resting upon the properties and upon securities representing these properties. Proceedings are already in progress to foreclose the mortgages upon the street railway properties which constitute in part the security under the note agreement. Such foreclosures probably would necessitate the purchase of the pledged securities by holders of certificates of deposit representing the notes deposited with the committee. For this reason as large a deposit of notes as possible before May 15 is desired. Mayor H. L. Jost is reported to have expressed his belief that a reorganization of the street railway properties will be effected before the expiration of the time limit on July 7.

Long Island Railroad, New York, N. Y.—At the annual meeting of the Long Island Railroad on April 13 L. L. Kellogg, representing Dick Brothers & Company and other minority stockholders, protested against the re-election of the retiring directors. The entire board, however, was re-elected by a vote of 170,404, 135,878 votes being cast by the Pennsylvania Railroad. The total minority vote was 25,317. Prior to this meeting Herbert C. Lakin had been elected a director to succeed A. J. County, resigned.

Memphis (Tenn.) Street Railway.—The directors of the Memphis Street Railway have deferred the usual quarterly dividend of 1¼ per cent on $2,500,000 of 5 per cent cumulative preferred stock.

Monterey & Pacific Grove Railway, Monterey, Cal.—The California Railroad Commission has refused to authorize the Coast Valleys Gas & Electric Company, which controls the Monterey & Pacific Grove Railway, to issue $100,000 of bonds until the question is settled as to who is the guarantor of $300,000 of thirty-six-year 6 per cent bonds of the subsidiary company. After several transfers the railway came under the ownership of the Coast Valleys Gas & Electric Company, but this company contends that the guarantee of the railway bonds made at the time of first issuance was either assumed by one of the intervening parties in ownership or did not pass from the original guarantor. The commission holds that it has no power to adjudicate the question of liability and suggests that the parties settle the matter between them or take it to court. The controlling company for a time paid the interest on the railway bonds but suddenly discontinued to do so. A recent default in bond interest on the part of the railway was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 23.

Mt. Vernon (Ohio) Railway.—On April 6 Robert L. Carr was appointed receiver of the Mt. Vernon Railway and instructed to operate the property until further orders from the court. This action was the result of a petition filed by N. L. C. Kachelmacher, president of the company, who presented a claim for $4,125 for services rendered.

Northern Electric Railway, Chico, Cal.—On March 29 the holders of the underlying bonds of the Northern Electric Company voted to grant the bankers' syndicate an extension of thirty days within which to carry out its reorganization plan. The suggested plan, as stated before in the ELECTRIC RAILWAY JOURNAL, embodies five agreements. It is reported that the sufficient signatures for all except the last have been obtained to render these provisions operative. Under the last agreement, which calls for subscriptions at 90 for $1,400,000 of underlying bonds, it is said that only about one-half had been subscribed for prior to March 30.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—At the annual meeting of the Oakland, Antioch & Eastern Railway on April 5, 56,000 of the 87,000 shares of outstanding stock were represented. The annual report showed a total of 124 miles of track and 586,000 passengers. The gross revenue was $542,180; the operating expenses, $394,689, and the gross operating income, $147,623. Five new directors were added, as follows: Jesse W. Lilienthal, C. Osgood Hooker, F. H. Beaver, A. Haas, and H. A. Lardner. Former members of the board of directors who were re-elected are Walter Arnstein, S. L. Naphtaly, H. C. Breeden and J. S. Walter. H. T. Scott and H. A. Mitchell are to be added to the board at a later meeting.

Ohio Traction Company, Cincinnati, Ohio.—The Ohio Traction Company has sold to Cincinnati bankers and Ervin & Company, Philadelphia, an issue of $1,500,000 of 6 per cent gold coupon notes dated March 1. The authorization of these notes by the Ohio Public Utilities Commission was noted in the ELECTRIC RAILWAY JOURNAL of Feb. 6.

Philadelphia Company, Pittsburgh, Pa.—The directors of the Philadelphia Company have declared a quarterly common stock dividend of 1½ per cent, payable in cash on May 1 to holders of record on April 17. This payment compares with 1¾ per cent paid quarterly from August, 1912, to February, 1915, inclusive, although the November, 1914, and the February, 1915, payments were made in scrip.

Public Service Corporation, Newark, N. J.—The Public Service Corporation of New Jersey has applied to the Board of Public Utility Commissioners for approval of an issue of $5,000,000 of bonds and $8,300,000 of stock by the Public Service Newark Terminal Railway. These new issues are to cover the construction of the Newark terminal with connecting tracks to the Public Service Railway, costing about $6,000,000, and to provide for the sale at par to the Public Service Corporation of $7,500,000 of capital stock in exchange for an equal amount of obligations of the Public Service Railway. Subject to approval by the board, it is proposed to consolidate the Public Service Newark Terminal Railway and the Public Service Railway, after which the stock of the railway will be issued share for share for the stock of the terminal company. It was stated by counsel in a hearing on the application that the perpetual interest-bearing certificates of the Public Service Corporation would receive as additional security $7,500,000 of stock of the Public Service Railway now represented by floating indebtedness ranking prior to the certificates, and also an additional $800,000 par value of stock of the railway represented by the stock interest of the terminal company in the terminal property. J. E. Aldred has been elected as his successor and as a member of the executive committee.

United Railways & Electric Company, Baltimore, Md.—It is announced that Francis E. Walters has resigned from the board of directors of the United Railways & Electric Company. J. E. Aldred has been elected as his successor and as a member of the executive committee.

United Railways Investment Company, San Francisco, Cal.—Although the United Railways Investment Company has changed its fiscal year to June 30, as previously announced in the ELECTRIC RAILWAY JOURNAL, the company is presenting a general balance sheet and a statement of income, profit and loss for the year ended Dec. 31, 1914, for the information of its stockholders. Its income during this year amounted to $1,949,199. Its expenses were $80,012 and other charges $1,147,977, a total of $1,227,989. The net income for the year amounted to $721,209. The addition of the profit and loss surplus at the beginning of the year, amounting to $5,222,528, and the subtraction of a profit and loss credit of discount on bonds purchased for the sinking fund, amounting to $75,146, gave a profit and loss surplus as of Dec. 31, 1914, of $6,018,883.

Virginia Railway & Power Company, Richmond, Va.—The Philadelphia Stock Exchange has listed an additional $180,000 of preferred stock of the Virginia Railway & Power Company, making the total preferred stock listed $7,879,400.

Warren, Brookfield & Spencer Street Railway, Brookfield, Mass.—On April 8 the property of the Warren, Brookfield & Spencer Street Railway was sold at public auction to Frank L. Palmer, Saco, Maine, for $160,000. Mr. Palmer's bid was the only one made. As noted heretofore in the ELECTRIC RAILWAY JOURNAL, four attempts were previously made to sell this road for an upset price of $150,000, but last February the receivers secured permission from the court to reduce the amount to $50,000. It is believed that

the property was purchased by Mr. Palmer for the bondholders, who will later reorganize and form a new company.

West Jersey & Seashore Railroad, Camden, N. J.—Joseph W. Cooper has been elected a director of the West Jersey & Seashore Railroad to succeed N. Parker Shortridge, deceased.

DIVIDENDS DECLARED

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, common.

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

Connecticut Railway & Light Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Denver & Northwestern Railway, Denver, Col., quarterly, 1 per cent.

Green & Coates Streets Passenger Railway, Philadelphia, Pa., quarterly, $1.50.

Havana Electric Railway, Light & Power Company, Havana, Cuba, 3 per cent, preferred; 2½ per cent, common.

Public Service Investment Company, Boston, Mass., quarterly, $1.50, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS, PHILADELPHIA, PA.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Mar., '15	$408,880	.....	.....	.....	.....
1 " " '14	415,528	.....	.....	.....	.....
3 " " '15	1,255,167	.....	.....	.....	.....
3 " " '14	1,251,340	.....	.....	.....	.....

ATLANTIC SHORE RAILWAY, SANFORD, MAINE

1m., Feb., '15	$20,961	*$19,977	$1,604	.....	.....
1 " " '14	18,835	*22,139	2,644	.....	.....

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

1m., Feb., '15	$25,260	*$16,594	$8,666	$10,939	†$2,274
1 " " '14	24,813	*16,232	8,580	10,829	†2,248
2 " " '15	52,972	*33,613	19,359	21,900	†2,541
2 " " '14	53,627	*33,027	20,599	21,618	†1,017

FT. WAYNE & NORTHERN INDIANA TRACTION, FORT WAYNE, IND.

1m., Jan., '15	$152,083	*$88,586	$63,497	$49,678	‡$14,138
1 " " '14	161,341	*92,406	68,935	47,407	‡21,656

HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.

1m., Jan., '15	$473,192	*$199,436	$273,756	$33,566	$240,190
1 " " '14	487,055	*204,653	282,402	32,570	249,832

KENTUCKY TRACTION & TERMINAL COMPANY, LEXINGTON, KY.

1m., Jan., '15	$62,079	*$36,818	$25,261	$16,986	‡$12,676
1 " " '14	62,650	*35,682	26,968	17,103	‡13,390
7 " " '15	491,370	*279,831	265,482	118,901	‡108,252
7 " " '14	463,586	*265,483	198,103	117,317	‡94,902

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., Feb., '15	$89,201	*$68,734	$20,466	$35,991	†$15,525
1 " " '14	90,021	*63,821	26,201	35,285	†9,084
2 " " '15	187,837	*140,546	46,991	71,917	†24,925
2 " " '14	195,509	*132,301	63,209	70,342	†7,133

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., Feb., '15	$260,451	*$164,986	$95,465	$50,854	$44,611
1 " " '14	248,006	*154,878	93,128	50,031	43,097
2 " " '15	541,289	*346,964	194,325	101,105	93,220
2 " " '14	518,966	*326,169	192,797	99,493	93,304

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m., Feb., '15	$1,833,772	$1,090,922	$742,856	$812,147	†$69,291
1 " " '14	1,779,009	1,096,891	682,119	802,233	†120,114
8 " " '15	15,777,297	9,163,401	6,613,896	6,472,515	141,381
8 " " '14	16,025,075	9,434,982	6,590,093	6,401,075	189,018

VIRGINIA RAILWAY & POWER COMPANY, RICHMOND, VA.

1m., Jan., '15	$436,197	$205,144	$231,052	$137,720	‡$99,508
1 " " '14	441,823	204,473	237,349	135,409	‡108,532
7 " " '15	3,068,902	1,467,164	1,601,737	948,283	‡700,385
7 " " '14	3,060,942	1,467,629	1,593,312	938,227	‡708,803

WESTCHESTER ELECTRIC RAILROAD, MOUNT VERNON, N.Y.

1m., Feb., '15	$16,079	$20,445	$4,365	$1,384	††‡$5,748
1 " " '14	14,909	20,435	5,525	1,164	††‡6,677
8 " " '15	175,280	181,032	5,752	10,270	††‡15,933
8 " " '14	169,431	170,127	695	8,743	††‡9,265

*Includes taxes. †Deficit. ‡Includes other income.

Traffic and Transportation

THE JITNEY BUS

Buffalo, Portland, El Paso and Tuscon Added Cities Which Have Passed Ordinances—One State Bill Passed and Others Pending

The ordinance governing the operation of the jitney in Buffalo, N. Y., was signed by the Mayor on April 6. The measure makes it unlawful for any person to use any streets in Buffalo for the operation of any motor vehicle for the carriage of persons at hire, at a rate of fare of 15 cents or less for each passenger, without first securing a license. Applicants for permission to operate in the city must file with the city clerk a map of the designated route, together with a statement containing the schedule to be maintained, the number of cars to be operated and the fare. All applications for permission to operate are to be referred to the committee on streets of the City Council for a public hearing. The Council may approve or modify any or all such routes, operating schedules or headways. The license fee is to be as follows: for each vehicle not to exceed five passengers, $75; for each vehicle having a capacity of more than five but not more than ten passengers, $100; and for each vehicle having a carrying capacity of more than ten passengers, $150. Before the license is granted the applicant must file a bond for $5,000 for one vehicle and $1,000 for each additional vehicle. If the applicant elects to do so, he may, in lieu of giving the bond, deposit $5,000 with the city treasurer for one car and an additional sum of $1,000 for each additional vehicle.

The ordinance regulating jitneys and automobile buses in Portland, Ore., has been passed by the City Council. It will go into effect on May 2. Among the provisions of the ordinance are the following: drivers must secure license. A license fee of $2 per month for all machines carrying seven or less passengers, and 25 cents per seat per month for larger machines. Machines must follow routes designated in the license. Service must be maintained from 6 a.m. to 10 a.m., and from 3:30 to 11 p.m. On Sunday, service may be started at 7:30 a.m. The fare is fixed at 5 cents. Machines carrying fourteen passengers or more are to stop at all railroad crossings. The number of passengers is limited to the seating capacity of the machine. Drivers are to take an examination. Machines are to be officially inspected monthly. Drivers must be at least eighteen years old. Routes are not to be changed except by permission of the commissioner.

On April 1 the City Council of El Paso, Tex., passed an ordinance regulating the jitney. This measure goes into effect on April 24. It provides among other things that no person shall operate an automobile in passenger service without first securing a chauffeur's certificate; that an examining board shall be appointed by the Mayor to pass upon all applicants for certificates; that each motor bus operated in the city shall be licensed by the city; that applicants for city license shall state their name, residence and business address, the number of vehicles to be run and the seating capacity of each car; that a bond shall be executed before the license is issued, such bond to be in the sum of $5,000 for the operation of less than six vehicles, $10,000 if the number is more than six and does not exceed ten and $15,000 if the number exceeds ten.

Favorable action has been taken by one board of the General Council of Louisville, Ky., on an ordinance which provides for the regulation of the jitney in that city and, it is stated, approval of the other board and that of the Mayor is assured. Only one vote was cast against the measure in the lower board. The principal provision of the ordinance is for the deposit by every operator of every jitney bus of a $5,000 surety bond or other security to that amount whenever a license is taken out. Licenses are graduated from $10 to $25 a year, according to the seating capacity of the vehicles, and it is provided that each machine in such service shall display on it the name of the owner or operator and the route and destination of the car; that no machine may be run except by licensed chauffeur and that where the owner runs his own car he must have such a license. No machine shall be operated while

persons are sitting or standing on the running boards or anywhere else except inside the car. Penalties of from $10 to $25 are provided for violation of any provision of the measure, each day the violation is persisted in to count as a separate offense.

The ordinance regulating the jitney passed in Tucson, Ariz., provides that drivers shall name a specified route over which they propose to run their cars and show that there is a need for such service as it is proposed to establish. They must agree to run their cars at specified hours of the day. Where a permit is approved an indemnity bond for $2,500 for each bus must be filed with the Council, and all buses seating less than seven passengers must pay in advance a license of $15 a quarter. Buses seating from seven to ten passengers must pay $20 a quarter, and larger buses must pay $30 a quarter.

A measure to regulate the jitneys is before the City Commissioners of Rock Island, Ill. The ordinance makes it necessary for those who intend to engage in passenger transportation to secure a license. Owners must designate the route intended to be traveled. The commissioners are empowered to modify any route or operating schedule. Every owner must pay the sum of $100 in advance for each machine carrying from one to five passengers, $125 for each car carrying from five to seven passengers, and $150 for each car carrying more than seven passengers. The indemnity bond is fixed at $10,000 for not more than two cars and at $20,000 for more than two. No vehicle is to be permitted to carry passengers in excess of its seating capacity.

The Frailey bill to regulate the jitney has passed the Senate of the Iowa Legislature and is expected to pass the House. The measure provides a law empowering city councils of all cities and towns to regulate jitney traffic by requiring license fees, fixing streets and routes upon which the jitneys must operate, and requiring the filing of indemnity bonds to protect the city and the public. Penalties for violations are provided. When the bill becomes a law the Des Moines City Council is ready to pass an ordinance as it provides. The aim of the proposed Des Moines ordinance is to protect the public from irresponsible operators. Emil G. Schmidt, president of the Des Moines City Railway, believes that competition from the jitney will be lessened when the new law goes into effect. Des Moines now has ninety jitneys in operation. The Frailey bill was published in full in the issue of the ELECTRIC RAILWAY JOURNAL of April 10, page 733.

The Thompson bill pending in the Senate of New York, referred to in the ELECTRIC RAILWAY JOURNAL of April 3, makes jitneys common carriers and subject to the public service commission law and also gives cities the right to regulate their operation. The measure was passed by the Senate on April 14. The companion bill in the Assembly is before the judiciary committee.

Governor Carlson of Colorado on April 10 signed a bill making jitney buses and companies public utilities and placing them under control of the State Public Utilities Commission.

The matter of regulating the jitneys in Atlanta remains unsettled. City Attorney James L. Mayson recently ruled that jitneys could not be required to apply for franchises. In view of this declaration Alderman Albert Thomson said recently: "If we are going to have jitneys permanently in Atlanta we should charge them for the use of the streets just as we do the Georgia Railway & Power Company. If we lack sufficient authority over the streets to require franchises we should apply to the Legislature. It might be a good idea to pass a prohibitive license until we are able to secure proper regulation."

A bill to regulate the jitney is before the City Commissioners of Galveston, Tex. The measure provides for licensing motor-bus operators, fixing the license fees as follows: for each motor bus seating five persons or less, including the driver, $30 a year; six or seven persons, including the driver, $35; eight to fifteen persons, including the driver, $45; sixteen to twenty-nine persons, including the driver, $55; thirty or more persons, including the driver, $75. A minimum indemnity bond in the sum of $5,000 is suggested.

Attorney-General Walter C. Owen of Wisconsin has rendered an opinion to the effect that the jitney does not come under the provisions of the Wisconsin public utility act. He says that the jitney should be classed with taxicabs and the hack. The jitney bus business is essentially a private one.

The jitney made its appearance in Seattle, Wash., on Dec. 14. Approximately 650 cars were in operation in the latter part of February. On April 8, however, approximately 300 were in operation. It is believed that 90 per cent of the cars in operation in the city are five or seven-passenger touring cars. No restrictive legislation had been passed by the municipality up to April 8 other than to revise the general traffic ordinance of the city, requiring that drivers of cars for hire pass an examination as to their ability as drivers and their condition of health. Some few drivers have been found unfit under these examinations, but the number of cars which have had to suspend on this account is not appreciable. At the recent session of the Legislature the State passed a bill over the Governor's veto requiring that all auto buses file with the Secretary of State an indemnity bond in the sum of $2,500, as noted previously in the ELECTRIC RAILWAY JOURNAL. This law went into effect on April 10.

Chief of Police Lang of Seattle, Wash., made the point on April 1 that in fifty-nine days there were 334 accidents from the jitney in that city. Of this total 199 resulted in damage to the machines, ninety-six visited greater or lesser bodily injury upon passengers, and thirty-nine caused injury to both passengers and vehicles. He recommends the restriction of the jitney bus to paved thoroughfares where street cars do not run; a rule requiring the jitneys to be lighted after dark; the stationing of police officers along jitney routes; provision against overcrowding, and suspension of jitney drivers for violation of rules of traffic.

It is reported by the jitney associations in Kansas City that as many as 70,000 persons have been carried as passengers in the buses and touring cars in a single day in that city. Some forty buses are now in service. One of the newest buses has windows which operate like those in street cars, and is equipped with electric lights. This bus has seats for twenty passengers and has straps for ten more. The opening of the Federal League baseball season in Kansas City brought out many buses and private cars to take patrons to the game. Many men in Kansas City are investing their savings in jitneys, companies are being formed, and in some cases men of small means have pooled their savings in order to put three or four buses in service. Despite the increase in the number of automobiles the Metropolitan Street Railway carried within 10 per cent of the normal number of passengers during March. The question of single or double indemnity for personal injuries received while a passenger on a jitney seems likely to be settled in favor of double indemnity by the casualty companies. One of the leading companies is known to have paid double indemnity to a policyholder who was injured in a jitney accident, and other companies are declaring that they will pay double indemnity. A few still leave the matter in doubt. So far as known, however, no company is writing jitney liability insurance in Kansas City.

The Vincennes (Ind.) Traction Company has announced that it will hereafter sell six tickets for 25 cents or twenty-five tickets for $1. At the same time Louis J. Fohr, president and superintendent of the company, announced that he would seek to obtain the approval of the city of his plan to place only one trainman on each car instead of both a motorman and a conductor. It is said that the changes which are proposed are due in a measure to the competition of the jitney.

The executive committee of the Safety First Federation considered the matter of the jitney at an executive session held in New York on April 8. Among those who attended the conference were Charles M. Talbert, director of streets of St. Louis; John Gillespie, police commissioner of Detroit; and W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America. The conference being executive no report of the proceedings is available, but Mr. Talbert expressed himself at length to the newspaper men in regard to the menace of the jitney in St. Louis. It will be recalled that it was Mr. Talbert who invoked the police power in St. Louis against the jitney. Mr. Talbert spoke particularly about the menace

of the second-hand car in jitney service. He said that in St. Louis a large supply of discarded cars, so broken down that private owners would not risk using them, was rolled out from the scrap heap for use as jitney buses. In consequence the city officials ordered all jitneys to be inspected at the city automobile garage once every two weeks and limited the carrying capacity of the cars. He was quoted to the effect that a comprehensive plan of regulation was dropped a few days before a local election, as the politicians feared the effect of this plan on the voters. Mr. Mahon is reported as having said that the Amalgamated Association plans a nation-wide campaign against the jitney because street railway employees are being laid off. The Amalgamated Association was prepared to urge that as a matter of fair play, the jitney drivers should be compelled to put up a bond of $10,000 to indemnify the victims of accidents.

Although the local transportation committee of the Chicago City Council looks with favor on some of the proposed 10-cent bus lines, it has criticised Montague Ferry, commissioner of public service, for devoting so much of his time to some of these projects, he having prepared and introduced an ordinance for a bus service and taken interest in securing signatures to bus petitions.

Municipal Traffic Engineer Kirkpatrick, of Portland, Ore., reports that since the completion of his recent survey of the jitney situation in that city, no new cars have been added to the service and that forty-five of the cars then in service have been put out of business by accidents. Mr. Kirkpatrick reports that many other former jitney drivers have gone out of business, but that their cars are being operated as jitneys by new owners. Mr. Kirkpatrick says that jitney drivers when they realize that there is no profit in the business sell their cars and retire quietly. He says: "It is my opinion, from careful observation and study, that the jitney business will adjust itself. It will need no regulation. I know of many jitneys that are for sale and I know of a long list of others that have been sold. The State license transfer records also show this fact. Appreciable slumps in the business will be seen when the cars now operating begin to wear out, or the repair bills become excessive by reason of age. I can see no possible way for touring car operation in regular service to become profitable."

Competition among the jitney operators in Atlantic City, N. J., has become so keen that the fares have been cut in some instances to 3 cents. The men operating jitneys on Atlantic and Pacific Avenues conceived the idea that it would be advisable to co-operate and attempt to secure from the city an exclusive franchise to members of the Jitney Omnibus Association. Cold water was promptly thrown on this proposal by Theodore Schimpf, city solicitor, who said that the proposal to license twenty drivers and eliminate all others was unconstitutional. Riding in an automobile is certainly not a novelty to most of the visitors to Atlantic City, and this fact has been advanced to explain the keen competition for the limited amount of patronage which is available.

Many of the daily papers throughout the United States have used in prominent places extracts from the article on jitney costs which was published in the ELECTRIC RAILWAY JOURNAL of Feb. 13, from the other articles on the jitney which have appeared in this paper, and from the literature on the jitney issued by the American Electric Railway Association.

ADEQUATE SERVICE QUESTION

Convenience of Public Limited Only by the Constitutional Limit of Confiscation

The Public Service Commission of the State of Washington has issued an order restoring service of Alki and Fauntleroy Street cars through Town to Virginia Street; directing the Puget Sound Traction, Light & Power Company to provide seats for substantially all persons using these cars, and insisting on continuation of through service on the Ballard Beach Street line. The order is of considerable interest on account of the reference which it contains to the subject of adequate service. The commission said in part:

"The service for which the company is entitled to receive compensation in the form of a return on its investment is the service defined by law that is adequate and sufficient. The law does not authorize the company to demand a return on its investment for providing a service which is 50 per cent adequate and sufficient, or anything less than 100 per cent adequate and sufficient. The measure of compensation to which the company may be entitled is not graduated according to the degree of proficiency with which it discharges its duty. The law does not authorize the company to demand one-half of a reasonable return on its investment for furnishing a service which is 50 per cent adequate and sufficient. Hence a proceeding such as this, to require the company to provide adequate and sufficient service facilities, is not a proceeding affecting rates.

"It is not incumbent upon the commission to make a valuation of the company's property before requiring the company to furnish adequate and sufficient service facilities. The company may not defend against such requirements by showing that the particular service demanded is not profitable, and in this case it is no defense for the company to show that a particular line of its system is or is not profitable. The sole question is the convenience of the public, limited only by the constitutional limit of confiscation. It is not contended it would be just or lawful to specify an unreasonable service; but a just and reasonable service that considers the frailties of women and others, who of necessity are required to use street cars, should at all times be required and furnished. A service which required patrons to stand for long distances is neither safe. adequate nor sufficient.

"The idea has been permitted to grow up that street railways shall not be required to furnish comfortable accommodations for all their passengers, and that in order to pay interest on bonds, dividends on stock and other charges, men and women must be subjugated to inconvenience and to unseemly conditions. This commission is not in sympathy with such an idea.

"The commission has ordered a valuation of the company's property. If it should appear upon the valuation that the company cannot provide adequate and sufficient service and at the same time earn a reasonable return upon its investment, the commission will increase its return. On the other hand, if it appears from a valuation of the company's property that the rate now charged is excessive, the commission will order the rates reduced."

A. L. Kempster, general manager of the company, is quoted in part as follows:

"There is little comfort in the declaration that the appraisal of the company's holdings may result in permission to increased rates. Such appraisal, though under way at the present time, will take a long time to complete even though we are throwing our books and records open to the commission's engineer and its field staff to facilitate the work. In the meantime, should we comply with the orders of the commission we would be compelled to shoulder a still further increase of losses. We have twenty days in which to appeal against the order of the commission, and proper action will be brought for this purpose in the immediate future."

Fare Boxes in Kansas City.—The Metropolitan Street Railway, Kansas City, Mo., installed fare boxes on the Troost and the Prospect lines on Easter Sunday.

Accident in Detroit. — Several persons were killed and about twenty others were injured on April 14 when a car of the Detroit (Mich.) United Railway was struck by a switch engine of the Detroit, Toledo & Ironton Railroad.

First Toronto Hydro-Radial.—The official opening of the London & Port Stanley Railway, which will be the first "hydro-radial" in operation in Ontario, is to be held on July 12. Sir Adam Beck, chairman of the Hydro-Electric Power Commission of Ontario, will preside.

Running Board Equipment Completed.—More than fifty open cars of the Springfield (Mass.) Street Railway have been equipped with double running boards in compliance with the law passed in 1914, prohibiting the use of running boards that are more than 15 in. from the ground.

Change in Freight Rates.—The Empire United Railway, Inc., Syracuse, N. Y., has announced that effective on May 1,

1915, the charge for a motor freight car furnished for the transportation of freight by special service between local stations will be 60 cents per mile, with a minimum charge of $25 in addition to the regular freight charge.

Extension of Order Against Overcrowding.—On April 9 the board of health of New York issued overcrowding orders against the Smith Street and the Gates Avenue surface lines of the Brooklyn Rapid Transit Company. This makes a total of five orders issued against Brooklyn lines since the start of the crusade by S. S. Goldwater, commissioner of health.

New Jersey Rate Re-hearing.—The State Board of Public Utility Commissioners of New Jersey has granted the application of the Pennsylvania Railroad, Philadelphia & Reading Railroad and the West Jersey & Seashore Railroad for a rehearing of their request for permission to put into effect a schedule of advanced passenger rates between points within the State. No date was set for the rehearing.

Advance in Fare.—The Orange County Traction Company, Newburgh, N. Y., has announced that effective on June 1, local one-way fares in both directions between Newburgh and Orange Lake Park or between Walden and Orange Lake Park will be 10 cents, an advance of 5 cents between the hours of 2 p. m. and 12 o'clock midnight. The chartered car rate for one way or round trip between Walden and Orange Lake Park will be $10.

Hearing on Open Cars in Toronto.—The Ontario Railway board on April 7 took up the matter of abolishing open cars in Toronto, but adjourned the hearing until May 15. Alderman Gibbons contended that the open car was a menace. R. J. Fleming, manager of the Toronto Railway, opposed the change. He said that an order requiring center aisles would mean the rebuilding of all the cars. The width of the devil strip made it impossible to widen the cars.

Procedure in Regard to Complaints.—Upon motion of Commissioner William Hayward, the Public Service Commission for the First District of New York has directed its secretary to notify all public service corporations that failure upon their part to respond promptly to letters from the secretary in regard to informal complaints will be deemed sufficient reason for the institution of formal proceedings, requiring the attendance of the officers of the companies at the commission's offices.

Tickets as Prizes for Safety Essay.—One book of fifty street car tickets has been given by the Knoxville Railway & Light Company, Knoxville, Tenn., to each of forty-three pupils of the city's public schools for the best essays on safety first, written and submitted during March. At the same time the company announced that the offer was renewed for April and that winners would be awarded the prizes early in May. Every pupil in the city's schools is eligible to compete and one prize winner is chosen from among the essays submitted by each class.

Los Angeles Railway Wins Fare Case.—The District Court of Appeals in Los Angeles, Cal., handed down a decision on April 6 upholding the right of the Los Angeles Railway to charge 10-cent fares from the city to Eagle Rock, Glassel and other points in that district. The suit against the Los Angeles Railway was brought under the old public utilities act of 1878, which provides for a penalty against any street railway in each instance where an overcharge is demanded. This section is plain on the subject, but, according to the Appellate Court, it was completely repealed in 1911 by what is known as the California public utilities act.

Increase in Fare Proposed.—The Idaho Traction Company, Boise, Idaho, has filed with the Public Utilities Commission of that State a new schedule of passenger rates, to become applicable, if approved by the commission, on the interurban lines of the company. The new schedule asks for an increase from 2½ cents to 3 cents a mile in the one-way rates, and from 2¼ cents to 2½ cents a mile on the round-trip rates. The increase requested on commutation rates is from 1¼ cents to 1½ cents a mile, and on school rates from 1 cent to 1¼ cents a mile. This rate would cause an increase on a one-way ticket between Boise and Caldwell, from 75 cents to 85 cents, and on a round-trip ticket from $1.25 to $1.45.

Extension of Copper Zones in Indiana.—At the hearing held on April 12 before the Public Service Commission of Indiana on the petition of the Indianapolis & Cincinnati Traction Company to change the basis of its passenger fares from the nickel zone to the copper basis, the commission stated that it would issue an order granting the petition of the company for the change in its tariffs. The order will be substantially the same as that granted the Terre Haute, Indianapolis & Eastern Traction Company on March 29, which was published in the ELECTRIC RAILWAY JOURNAL for April 10, page 734. The fares will be based on the rate of 2 cents a mile for the distance actually traveled, ½ mile at 1 cent to be taken as the unit.

Cleveland Suburban Operating Controversy.—The contention between Peter Witt, street railway commissioner of Cleveland, Ohio, and the suburb of Lakewood has assumed a queer angle. Mr. Witt recently gave the village until May 1 to enact an ordinance permitting the interurban cars to run through its territory without stopping under penalty of having the day service on Clifton Boulevard reduced from ten to fifteen minutes and the night service eliminated entirely. Mayor Tyler, however, contends that the franchise granted to the Cleveland Railway in 1901 confers on the Lakewood Council the right to regulate car service between midnight and 6 a. m. Lakewood councilmen say that the interurban cars are going through their city by tolerance, and that they can be stopped at the boundary line if Council chooses to take action in that direction.

Freight Shipments Increase.—With arrival of spring and spring weather, the freight business of the Louisville & Interurban Railway, Louisville, Ky., has grown to considerable proportions, all manner of freight being carried, farm implements, seed, fertilizer, etc. C. H. Wyatt, general freight agent for the company, has been engaged for some years in impressing the farmers of the territory reached by the company's lines that their time, at seasons like this, is worth much more when spent or exerted in the fields than when given to hauling supplies out from town. New equipment in the way of motor-driven flat cars has been added to the service to take care of the increased business in coal and building materials. A recent development is that of the Ohio River Sand & Gravel Company in locating big bins on the tracks of the Louisville Railway. It is thus possible for these building materials to be loaded expeditiously and at low handling cost.

The Ohio Service Case.—In order to enable the company to carry its case to the United States Supreme Court the Ohio Supreme Court granted the Hocking Valley Railroad a temporary injunction on April 9, to prevent the Public Utilities Commission of Ohio from inforcing its order to the effect that electric railway service shall be resumed between Hamden and Wellston. As has been stated in the ELECTRIC RAILWAY JOURNAL, the company sought to supplant the electric service between these two points with a steam service. The commission ordered the company to resume electric railway service and the case was carried to the Ohio Supreme Court, which decided that the order was not unreasonable and refused to disturb it. The United States Supreme Court will be asked to decide the question of whether a particular kind of service may be discontinued on a certain branch line because it is unprofitable when it is not shown that the entire line is unprofitable.

Seven Years Without a Fatality.—*Safety* for March, 1915, published by the American Museum of Safety, New York, N. Y., contains the brief submitted by the Hudson & Manhattan Railroad in competition for the Brady medals of the museum. The company, in a letter by W. C. Fisk, the president, says: "The Hudson & Manhattan Railroad was a competitor for the Brady medals for the year ended June 30, 1914, and expects to compete continuously throughout the years to come. That this company was not successful in winning the medals this year is not an implication of any lack of safety appliances, or of constant effort on the part of the officers and employees to promote safety and health. This company enjoys a reputation of being 'the safest railroad in the world,' and we are happy to state that in the seven years from the beginning of operation, to Feb. 26, 1915, we carried 329,357,277 passengers without a fatality attributable to train operation."

Personal Mention

Mr. O. W. Brain, chief electrical engineer for railways and tramways to the New South Wales government, has accepted the position of president of the Electrical Association of Australia.

Mr. John A. Crilly, claim agent of the Hartford lines of the Connecticut Company, completed fifty years of service on April 7 with that company, the Hartford Street Railway and their predecessors. Mr. Crilly is sixty-eight years of age. He is active in civic affairs in Hartford and has served in the Council of that city.

Mr. A. Mueller has resigned as superintendent of the Mankato (Minn.) Electric Traction Company to become manager of the New York Department Store in Mankato. Mr. Mueller has been connected with the Mankato Electric Traction Company for the last five years, three years as cashier and bookeeper and two years as superintendent and purchasing agent.

Mr. J. E. Aldred has been elected a director of the United Railways & Electric Company, Baltimore, Md., to succeed Mr. Francis C. Waters. Mr. Aldred has also been elected a member of the executive committee of the company. Mr. Aldred was formerly president of the Consolidated Gas, Electric Light & Power Company, Baltimore, and the Pennsylvania Water & Power Company.

Mr. Emil N. Thyse has been appointed superintendent and purchasing agent of the Mankato (Minn.) Electric Traction Company to succeed Mr. A. Mueller, who as noted elsewhere in this column has assumed the managership of the New York Department Store in Mankato. Mr. Thyse has been connected with the Mankato Electric Traction Company for the last five years as a conductor.

Judge John W. Slocum, of the Monmouth County Common Pleas Court, last year's president of the Senate of New Jersey, was on April 2 appointed by Governor Fielder and confirmed by the Senate as a member of the State Board of Public Utility Commissioners to succeed Mr. Thomas J. Hillery, of Morris County. Mr. Hillery had been on the board since its creation and was the only Republican remaining of the three.

Mr. C. H. Robbins, chief clerk of the Yakima Valley Transportation Company, North Yakima, Wash., has been appointed superintendent of transportation, and Mr. Max Vestal, who has been chief electrical engineer, has been appointed superintendent of way and equipment. These appointments mark a slight change in the organization of the company's operating department, the two positions having been created following the recent resignation of Mr. F. H. Drake as superintendent.

Mr. William F. Turner, who has maintained an office in Portland, Ore., since 1911 as a consulting engineer, has been elected president of the Oregon Society of Engineers. Mr. Turner was born in Quincy, Ill., in 1858. He was graduated from Knox College in 1879 and from Cornell University two years later with a degree of M. S. After various engineering experiences Mr. Turner entered the employ of J. G. White & Company, in 1899 and continued with them until 1907. For that company he acted as managing engineer at Auckland, New Zealand, where he supervised the construction of electric tramways paving, conduits and power plants. Returning to New York he engaged in general engineering practice and subsequently accepted the appointment as Northwest manager for W. S. Barstow & Company.

OBITUARY

W. S. Walcott, formerly superintendent of the Salem division of the Bay State Street Railway, Boston, Mass., is dead. Mr. Walcott was born in Danvers on Feb. 9, 1862. He entered the employ of the Salem & Danvers Street Railway as a driver and later became connected with the Boston & Northern Street Railway.

Henry W. Poor, banker and internationally known as the publisher of *Poor's Manual*, died suddenly on April 13 at his home in New York. He was born in Bangor, Maine, in 1844, and received his education at Harvard University, from which he was graduated in 1865 with the degree of A. B., taking the degree of A. M. in 1872. Mr. Poor settled in New York immediately after graduation in 1865, and started in the banking and publishing business as a member of the firm of H. V. & H. W. Poor. He started publishing *Poor's Railway Manual* in the same year, and soon became widely known.

George Cutter, one of the pioneers of the electrical industry and the organizer and vice-president of the George Cutter Company, South Bend, Ind., died of heart failure on April 6, 1915, in Los Angeles, Cal. Mr. Cutter was born near Boston in 1853. He was intimately associated with the introduction of the Bell telephone in 1876. In 1881 he went to Russia for the International Bell Telephone Company. Two years later he became connected with the Thomson-Houston Company, and as engineer for that company he made a second trip to Europe. In 1889 he started in business for himself in Chicago in the manufacture of electrical appliances. In 1898 he organized the George Cutter Company, which designs and manufactures specialties for outdoor electric lighting.

J. A. Gaboury, whose death in Baltimore was noted briefly in the Electric Railway Journal of April 10, was born in Quebec, Can., in 1851. He moved to Florida in the early seventies and built several railway lines. From that place he moved to Montgomery, Ala., acquired control of the street railway properties, mapped out Capital City Park, and rendered other conspicuous services, among them being the application of electricity to the horse cars. Losing heavily by fire at Montgomery, Mr. Gaboury moved to Jacksonville to become general manager of the Jacksonville Mining & Manufacturing Company. He owned the waterworks plant there at the time of his death. In his career he built the street railway line at Columbus, Ga., the railway and electric light system at Bowling Green, Ky., and Greenville, Miss., and was interested in constructing sewerage systems at Macon, Ga.

W. A. Foote, vice-president of the Michigan Railway, Kalamazoo, Mich., and president of the Consumers Power Company and the Commonwealth Power Company, all of which are controlled by the Commonwealth Power, Railway & Light Company, died suddenly at his home in Jackson, Mich., on April 14. Mr. Foote was a native of Adrian, Mich. With his brother, J. B. Foote, W. A. Foote established the electric-lighting plant at Jackson many years ago, and subsequently organized the extensive interconnected transmission system which now links the towns and cities of central Michigan. Among the achievements of the Foote interests have been the construction successively of the first 72,000-volt transmission line, the first 100,000-volt line and the first 140,000-volt line. Mr. Foote was about sixty-five years old. He is survived by a widow and two daughters, also his brother, who is an officer of the Consumers Power Company and other properties.

CHICAGO UTILITIES WANT STATE CONTROL

At a hearing before the House committee on public utilities and transportation held in Chicago, Samuel Insull, president of the Commonwealth Edison Company, Chicago; Bernard E. Sunny, president of the Chicago Telephone Company, and Leonard A. Busby, president of the Chicago Surface Lines, were witnesses. Mr. Insull stated that he believed in regulation, but that if his company were left entirely alone for ten years the rate for electricity would be lower than with regulation. It would be a step backward to have utilities regulated by the city alone as opposed to State authority. Mr. Busby stated that he believed it was best to have a single commission for the whole State. He had no objection to a local commission divorced from petty politics.

THE KANSAS CITY STATION

A group of men interested in North Side property between the retail district and the Missouri River, were heard on April 6 by the Council committee in behalf of their project for an interurban railway station between Sixth Avenue and Seventh and Grand Avenue and Walnut Street. They urged the development of the North Side and predicted that ultimately cars on the interurban lines would have to be routed away from Main, Walnut and Grand Streets in the business district because of congestion. In that event the proposed site would obviate much inconvenience.

Construction News

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

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

FRANCHISES

Wichita, Kan.—The Arkansas Valley Interurban Railway has asked the Council for a franchise for a line from Twenty-first Street west to Mascot Avenue and then north to the city limits.

Boston, Mass.—Charles S. Baxter, attorney for the Boston & Eastern Electric Railroad, appeared before the committee on street railways at the State House recently to urge the passage of the bill providing for an extension of the time within which the company must file the bond of $400,000 required by its charter for the construction and operation of its line. Mr. Baxter said that up to last January the people behind the Boston & Eastern Railway had expected to file the bond before April 1 of this year, to which time the General Court in 1914 had granted an extension, but had been unable to do so, and now ask for an extension to April 1, 1917.

Crystal, Mich.—The Muskegon-Saginaw Electric Company has received a franchise from the Council in Crystal to build an electric line on certain highways in the township and also to build a line through the village of Crystal. This is part of a plan to build an electric line to connect Muskegon, Casnovia, Crystal, Egelston, Moorland and Saginaw. [Jan. 13, '15.]

Port Huron, Mich.—The Detroit United Railway has been ordered by the St. Clair County Road Commissioners to move its tracks off a portion of the right-of-way of the main line in Port Huron. It is declared that the company has no franchise for the ground it is using.

Newark, N. J.—The Public Service Railway will ask the Council for a franchise across the Jackson Street bridge. The line will form a connecting link between the tracks on Market Street, Newark, and those on Fourth Street, Harrison. The Board of Public Utility Commissioners has approved the ordinance of West Orange empowering the Public Service Railway to operate an extension of its double track in Central Avenue from the dividing line between West Orange and Orange, westwardly to the westerly line of Valley Street.

Albany, N. Y.—The Public Service Commission for the Second District has received an application from the Lehigh-Buffalo Terminal Railway Corporation for a certificate of convenience and necessity, and for consent to issue $50,000 capital stock, and $5,000,000 debenture bonds for the acquisition of property and the construction of facilities at Buffalo. [Aug. 15, '14.]

Albany, N. Y.—The United Traction Company will ask the Council for a franchise to build a loop at Grand Street, Hamilton Street, Trinity Place and Madison Avenue and to extend its Arbor Hill line in Albany.

Buffalo, N. Y.—The International Railway has received an extension of time on its franchise to lay tracks in East and Delavan and West Delavan Avenue in Buffalo.

Niagara Falls, N. Y.—The Niagara River & Eastern Railway has applied to the Public Service Commission for a certificate of convenience and necessity to build an electric railway between Buffalo and Niagara Falls. [Dec. 12, '14.]

Wilmington, N. C. — The Wilmington & Philadelphia Traction Company has asked the Council for an extension of time on its franchise in which to build the new Washington Street and Boulevard extension in Wilmington.

Cleveland, Ohio.—The Cleveland Railway has asked the Council for a franchise for the extension of the Madison Avenue (N. W.) line from West 117th Street to Rocky River.

East Linden, Ohio.—The East Linden Electric Railway has received a franchise from the Council in East Linden. The company now holds a franchise for 3 miles outside the city limits, in Atcheson Avenue, Mock Road and Parkwood Avenue to East Linden. The Columbus Council has under consideration a franchise for this company, covering about ½ mile of line, south in Joyce Avenue from Fifth Avenue to a connection with the present system near the Leonard Avenue viaduct. [March 20, '15.]

Ottawa, Ont.—The Ottawa City Council has appointed a special committee to consider the construction of a bridge on Pretoria Avenue to permit of the extension of the Ottawa Electric Railway to Ottawa East.

Erie, Pa.—The Buffalo & Lake Erie Traction Company has received a twenty-five-year franchise from the Council for the double-tracking of East Sixth Street and a new line in West Seventeenth Street from State Street to Peach Street in Erie.

Montreal, Que.—The Quebec Legislature has extended the time within which the Town Council of Mount Royal may enter into agreements for the construction of electric lines in Mount Royal with the Montreal Tramways Company, or its subsidiary, the Public Service Corporation.

Richmond, Va.—The Virginia Railway & Power Company has asked the Council for a franchise to remove its tracks on First Street, from Duval Street south to Broad Street in Richmond.

Madison, Wis.—The Janesville & Madison Traction Company has asked the Council for a franchise for about 1 mile of new track in Madison. G. Pickhardt, 409 Washington Building, Madison, president. [Oct. 17, '14.]

TRACK AND ROADWAY

Marin County Electric Railways, Mill Valley, Cal.—The Railroad Commission has issued an order granting the Marin County Electric Railways an extension of time to and including July 1, 1915, within which to sell stock for the construction of its electric railway in Mill Valley. [March 6, '15.]

***Mountain Valley Water Company, Hot Springs, Ark.**—Surveys have been made and capital has been secured by this company for the construction of an electric railway from Hot Springs to Mountain Valley.

San Francisco, Cal.—Final arrangements have been made by the Supervisors to build a loop at the beach terminus of the Geary Street line in San Francisco, $2,300 being appropriated for the work.

Southern Pacific Company, San Francisco, Cal.—That the old Valencia Street line of this company eventually will be made the nucleus of a fast suburban electric system down the peninsula was stated recently at a hearing before the State Railroad Commission by E. J. Foulds, attorney for the Southern Pacific Company.

Stockton Terminal & Eastern Railway, Stockton, Cal.—J. E. Adams, president of this company, appeared recently before the commission and presented evidence on the company's application for the commission's authority to issue $319,000 of bonds to build an extension of its railway from Bellota to Jenny Lind. The application contains the alternative proposition that if the commission fails to approve of the bond issuance it sanction an extension of 2 miles of railway beyond Bellota at a cost of $21,000.

Bristol & Plainville Tramway Company, Bristol, Conn.—Plans are being made by this company to extend its lines in Bristol and change the location of its tracks from Park Street to Divinity Street in Bristol.

Capital Traction Company, Washington, D. C.—This company proposes to build an extension from Seventeenth Street and U Street N. W. south on Seventeenth Street to I Street; thence to Thirteenth Street; thence to H Street, and thence to Seventh Street. It also proposes short links of track on Fifteenth Street and on Eighteenth Street and a loop at the intersection of Seventh Street, Louisiana Avenue and C Street N. W.; the estimated cost, including equipment, is about $750,000. The Public Utilities Commission will hold a hearing on April 22.

Arkansas Valley Interurban Railway, Wichita, Kan.—Orders have been placed by this company for 2800 tons of steel rails and 60,000 ties. The voting of the terminal bonds by the city of Hutchinson assures the construction of this interurban railway on up the valley.

Peoria, Galesburg & Western Railroad, Galesburg, Ill.—Surveys have been made and plans are ready to begin work as soon as financial conditions are improved to place the

bonds for the construction of this proposed railway to connect Peoria and Galesburg. W. T. Irwin, Peoria, president. [Jan. 10, '13.]

*Hodgenville, Ky.—An electric railway to connect Greensburg, in Green County, Ky., and Hodgenville, in LaRue County, Ky., is being considered by residents of those two counties. The right-of-way would be readily obtained to run past the Lincoln farm, and timber for all the necessary ties, etc., could be obtained at small cost along the right-of-way, while at one end of the line connection would be made with the Louisville & Nashville Railway at Greensburg and with the Illinois Central Railway at Hodgenville. A. H.. Benningfield, Taylorsville, is interested.

St. Tammany & New Orleans Railway & Ferry Company, Mandeville, La.—This company reports that contracts are all awarded and construction has been begun on this 14-mile line to connect Covington, Abita Springs and Mandeville, La. The motive power will be crude oil engines and the company will operate three cars. It will furnish power for lighting purposes and its power plant will be located at Helenbirg. The repair shops will be located at Mandeville. Capital stock, authorized, $200,000. Capital stock, issued, $120,000. Officers: Joseph Birg, Mandeville, president; Lewis L. Morgan, Mandeville, vice-president; Harvey E. Ellis, Covington, secretary and treasurer, and H. T. Carroll, Mandeville, superintendent. [March 20, '15.]

Detroit, Lansing & Grand Rapids Railway, Detroit, Mich. — This company reports surveys completed, from Detroit to Lansing and expects to begin construction soon. The company holds fifty-one township franchises and fifteen city and village franchises between Detroit and Grand Rapids, all of which are identical in their terms and conditions. These franchises all provide for a uniform rate of 2 cents per mile or fraction thereof, and that no single fare shall be less than 5 cents. The road is to be operated by any motive power excepting the necessary side tracks, switches, etc. Capital stock, authorized, and outstanding, $25,000. Officers: Henry M. Wallace, president; W. T. Utley, vice-president; R. G. St. John, Detroit, secretary and treasurer. [July 11, '14.]

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—Surveys are under way for this company's line from Little Falls to Pierz. B. H. Bradley, chief engineer. [March 27, '15.]

St. Louis & Western Traction Company, St. Louis, Mo.—This company reports that on account of financial conditions no definite plans have been decided upon when construction will be begun on its 40-mile line between St. Louis and Gilmore. James D. Houseman, 701 Roe Building, St. Louis, president. [Aug. 8, '14.]

Big Horn Canyon Irrigation & Power Company, Hardin, Mont.—Surveys are being made by this company for an electric railway from Hardin to Custer, Mont. John J. Harris, Hardin, president. [Jan. 19, '15.]

Exeter, Hampton & Amesbury Street Railway, Exeter, N. H.—Plans are being made by this company for the removal of its tracks in Portsmouth between the Ashworth Hotel and the casino, and relaying them from the Ashworth Hotel down Marsh Avenue to the rear of the casino, where a transfer will be located.

Public Service Railway, Camden, N. J.—A permit for the construction of a short cut on the electric line from Camden to Haddonfield has been granted to the Public Service Railway by the Public Utility Commission of New Jersey. The permit provides for a new route in Star Avenue, crossing Border Street, and the necessary connections. It also provides for a new line in Border Street. In addition a double track on the White Horse Pike, from Ferry Avenue to Haddon Avenue, will be built.

Brooklyn (N. Y.) Rapid Transit Company.—Senator Bernard M. Patten, of Queens, has introduced a bill to permit the extension of this railway from Corona over tracks of the Long Island Railroad to Little Neck, via Whitestone and Flushing.

New York State Railways, Rochester, N. Y.—This company is interested in securing the immediate installation of a scenic railway or modern type of amusement device ride in Sea Breeze Park, which is owned and operated by this company. It will consider a proposition on the basis of 25 per cent of the gross receipts, with a guarantee that the amount of percentage shall not be less than $1,500 for any one year, the period of agreement to be for ten years.

Chardon, Jefferson & Meadville Interurban Railway, Cleveland, Ohio.—Preliminary arrangements are being made by this company for the construction of its proposed electric railway to connect Chardon, Hampton, Rock Creek and Jefferson, Ohio, 30 miles. F. A. Pease, Cleveland, engineer. [March 27, '15.]

Goldsboro (N. C.) Street Railway.—This company reports that it has been reorganized and will place its line in operation again at once. Additional track will be laid and other improvements made. Contracts for material will be placed immediately.

Atlantic & Carolina Railroad, Kenansville, N. C.—This company has placed in operation its 10-mile line between Warsaw and Kenansville. A gasoline motor car and a trailer are used. Connection is made at Warsaw with the Atlantic Coast Line. A. R. Turnbull, Norfolk, president. [Aug. 8, '14.]

Oklahoma Interstate Railway, Oklahoma City, Okla.—John R. Rose, promoter of this railway, has arranged with the Commercial Club to extend the interurban line from Miami to Afton via Vinita to Centralia. Vinita is to furnish a cash bonus of $30,000 and a right-of-way 100 ft. wide from the city limits to Vinita northeast to the county line 2 miles west of Afton and also one-half of the distance to Centralia. [March 20, '15.]

*Oklahoma (Okla.) Rapid Transit Company.—S. A. Horton, attorney at law, 1014-1017 Concord Building, Oklahoma City, Okla., has announced that this company has been organized to build an electric railway from Oklahoma City to Tulsa, Muskogee and Bartlesville, Okla. The proposed route is about 300 miles long, reaching the principal cities in the eastern part of Texas and extending through oil territory. Negotiations are in progress to sell bonds and let construction contracts.

Oklahoma Union Traction Company, Tulsa, Okla.—The reconstruction of this company's lines in Tulsa has been begun.

Carolina, Greenville & Northern Railroad, Greenville, Tenn.—It is reported that LeRoy Park and associates of this railway who are promoting an electric railroad from Kingsport to Newport, are considering, at the solicitation of local parties, an extension of their railroad and power transmission lines into Morristown. The new railway is planned as a standard-gage, low-grade, low-curvature line, to carry both freight and passenger traffic, connecting the Carolina, Clinchfield & Ohio Railway at Kingsport with the Tennessee & Carolina Railroad at Newport. [March 6, '15.]

McConnellsburg & Fort Loudon Railway, McConnellsburg, Pa.—Surveys are about completed for the proposed line from McConnellsburg to Fort Loudon, Pa. Bids are now being received. The company has secured rights-of-way, and capital stock of $60,000 is nearly all subscribed and paid in. Subscriptions for the bonds are now being taken. The route crosses a mountain and connects with the Cumberland Valley Railroad at Fort Loudon. A. Spotwood Dandridge, engineer. [March 13, '15.]

Chester & Lancaster Railway, Phoenixville, Pa.—Plans are being considered to build a proposed electric line to connect Lancaster and Phoenixville. Several meetings have been held in a number of small towns in Lancaster County, and according to reports the project is being considered favorably. The plan as outlined by the promoters is about as follows: The proposed line to start at Blue Ball, where it will connect with an electric line already built to Lancaster. From Blue Ball the line will go through Conestoga Valley to Churchtown, thence to Morgantown, to Goodville, Elverson, St. Peter's, Knauertown, Falls of French Creek, Coventryville, Pughtown, Birchrunville, Chester Springs, Kimberton, Harveyville, thence in West Bridge Street to Nutts Avenue and connect with the Pottstown & Phoenixville Railway.

Reading Transit & Light Company, Reading, Pa.—This company plans to expend $165,000 in improvements in Reading during the year.

Bryan & College Interurban Railway, Bryan, Tex.—This company has ordered $16,880 worth of equipment and materials from Fairbanks, Morse & Company, Chicago, Ill.

Beaumont, Liberty & Houston Traction Company, Houston, Tex.—Plans are being made to begin work at once on the proposed line between Houston and Richmond. Edward Kennedy, president. [March 27, '15.]

Southwestern Traction Company, Temple, Tex.—Arrangements are being made by this company for the completion of the line from Waco to Austin.

Glen Rose & Walnut Springs Railway, Walnut Springs, Tex.—Plans are being contemplated by this company to build a line from Glen Rose northeast to Fort Worth, Tex., about 40 miles. The company has nearly completed its 14-mile line between Glen Rose and Walnut Springs. J. H. Farr, president. [Dec. 12, '14.]

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Among the improvements planned by this company are the paving and double tracking of its line on Market Street in Parkersburg.

Badger Railway & Light Company, Whitewater, Wis.—Surveys are being made by this company for a line from Whitewater to Lake Geneva, with a branch to Fort Atkinson and Jefferson. Construction will be begun as soon as the weather permits. The line will be 25 miles long, and 6 miles have been built. It is planned to use gasoline-propelled cars.

SHOPS AND BUILDINGS

Iowa Railway & Light Company, Cedar Rapids, Ia.—This company has recently placed a contract for two new boilers and coal and ash-handling apparatus for its generating station at Cedar Rapids.

Centerville Light & Traction Company, Centerville, Ia.—This company has completed the additions to its carhouses in Centralia.

Stark Electric Railway, Alliance, Ohio.—This company is installing two 500-hp Sterling boilers and Jones underfeed stokers at its power house in Alliance.

Toronto (Ont.) Civic Car Lines.—This company expects to complete, in about six weeks, the new carhouse at the corner of Hillingdon Avenue and Danforth Avenue, this being in the northeastern part of Toronto. The carhouse is of concrete, tile and steel, and has accommodation for twelve cars. There is a wing in connection with the building 50 ft. x 109 ft., a portion of which is two stories. The wing is for shop and stores purposes. A temporary carhouse was constructed during January on Bloor Street west, between Dorval Road and Indian Road. This building is 85 ft. long x 21 ft. wide, heated, and will accommodate two single-truck cars. This structure is to serve the new Bloor Street line, and it is located in the western portion of Toronto.

North Branch Transit Company, Bloomsburg, Pa.—This company is building and equipping a new car repair shop.

POWER HOUSES AND SUBSTATIONS

Arkansas Valley Interurban Railway, Wichita, Kan.—This company plans to build a substation at Burton.

Milwaukee Northern Railway, Minneapolis, Minn.—This company has completed about half of the work on a new terminal building on Sixth Street between Cedar Street and Wells Street in Milwaukee.

Steubenville & East Liverpool Railway & Light Company, East Liverpool, Ohio.—This company has completed its new outdoor type of transformer substation on Wilson Avenue in South Steubenville, Ohio. Construction is of steel tower with concrete foundations. The capacity is 3000-kv.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—This company is building a new three-story brick combination passenger freight and substation in New Castle. The cost is estimated to be about $65,000.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—Among the improvements planned by this company during the year will be the erection of its new generating plant in Parkersburg. The cost is estimated to be about $500,000.

Manufactures and Supplies

ROLLING STOCK

Austin (Tex.) Street Railway will purchase two pay-as-you-enter cars this spring.

Goldsboro (N. C.) Street Railway expects to purchase at once new and second-hand single-truck cars.

Southern Wisconsin Railway, Madison, Wis., is reported as having in the process of preparation plans and specifications for ten city cars.

Paraguayan Company, Inc., New York, N. Y., expects to purchase a large number of motor buses or gas-electric buses in the near future for use in Paraguay.

Lehigh Traction Company, Hazleton, Pa., noted in the ELECTRIC RAILWAY JOURNAL of March 13, 1915, as having issued specifications for ten all-steel center-entrance cars, has ordered this equipment from The J. G. Brill Company.

Wilkes-Barre & Hazleton Railway, Hazleton, Pa., noted in the ELECTRIC RAILWAY JOURNAL of March 6, 1915, as having issued specifications for ten all-steel interurban cars, has ordered this equipment from The J. G. Brill Company.

Phoenix Construction Company, New York, N. Y., has received bids for five closed steel cars, 21 ft. between body end posts, for the Anniston Electric & Gas Company, Anniston, Ala., and the Carolina Power & Light Company, Raleigh, N. C., and four cars of 16 ft. body length for the Huntsville Railway, Light & Power Company, Huntsville, Ala. Contracts will be let in a few days.

Toronto (Ont.) Civic Railway, on April 1, opened four tenders for four new single-truck car bodies to be used on the civic car lines. The prices ranged from $2,386 to $3,644. The lowest offer was that of the Preston Car & Coach Company, which offered to deliver them in sixty days. As there were American companies who tendered, the comptrollers, not knowing the duty which might be charged, referred the tenders to the works commission for a report.

Chicago & Milwaukee Electric Railway Company, Highwood, Ill., which purchased fifteen all-steel interurban cars from The J. G. Brill Company, as noted in the ELECTRIC RAILWAY JOURNAL of March 6, 1915, has specified the following details:

Length over vestibules, 53 ft. 7 in.	Underframe .....all-steel
Width over sills....8 ft. 8 in.	Bumpers, Hedley anti-climbers
Width over all..8 ft. 10¾ in.	Couplers,
Inside width.....8 ft. 1¾ in.	Tomlinson M. C. B. radial
Bolster centers...32 ft. 8 in.	Curtain material...Pantasote
Height, rail to sill, 3 ft. 4 3/16 in.	Trucks...Brill M. C. B. type
Body .....all-steel	Sashes....Forsythe Brothers
Interior trim.....mahogany	Seats.....Hale & Kilburn
Headlining .....steel	Seat material, Plush and rattan
Inside sheathing....Agasote	Motors .....Westinghouse
Roof .....arched	Control .....Westinghouse

TRADE NOTES

R. B. Kennard, Allentown, Pa., architect, has changed his address to 237 Second Street, Slatington, Pa.

Universal Iron & Supply Company, St. Louis, Mo., will be pleased to send on request a calibration depth and capacity curve for horizontal cylindrical tanks of any dimensions. This method was devised by H. J. Elson of the company named.

Charles Eckert Young, Technical Advertising Service, Chicago, Ill., has appointed Joseph H. Everston, formerly sales manager of the Arex Company, as copy writer, and Edwin Carrell as art director. This company has moved its offices from the First National Bank Building to Suite 1109, Ellsworth Building, 537 South Dearborn Street, Chicago.

Esterline Company, Indianapolis, Ind., has received an order from the Lehigh Valley Transit Company for "Golden Glow" interurban headlights to replace arc lights on its Philadelphia-Allentown high-speed service.

American Vanadium Company, Pittsburgh, Pa., has appointed Merrill G. Baker as assistant general manager of sales. Mr. Baker has been identified with the iron and steel

trade for the past eleven years, and was recently connected with the Cambria Steel Company as assistant to general manager of sales of that company.

ADVERTISING LITERATURE

Welding Material Company, Inc., New York, N. Y., has issued a bulletin on its variable voltage arc welder.

McCord Manufacturing Company, Detroit, Mich., has issued a sheet on its forced-feed lubricator for use in connection with mechanical shovels, drag-line excavators and wrecking cranes.

New Haven Trolley Supply Company, New Haven, Conn., has issued catalog No. 1, describing and illustrating its various types of fare registers, fare boxes and other electric railway supplies.

American Ingot Iron Company has issued a reprint from the *Railway Age Gazette* of Feb. 19, 1915, which contains a description of successful results obtained by their use under sliding banks and in other unfavorable locations.

Standard Underground Cable Company, Pittsburgh, Pa., manufacturer of wire and cable, has issued a folder outlining the three years of progress of this company. The folder contains a description of its exhibit at the Panama-Pacific Exposition. This company has also issued bulletin No. 201-1, which contains specifications of its standard C.C.C. wire.

American Rolling Mill Company, Middletown, Ohio, has issued a bulletin appropriately entitled "Next to Excellence Is the Appreciation of It," which reproduces a series of letters written by a number of well-known companies expressing favorable opinions regarding their experience with the use of Armco-American ingot iron for condenser and boiler tubes, culverts, sheet metal for buildings and various other uses as an effective rust resistant.

Spray Engineering Company, Boston, Mass., has issued a catalog illustrating and describing its spray system for cooling water for condensers, transformers or water jackets. Illustrations are shown in the catalog of these sprays as installed in a number of power plants, including that of the Philadelphia & Westchester Traction Company, Philadelphia, Pa. Another catalog issued by the same company describes its system for washing and cooling air for steam turbine generators. Among the companies which use this system are the Richmond Light & Railroad Company, Lehigh Valley Transit Company and the Metropolitan Street Railway, Kansas City, Mo.

Van Dorn & Dutton Company, Cleveland, Ohio, has issued a folder entitled "A Feature of Lowest Operating or Maintenance Cost," which describes its various types of grade-hardened or grade-treated motor gears and pinions. An illustrated tooth section in the folder shows the tool steel wearing surface and the toughened core. In the production of its grades hardened and treated materials are selected by this company with particular reference to what it is desired to accomplish. The solid gears are made from either steel castings or the forged or rolled steel blanks, as may be desired; the split gears from cast steel only; while the pinions are produced from hammered or forged steel.

Railway Storage Battery Car Company, New York, N. Y., has issued a folder which outlines the features of the Edison storage battery for railway operation. Its chief advantages are said to be its low first cost and maintenance cost, as it requires no overhead construction or expensive attendance, and has only one rotating part in the motor; and the reliability and long life of the storage battery. The above points are well supported in the folder by reproductions of a number of letters from storage-battery railways of wide geographical distribution and by newspaper reports of recent successful tests of this kind of equipment. The company has also issued supplementary bulletins showing photographs and data of three types of storage-battery cars: the city type, as exemplified by a car of the Suffolk Traction Company, Patchogue, L. I.; the suburban type as shown by a car of the Long Island Railroad and a 50-ft. interurban car operated by the Cambria & Indiana Railroad, Colver, Pa.

Harris Winthrop & Company, New York, N. Y., are issuing an interesting pamphlet giving facts relative to the capitalization, earnings, indebtedness and records of fifty-two stock issues that were quoted on the New York Stock Exchange in March, 1915, at or below $16 a share. The high and low prices of each issue for the years since 1907 are tabulated. The bankers do not recommend the purchase of any of the stocks named. It is stated that some may be absolutely worthless, but others may represent equities which, if preserved, may greatly increase in value in prosperous times. It is thought that if a sufficiently wide distribution of the risk is made, these securities offer a good chance for speculation. The list contains Interborough-Metropolitan common stock and United Railways Investment common stock. The bankers embody in their pamphlet a list showing how many securities selling at low prices in 1894 made marked advances by 1906.

NEW PUBLICATIONS

The Federal Reserve Act. By C. W. Barron. Boston News Bureau Company. 1914. 223 pages. Cloth, $2.

This is a reprint of a discussion of the principles and operation of the federal reserve system, as originally published in the *Wall Street Journal* and the *Boston News Bureau.* It includes a description of the financial, commercial and industrial characteristics of each of the federal reserve districts, and also the complete text of the federal reserve act, fully indexed, and of pertinent preceding legislation. The twenty-eight sections of the book are really essays on credit, and are written in a free, non-technical style that enables the reader fully to grasp the essential details of the new system.

Graphic Methods for Presenting Facts, by Willard C. Brinton. Published by the Engineering Magazine Company, New York, 1914. 7½in. x 10¼in., xii + 371 pages. Price $4.

Mr. Brinton has given in convenient form for reference sample graphical representations of data from all fields in which such representation has been found useful. A total of 255 diagrams and pictures form the basis of an illuminating discussion of the principles involved in clearly and attractively presenting information by this method. The subject matter is divided into seventeen chapters, each introduced by a short generalization followed by comment upon the examples illustrated. The chapter headings are these: Component parts, simple comparisons, simple comparisons involving time, time charts, curve plotting (two chapters), comparison curves, component parts shown by curves, cumulative or mass curves, frequency curves, correlation, map presentations, maps and pins, curves for the executive, records for the executive, corporation financial reports, general methods and a few cautions.

In discussing the graphs the author not only calls attention to the technical features from the graphic method point of view but also interprets many of the data from that of the user of the charts. By this means he imparts a readable quality to the book which it would hardly have if it were a mere compilation of diagrams and comments upon graphic characteristics.

It is unfortunate that Mr. Brinton lends his influence to the use of the word "curve" to denote a stepped or other line containing angles. Webster defines the word, as it is popularly understood, as "a bending without angles." While it may be technically correct to speak of a broken line as a curve, as it would be to refer to a circle as a polygon, in the interest of general clarity "graph," "locus," "diagram," "chart," "solid line," "dotted line," etc., answer the same purpose and conform more nearly to ordinary usage. It is, of course, true that "curve" is used to a considerable extent by engineers; e.g., "speed-time curve," "power-station load curve," etc., but this does not necessarily justify its use unless it is allowed to become a "good usage." Then it is too late to make a change.

That a book of this sort should prove valuable at present may be inferred from the growing interest in diagrammatic and pictorial record and display of facts. This tendency is evident in the electric railway field as elsewhere. Compared with curves and other diagrams numerical tables of statistics are dry and uninteresting to the average reader. In mathematics instruction teachers are more and more coming to use graphical forms of expressing equations, and graphical solutions of problems are increasingly popular with students.