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JAMES H. MCGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.

CURTIS E. WHITTLESEY, Secretary and Treasurer.

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor.

Associate Editors:

RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.

News Editors:

G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building

CLEVELAND OFFICE.....1015 Schofield Building

PHILADELPHIA OFFICE.....Real Estate Trust Building

EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

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### Rapid Transit in New York.

According to rumor Mr. Willcox and Mr. Shonts have at last "gotten together" on the rapid transit situation in New York and an important announcement will soon be made of plans which will be acceptable both to the commission and to the Interborough Rapid Transit Company. This is as it should be. The Interborough Company, through its ownership of the present subway and lease of the elevated system, is in a better position than any other corporation or set of interests can be to give the city what it requires in the way of rapid transportation. No particular good would be accomplished in trying to fix the responsibility for inaction up to this time. Undoubtedly both sides were endeavoring to obtain the best terms possible. But almost any terms are desirable to either side when the needs of the city in the way of transportation are considered. It would seem as if there was sufficient space between the irreducible minimums of each to afford the basis of an agreement and we trust that it has been found.

### A Progressive City Council

A municipal body politic, like the individuals which compose it, is subject to idiosyncrasies and disorders of various kinds. Sometimes these assume serious proportions, but more often they are light in character and short in duration. One of these diseases of the recurrent type is the no-seat, no-fare hallucination. Its last abode seems to have been in Syracuse, N. Y., where a small but blatant number of "reformers" petitioned the City Council to inaugurate the street railway millennium by the magic of an ordinance. However, in this instance the City Council was not intimidated, but wisely determined to learn at first hand what experience had been obtained elsewhere with similar measures. A transportation committee was duly appointed and visits were made to Jersey City and Trenton, where the Councilmen were informed that no-seat, no-fare ordinances had proven failures in practice. Further than this the Council had a conference with the Syracuse street railway management from which it was gratified to learn that substantial car orders had been placed long before the senseless no-seat-no-fare agitation had been begun. As the result of the investigation by its committee, the Council rejected the proposed ordinance. The experience in Syracuse shows that many of the errors now made by City Councils would be avoided if the questions at issue with the public-service corporations were considered in a fair spirit and the authorities investigated matters before legislating upon them.

### Bridging the Mississippi River

The States of Illinois and Missouri will soon be linked by interurban trolley service. Announcement that the McKinley Bridge of the Illinois Traction System will be ready for through travel on Oct. 1 has just been made. This structure commands attention, not only because of the enormous outlay



required to bridge the Mississippi River, but because it is also of great importance from the traffic standpoint. Trade and travel between St. Louis and the great industrial districts across the Mississippi River have been restrained largely by reason of bridge tolls and lack of frequent through service. The franchise by which the Illinois Traction System was permitted to build its \$2,000,000 bridge and its 2.5-mile double-track entrance into the heart of the St. Louis business district, thus making possible through interurban service and electric freight and express service, does not permit any arbitrary charge for bridge traffic. The direct revenue from the bridge, therefore, must come from the 5-cent fares of the local street car service and the interurban fares based on 2 cents per mile. Some additional revenue, of course, will be received from the tolls charged foot-passengers and team traffic moving over the roadways at either side of the electric tracks. The bridge is by far the most important and expensive single engineering undertaking of its kind built by an interurban electric railway company. Its neighbor, the Merchants' Bridge, used by a number of steam railroad companies, was considered at the time of its construction as a wonderful achievement, and it is a striking instance of the development of electric interurban railways that this bridge should now be paralleled by another built by a single electric railway system.

#### Power Saving Through Anti-Friction Bearings

Mr. Stützer's article in this issue on "Car Tests in Philadelphia with Anti-Friction Bearings" should attract wide attention as it presents some novel and most instructive data on the vital subject of power consumption. The almost universal tendency, at least up to within a very recent period, to increase the size, weight and speed of cars has encouraged the development of every possible power-saving means whether applied to car construction or car apparatus. The seriousness of the problem is well illustrated by the experience in Philadelphia, where the gradual increase in the number of double-track cars raised the power consumption per car-mile from 1.4 kw-hours in 1897 to 2.6 kw-hours in 1907. It is no wonder then that the Philadelphia Rapid Transit Company should have consented to try anti-friction bearings as a partial relief. The results of its tests have been so gratifying that this company will soon have in operation over a score of cars equipped with anti-friction bearings, both on the armatures and axles. The figures given by Mr. Stützer on decreased power consumption per ton-mile and on less temperature rise in the motors of the three test equipments speak for themselves in showing what can be done to stave off the installation of four-motor in favor of two-motor equipments. The anti-friction armature bearings appear to have been of most service in reducing the heating of the motors, while the anti-friction journal bearings were most effective in reducing the power consumption per ton-mile. It is significant that while the addition of anti-friction journal bearings increased the acceleration of the four-motor equipment by 14.2 per cent, the decrease in deceleration was only 4.3 per cent. In general, the use of anti-friction journal bearings obliged the motormen to increase their coasting periods in order to keep to schedule. The bearings have not been in service long enough to state definitely what their annual maintenance cost would be. It is important to note, however, that they were installed without making any material changes in the trucks and motors and that so far they have given no trouble whatever, such as breakage, wedging or appreciable wear.

#### THE TRACKLESS TROLLEY

From time to time during the past 15 years the project of a trackless trolley system has appeared again and again, only so far as this country is concerned to come to an untimely end. There have been one or two attempts which got as far as making the wheels go round, but nothing more tangible has come of them. On the other hand, abroad the scheme seems to have met some little degree of success, and recently in England there have been two applications for trackless trolley lines on behalf of the cities which have municipal tramway systems. One of these, Bradford, sent a committee to the Continent where such systems are in operation to investigate the matter. Trackless trolley systems were found in measurably successful operation in Vienna, as part of a municipal tramway system on the Italian lakes and in Mülhausen. The first-named system was installed by the Vienna municipality for the purpose of service in districts of very light traffic where the permanent way of an ordinary tramway would involve too much expense. A little outside of Vienna there is a further section of trackless trolley service owned by a local company.

The Bradford committee was favorably impressed with this Viennese system, which gave a smooth and quiet service at reasonable speed over the ordinary macadamized roads on which it runs. There are, however, four trolley wires, two for the cars running in each direction as if it were a double-track tramway. This is to avoid the inconvenient necessity of exchanging trolleys when the cars meet as is actually done on the little suburban line near Vienna, to which reference has been made. This problem of permitting vehicles to pass on a trackless trolley system has always been a troublesome one and where an overrunning trolley is used no very satisfactory solution has been devised aside from a double trolley equipment. The system on the Italian lakes, like that of Mülhausen, works on good macadam road, but at very steep grades, so that the large power supply from the trolley wires becomes a distinct advantage over anything that could be done with a gasoline motor bus. There are in Italy besides Lake Como a number of other short lines, aggregating perhaps 50 miles in length, all of which are in regular use and apparently have done good service. On most of these Italian lines a very long trolley pole is used, carrying a double under-running contactor and permitting the vehicle considerable latitude in regard to direction.

The energy consumed per car-mile is said to be about the same as in the ordinary Continental tramway system. From this we assume that the buses are much smaller than the tramway car taken for comparison, because previous estimates have been to the effect that on a good road the energy required per ton-mile was about double that needed on rails. On one of the Italian lines for which figures were obtained the total operating expense footed up to 11¼ cents per car-mile, of which by far the largest item was the rubber tires, which amounted to a little over 4¼ cents. Altogether the impression made upon the investigators by the trackless trolley systems was distinctly favorable, bearing in mind that their function is a rather special one, that of taking care of territory in which the expense of an ordinary tramway would be too large.

All this, however, does not give any indication that a trackless trolley scheme would be a good one when introduced into this country. The tendency of tramway operation here is so different from anything found abroad that comparisons are



extremely difficult to make. An American city is a sensitive, mobile organization, entirely lacking the stability in habit of the ordinary Continental city. Nothing has been more thoroughly demonstrated here than that traffic follows the trolley. Put a line in almost any direction from any American city and it will make good earnings within a year or two because the new facilities of getting out of the city lead to their immediate utilization. It is very doubtful whether this would be true in the average European city even supposing that the tramway companies there were willing to take the chance. Then again American suburban roads as a whole are very much inferior to those in Europe and driving a trackless trolley in many outlying districts here would be no sinecure. We very much doubt also whether, with the present development of the gasoline omnibus in one form or another, there is much encouragement for the trackless trolley system. It has most of the disadvantages of the trolley line from the standpoint of the residents along the street in that it requires an overhead system somewhat more complicated than the ordinary trolley and it does not possess any particular advantage in general convenience over the automobile omnibus line. If it has any useful function in American practice it seems to us that it is in extremely local use as an auxiliary for the ordinary tramway service on comparatively short runs where the traffic is not heavy, but upon the whole it does not look promising, in spite of its great ingenuity and its undeniable comparative success on some of the lines where it is in use.

It is interesting to note that the development of the system abroad has led to pretty definite conclusions as to the relative advantages of an over-running and under-running trolley. The latter has been found to permit practically as great latitude in the operation of the cars as the former, in addition to possessing undeniable advantages: (1), it simplifies the construction of the overhead turnouts; (2), it allows the use of the standard overhead trolley construction, and (3), when the trackless trolley line is owned by the railway system, the busses can use the trolley company's repair shops and proceed to them over the trolley tracks, taking current from the overhead line.

#### RIDING QUALITIES OF ELECTRIC LOCOMOTIVES

In an editorial on "Electric Locomotive Problems" published in the *ELECTRIC RAILWAY JOURNAL* of Aug. 6, 1910, the theory was advanced that the nosing of certain types of electric locomotives might be due to the drawbar side stresses exerted through a long lever arm. Elsewhere in this issue we print a letter from G. M. Eaton, who disagrees with this theory and expresses the opinion that "nosing" is caused by track defects which start the wheels riding up on the flange fillets, first to one side and then to the other, with increasing violence.

Mr. Eaton argues that the drawbar side stresses cannot be the cause of nosing for the reason that this action takes place on straight track and is as severe when the locomotive is running light as when hauling a train. He points out further that a locomotive which is nosing on straight track will steady down somewhat on a curve. We have observed a number of electric locomotives running at high speed on straight track and on curves, and while it is true that nosing takes place on straight track and without a trailing load, very severe periodic oscillations have been noted on curves. The wheels do not necessarily swing from side to side, because the leading outside wheel is pressed hard against the rail due to the constant deflection

from the tangent. The frame and spring-borne parts, however, lurch sidewise with great force and as long as the guiding pressure exceeds the force of the side swing the leading outside wheel will cling to the rail, but the total side pressure will be equal to the sum of the two and may reach considerable proportions. Whether the nosing action is actually caused by the drawbar side stresses we do not claim as an uncontrovertible fact. On a curve, however, the nosing pressure is added to the guiding pressure.

An interesting point which is not explained by Mr. Eaton's theory is that nosing disappears when the power is shut off and before any appreciable reduction in speed takes place; hence it can hardly be due to track defects. It may represent a definite loss of energy, but the energy of the motors is stored in the moving mass of the locomotive and train and it would be reasonable to suppose that nosing would continue as long as the locomotive was in motion at or near the critical speed. This phenomenon would suggest that there must be a marked difference in the riding qualities of trailing wheels and driven wheels.

#### INDIVIDUAL MOTOR DRIVING FOR MACHINE TOOLS

The advantages of using individual motors for driving machine tools have been demonstrated in numerous industrial establishments, and it is surprising that this method has not been adopted more generally in electric railway repair shops. The reason undoubtedly is the comparatively high first cost of a number of individual motors as compared with one or two large motors driving shafting. The day is close at hand, however, when every means of forcing the output of an electric railway repair shop must be considered and there is coming to be a better appreciation of the inefficiency of shafting and belt driving. A test of the power required to run even a small shop using overhead shafting usually will show that more current is consumed in turning the shafting, pulleys and belts than in actual machine operations.

There are certain advantages of individual motor drive which are particularly beneficial in a railway repair shop. No other method permits the development of shop facilities so freely along the lines which could not be foreseen when the shop was first built. There is a constant tendency toward using heavier tools in street railway shops and rearranging them on the floor to facilitate routine operations. The cost of moving tools and changing the shafting and pulleys as the shop grows in size or the character of the work done changes often may be equal to the initial expense for direct-connected motors for all the machines. Individual motors can be applied to the larger tools first and to any isolated machine of moderate size for which room cannot be found in the department in which it should be placed. Better light, greater safety to employees and more overhead and aisle space will result from the substitution of individual motors for shaft driving.

In many cases the first cost of the motors for individual drive appears so formidable that the economies which would result from a well-planned installation do not receive the consideration to which they are entitled. The first cost can often be reduced by judicious use of second-hand motors. The present tendency in central-station operation is to substitute alternating-current distribution for 550-volt direct-current power supply and this change has released many direct-current motors in good condition which could be adopted readily for use in railway shops, which can be bought at low prices.



**SEATTLE-EVERETT INTERURBAN RAILWAY**

The six foremost cities on Puget Sound form a perfect arc which sweeps round the eastern shore of that famous body of water like a Titan's bow. It is drawn as though to discharge across the continent a great arrow heralding this section's future commercial and industrial supremacy. The powerful right hand of Fortune stretching athwart the Pacific grips the arrow with the notch at the coast line and the head close up against the bow just where Everett lies, 112 miles to the east. The southern end of the bow rests at Olympia and the northern end at Vancouver, 150 miles away. Inlaid in the stave of this bow are the cities of Bellingham, Everett, Seattle and Tacoma, with Puget Sound inside the arc.

One of the finest counties in this section is Snohomish, which lies midway on the eastern shore line of the Sound. In fact, were the arrow discharged it would, at the very beginning of its flight, cleave Snohomish through the center. With a population of 75,000 this county has resources that would support many times that number, for it abounds in timber and fisheries, in agricultural and in mineral wealth and is larger than Rhode Island and Delaware combined. Everett is the principal city and is splendidly situated on one of the finest harbors on the Sound. Less than 20 years ago the great fir trees stood in unbroken ranks over the entire site of this city, which now numbers nearly 40,000 inhabitants, and already has cast off the last habiliment of a frontier town. By far the most important step of recent years in the development of Snohomish County is the new interurban railroad just completed between Seattle and Everett. It is quite characteristic of the spirit of the Northwest that, while traversing a section where the professional lumberman's axe was the first and actually the most necessary implement of construction, the road nevertheless has been built for a speed of 40 m.p.h.

For 12 miles the way literally has been bored through a solid forest, large gangs of lumbermen being employed to cut and dispose of the great trees. These trees frequently reached a diameter of 8 ft. and a height of 200 ft., and their stumps and far-reaching roots had to be removed by blasting before the steam shovels could work. The maximum grade of this road is only 2 per cent and the maximum curvature 4 per cent, but this excellent physical condition was not due to favorable topography. It was attained by grading to an average amount of 25,000 yd. per mile or the equivalent of a continuous embank-

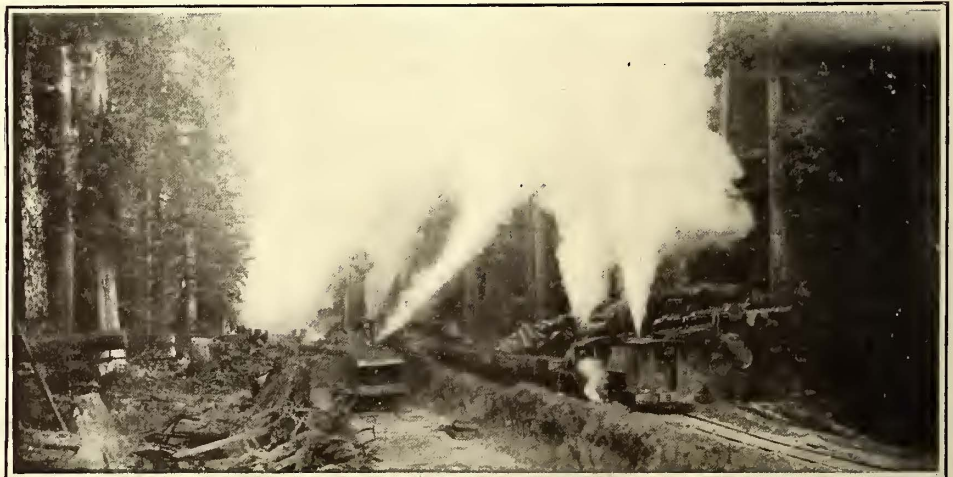
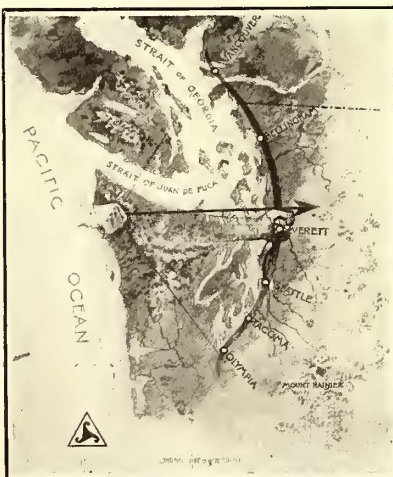
In making some of the cuts there was unexpectedly encountered on the southern section of the line a soil formation almost like hardpan. It could not be handled with steam shovels and so was blasted out, well-boring machines being used for the drilling. In places the holes were drilled to a depth of 25 ft. or 30 ft. The heaviest cut was one of 50,000 yd., with a depth



Seattle- Everett Line—A Tangent Through the Woods

of 30 ft. and length of about ¼ mile, situated midway between Seattle and Everett.

In breaking through a largely virgin country like this the problem of taking care of the working forces, especially during a wet winter such as was the past, quite equaled the difficulty



Seattle- Everett Line—Map of the "Magic Bow" and a Scene Showing Grading Operations in the Primeval Forest

ment 6 ft. high and 16 ft. wide on grade. In fact, the standard width of fills was 16 ft., while the width in cuts was 18 ft. The largest fill is over a swamp ½ mile from Halls Lake, the southern terminus of the new section of the line. This fill is 40 ft. high and ½ mile long. A great deal of difficulty attended its making, because the unstable foundation required trainload after trainload of spoil for fully two weeks before the grade rose to view.

of the work itself. First came road building to establish camps. As all the large trees had to be avoided, the camp roads were as tortuous as bridge paths in a forest. Whenever a camp was shifted it meant building a new road and usually the moving of heavy equipments. Among the latter were the donkey engines for logging and drag-scraper work, which made slow, tedious loads to be hauled over sinuous trails by four-horse teams. In spite of the wet climate the problem of watering the camps and also of getting water for donkey engines, steam shovels, loco-



motives, etc., required a water-works system that might have done credit to a small town. At one time there were laid 6 miles of temporary mains to supply 500 men in scattered camps besides the extensive steam equipment. The pressure head was afforded by three gasoline-engine pumping sets.

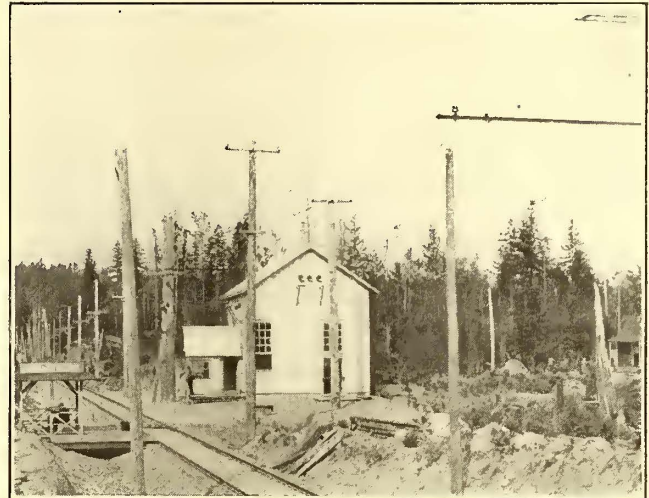
The track consists of 70-lb. T-rail laid on 6-in. x 8-in. x 8-ft. ties. The rail joints are of the Continuous type. The ballast is gravel with from 6 in. to 12 in. depth under the ties. The grading was done by steam shovels in the larger cuts and drag scrapers operated by donkey engines in the smaller cuts. The

four 75-hp G.E.73 motors and multiple-unit control apparatus. The trucks are to be of the M. C. B. type, made by the Baltimore Locomotive Works. Westinghouse air brakes will be used. The company also has two electric locomotives for freight service, 12 flat cars and six box cars. Six more freight cars will shortly be purchased.

The initial schedule for passenger operation calls for slightly over 20 m.p.h., including stops and turn-outs, but exclusive of time lost running over 6½ miles of terminal tracks. The total length, including terminals, is 22 miles and the full running time



Seattle-Everett Line—Beverly Park Station



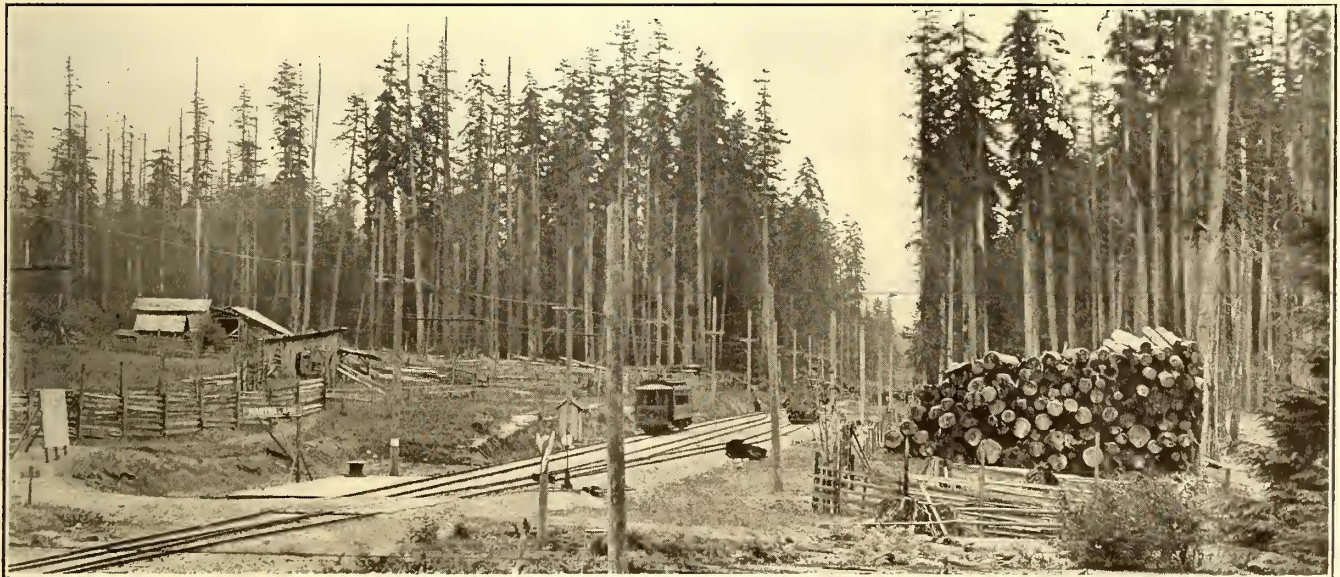
Seattle-Everett Line—Substation at Hall's Lake

total material handled by the equipment was about 2000 yd. a day. Five locomotives, two being standard gage, together with 75 dump cars, were kept busy with the ballasting and grading.

The chief point of interest in the overhead equipment of the road is the use of catenary construction. This consists of No. 0000 grooved trolley wire suspended on galvanized hangers 6¼ in., 7½ in., 10 in. and 14¼ in. long. The feeder is 795,000 circ. mil bare aluminum cable of 37 strands, and the transmission line is of 66,370 circ. mil aluminum, which is equivalent to No. 4

is 1 hour and 15 minutes with hourly service and 17 cars each way daily. The new section from Halls Lake to Everett has been constructed to a 40 m.p.h. standard, but the older section from Seattle to Halls Lake, which had previously been built and is now being renovated, will not now permit this speed.

Power for operating the Seattle end of the line is supplied from the system of the Seattle Electric Company to a substation at Halls Lake, where a 500-kw motor-generator is installed. Power for operating the Everett end is supplied from



Seattle-Everett Line—Turn-Out Near Martha Lake

B. & S. copper wire. The Ohio Brass Company supplied the overhead equipment.

Passenger service on the line was begun with cars previously used by the Everett Railway, Light & Water Company, but six new interurban coaches are being manufactured by the Niles Car Company and will shortly be placed in service. The new cars will be 52 ft. over the bumpers and will be equipped with

the system of the Everett Railway, Light & Water Company to a 400-kw motor-generator in the Broadway substation.

The operating company is the Seattle-Everett Traction Company, of which William I. Sturtevant is general manager. The Stone & Webster Engineering Corporation carried out the entire contract for the engineering, construction and equipment of the new line.



### CAR TESTS IN PHILADELPHIA WITH ANTI-FRICTION BEARINGS

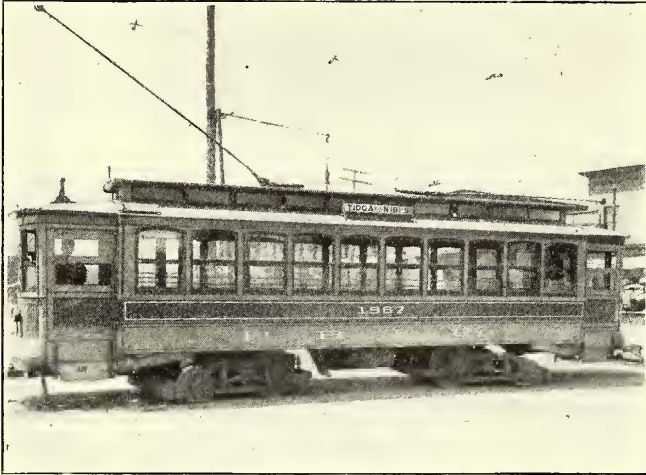
BY ARTHUR B. STITZER, FORMERLY ELECTRICAL ENGINEER, PHILADELPHIA RAPID TRANSIT COMPANY

The possible saving in energy attainable by using anti-friction bearings in car equipments has been a subject for discussion in the past, but hitherto all comments have been based on theo-

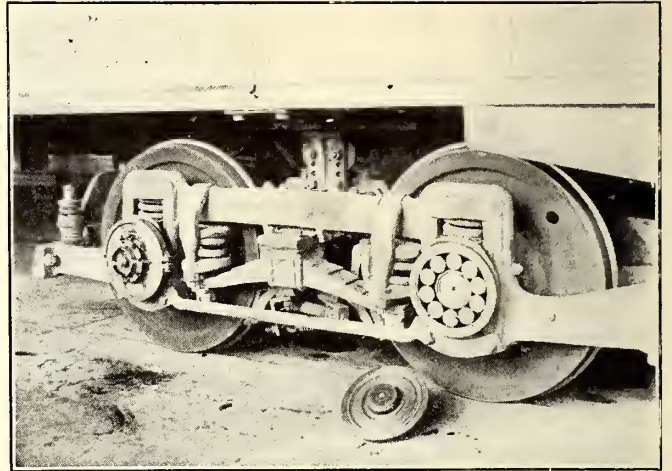
period of nearly one year, beginning June, 1909, and ending May, 1910. The results obtained were of the most favorable character and upset many preconceived ideas on the effect of anti-friction bearings in car operation. The various trials hereinafter recorded were carried out under the direction of the writer.

#### TEST CONDITIONS AND RECORDING EQUIPMENT

The tests were inaugurated with car No. 2140 of the company's standard double-truck type, carrying unmodified Brill



Philadelphia Anti-Friction Bearing Tests—One of the Three Trial Cars



Philadelphia Anti-Friction Bearing Tests—Roller Bearings Installed

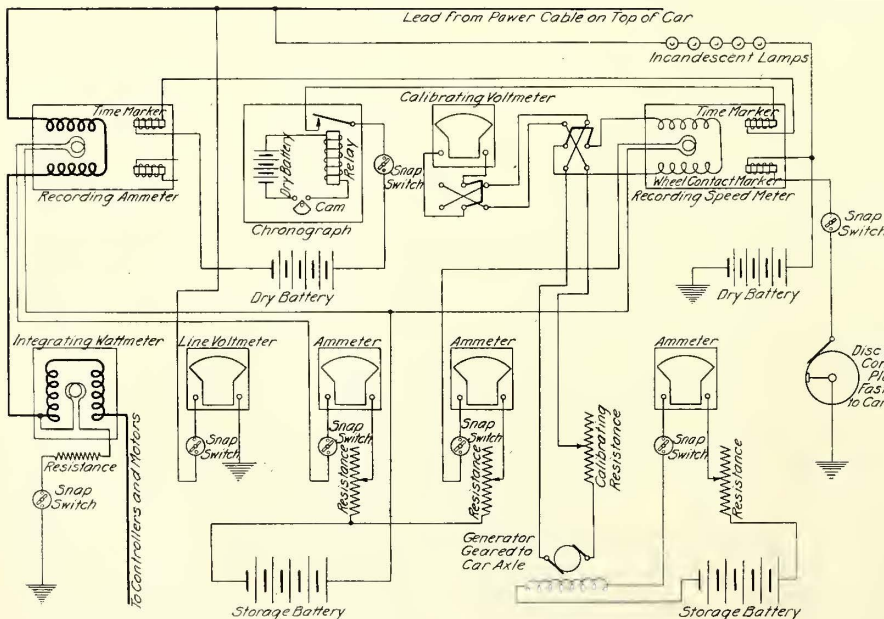
retical calculations rather than on practical tests. Among the objections which have been urged against the adoption of such devices the three following deserve special consideration:

First—The saving from the use of anti-friction bearings would be small because the amount of energy dissipated as heat from bearing friction is but a small percentage of the total energy required for operation.

Second—The motorman will not take advantage of the greater

No. 27-G trucks and four Westinghouse 101-B 40-hp motors. The test car followed a service car around its route, making stops at all streets for approximately the same periods as the service car ahead. Runs were made only on clear days so that the track conditions for all tests would be as nearly uniform as possible. To eliminate the personal factor of the motorman, the same man operated the car throughout all trials, nor were any special instructions or information given to him as to the handling of the car or its equipment.

Car No. 2140 was equipped with recording instruments, as shown herewith. The recording ammeter and speed meter made a record on special paper strips 3 in. wide, which were moved at the rate of 6 in. a minute.



Philadelphia Anti-Friction Bearing Tests—Wiring Diagram of Test Car No. 2140 and View of Roller Bearing Encased



possibilities for coasting unless he receives special instructions and most likely he will not do so even then.

Third—Although the rate of acceleration may be greater, the saving will be offset by the decreased rate of deceleration.

In view of the foregoing statements it may be of interest to present the history of a series of tests with anti-friction armature and journal bearings as made under regular running conditions by the Philadelphia Rapid Transit Company for a

By means of a chronograph, two-second intervals were marked simultaneously on both record sheets. The ammeter was calibrated with a Weston portable. The speed meter was calibrated to read speed in m.p.h. and its accuracy was checked by making a run over a known distance and finding the area of the speed curve.\* The wattmeter was calibrated before and

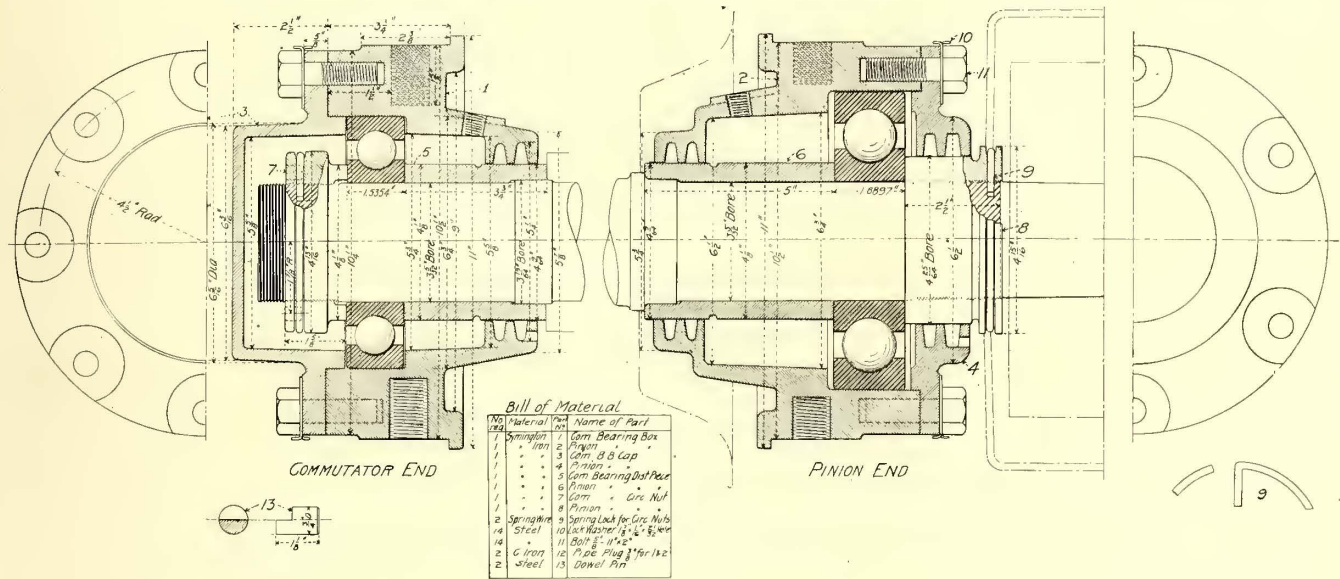
\*A description of this speed meter, its calibration and use were presented by the writer before the Engineers' Club of Philadelphia, and published in the January, 1909, Proceedings of that body.



after each set of runs, and the results were checked by integrating the ammeter record and multiplying by the average voltage. All power readings given in the tables are for traction only.

The line voltage was recorded at every stop and while starting and running. The length of stops was taken with a stop-watch and checked from the speed records. Thermometers were placed in each motor and read at the beginning and end of each day's run. The temperature of the air was recorded at

the coefficient of adhesion for wheels on sanded track, and considering the weight at the tread of these wheels for a crowded car. Each commutator bearing has eight  $1\frac{1}{16}$ -in. balls and was selected according to the weight of an armature, since it takes its entire end thrust, which is necessarily proportional to its weight. This commutator bearing, therefore, has to be of larger size than would be called for by the simple radial load imposed upon it. Owing to the comparatively long distance between the bearings and the short distance between

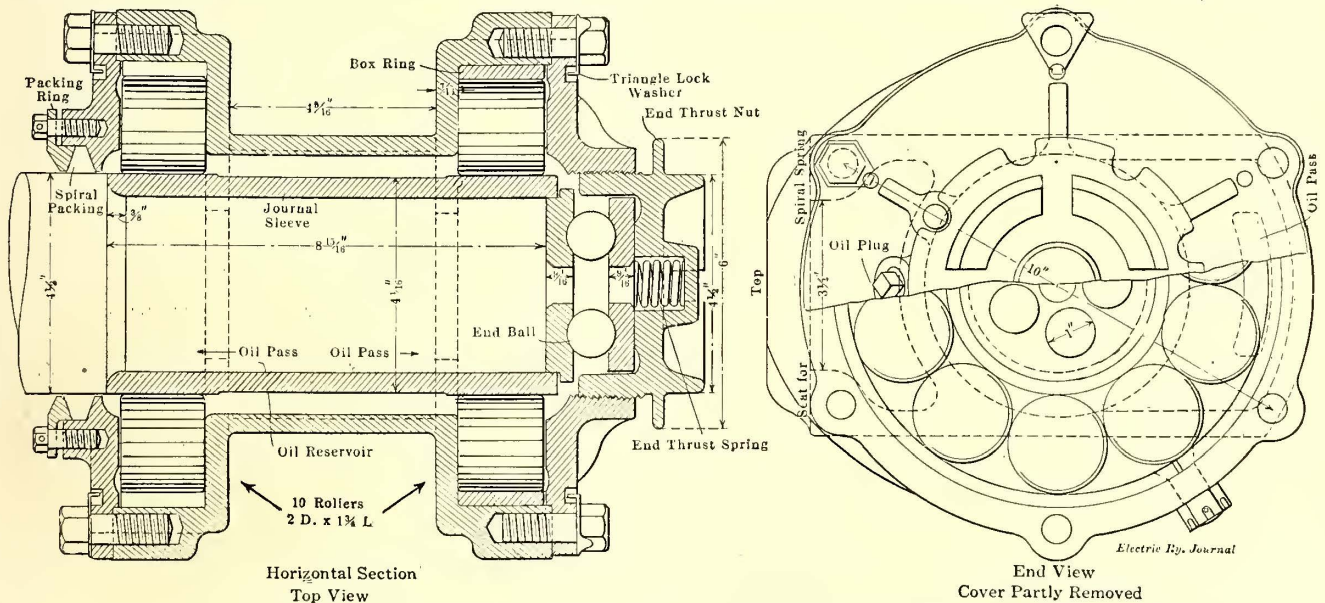


Philadelphia Anti-Friction Bearing Tests—Details of Armature Ball Bearings

the beginning, the middle and at the end of each day's run. At the time these data were finally compiled none of the different bearings installed had shown any appreciable wear. The following descriptions of both types of anti-friction bearings were furnished by the makers.

the pinion and pinion bearing the pinion load produces no severe radial stress on the commutator bearing.

The outer races of the bearings are assembled with an easy fit in their housings, permitting them to move around gradually in operation, so that hammer-blows, which would otherwise



Philadelphia Anti-Friction Bearing Tests—Section and End View of Roller Bearings for the Journals

ANTI-FRICTION ARMATURE BEARINGS

The armature anti-friction bearings were furnished by the Hess-Bright Manufacturing Company, Philadelphia, Pa. In this ball-bearing arrangement the pinion bearings are placed as near the pinions as the necessary clearances for the bearing housings and gear cases permit. Each pinion bearing has  $1\frac{3}{8}$ -in. balls and was selected according to the maximum load which it is called upon to sustain. This load was determined from the force necessary to slip a pair of driving wheels, using

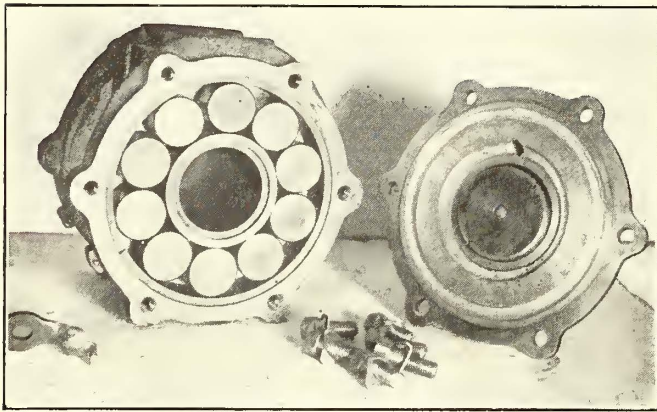
come continually upon one or two points, are distributed around the races. This prevents fatigue in the metal and consequent fractures which might occur on that account. A very small lateral clearance, not more than  $1/64$  in. on either side, is allowed around the outer race of the commutator bearing to facilitate machining and insure that this race is not pinched between the shoulders formed inside and housing itself. The pinion bearing is not bound endwise, thus the shaft can expand freely under an increase in temperature without pro-



ducing any lateral stress between the ball bearings. Both bearings are mounted firmly on the shaft with a light drive fit, representing a steady pressure of about 1000 lb. The inner races are securely clamped between two shoulders; the inside shoulder is formed on the shaft itself and the outside one is the face of a circular nut. The ball-bearing housings or frameheads are made of Symington iron. This material has about twice the tensile strength of cast iron and consequently may be subjected to greater shocks without causing breakages, at the same time it is hard and wears better than malleable iron.

ANTI-FRICTION JOURNAL BEARINGS

The roller-bearing journal boxes used in the tests were manufactured by the Railway Roller Bearing Company, Syracuse, N. Y. This journal box, which is made of special malle-



Philadelphia Anti-Friction Bearing Tests—Roller Bearings for Journal

able iron, contains a series of rollers without cage or separators, placed on both sides of the truck frame. Each roller raceway in the box contains 10 rollers of 2-in. diameter and 1 3/4-in. length, enclosed in a hardened alloy steel ring which forms the outer raceway. The inner raceway is a single journal sleeve

TABLE I—POWER TESTS WITH ANTI-FRICTION BEARINGS, CAR NO. 2140.

Weight of car with four-motor equipment, "plain," 21.34 tons; with four-motor, "ball," 20.97 tons; with four-motor, "roller," 21.58 tons; with two-motor, "plain," 18.32 tons; with two-motor, "roller," 19.72 tons; Brill 27-G double trucks.

Run.	Four-motor equipment— Power, watt-hours per ton-mile.				Two-motor— equipment. Power, watt-hours per ton-mile.			
	Plain.	Ball.	Per cent saving.	Roller.	Plain.	Roller.	Per cent saving.	Power per cent saving two-motor roller over four-motor plain.
12th and 16th.....	154.6	153.8	0.5	120.9	21.8	.....	.....	.....
17th and 19th.....	155.0	148.8	4.0	122.1	21.4	148.4	110.2	25.8
13th and 15th (League Id.)	147.8	142.4	3.7	118.3	20.0	128.1	105.0	18.1
Baring (Subway).....	147.3	140.6	4.5	114.7	22.2	147.3	113.7	22.8
Lancaster (Subway).....	143.3	140.7	1.8	113.6	20.7	132.2	113.1	14.4
Darby .....	158.1	152.4	3.6	125.2	20.8	135.1	119.7	11.4
Averages .....	151.0	146.5	3.0	119.1	21.1	138.2	112.3	18.5

NOTE—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings. The round trip lengths of each route are as follows: 12th and 16th, 10.97 miles; 17th and 19th, 12.36 miles; 13th and 15th, 16.81 miles; Baring, 8.26 miles; Lancaster, 8.26 miles; Darby, 10.69 miles.

of the same material, forming a raceway for both series of rollers.

The rollers are relieved of end thrust duty by an adjustable ball end thrust nut contained in the outer cover of the box; the inner raceway of the ball thrust engages the end of the axle when screwed into place and was locked after the truck frames were dropped into the channel separating the two roller raceways. The ball races contain six high-duty balls of 1 in. diameter. It is worth mention that the roller journal boxes were

placed in operation without requiring any change in the trucks. The roller journal sleeves were placed with a light drive fit on the regular axles, which previously had been operated with plain bearings.

Roller bearing journal boxes similar to those just described were also installed during the past year on cars Nos. 2130 and 1967, which have plain bearing armatures. Car No. 2130, weighing 18 3/4 tons and equipped with Brill No. 27-G trucks and two 40-hp motors on the rear truck, operates on the Tenth and Eleventh Street line; car No. 1967 is of like weight and motor equipment, but equipped with Brill No. 39-E maximum traction trucks and is operated on the Seventeenth and Nineteenth Street line. Both cars began operation with the roller bearing journals nearly a year ago and have since maintained their schedule easily without undue motor heating or repairs.

EFFECT ON POWER CONSUMPTION AND MOTOR HEATING

The accompanying Table I shows the watt-hours per ton-mile obtained from the tests with car No. 2140 on six different lines. These values are not the result of a single run, but the average of from three to six round trips on each route. This made the actual running time for each type of bearing for each route about six hours—a period long enough to secure the motor temperature rise for each condition. The temperature rise for the various conditions is given in Table II.

Although the application of ball bearings to the armatures of the four-motor equipment on car No. 2140 showed a saving of only 3 per cent in power, it is noteworthy that the decrease in motor temperature rise was 16.4 per cent.

The total losses in a railway motor (excluding gears) are about 10 per cent of its output, of which losses approximately one-third is bearing friction. All of this lost energy reappears directly as heat in the motors. Therefore, any reduction of bearing friction will decrease the temperature rise of the motors much more than it decreases the power consumption.

While it is true that the speed of the armature is greater than that of the axle journal (in accordance with the gear ratio) the weight on each journal box is about eight times greater than the weight on each armature bearing. Hence the saving in power from reduced journal friction must be far greater than that

TABLE II—TEMPERATURE RISE OF MOTORS, CAR NO. 2140.

Run.	Four-motor equipment— Temperature rise, degrees Centigrade.				Two-motor— equipment. Temperature rise, degrees Centigrade.	
	Plain.	Ball.	Per cent saving, ball over plain.	Roller.	Per cent saving	Per cent saving, roller over plain
12th and 16th.....	34.69	30.62	11.7	27.42	21.0	.....
17th and 19th.....	34.36	28.67	16.6	26.37	23.1	70.37
13th and 15th (League Id.)	42.35	33.82	20.1	29.70	29.9	74.50
Baring (Subway).....	36.59	30.95	15.4	27.29	25.4	69.17
Lancaster (Subway).....	37.87	31.08	17.7	29.65	21.7	72.17
Darby .....	36.08	29.95	17.0	.....	.....	61.83
Averages .....	36.97	30.85	16.4	28.08	24.2	69.61

NOTE—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings.

from reduced bearing friction. However, the decrease in motor temperature rise will not be as great proportionately because this energy reappears in the motor only as heat in proportion to the efficiency. In these tests on the four-motor car No. 2140 the addition of anti-friction journal bearings to the ball bearing armature equipment decreased the power consumption from 3 per cent to 21.1 per cent, but decreased the temperature rise only from 16.4 per cent to 24.2 per cent. The temperature values in the two-motor equipment tests are given in the next chapter.

Table No. III shows the average coasting and braking time in minutes for each series of tests on the six different lines with car No. 2140. The total running time was obtained from the speed curves; the time with power on from the current curves and as 1/2 in. on both tape records representing two-second intervals were marked simultaneously on both records, the values were very accurately derived.



EFFECT ON COASTING AND BRAKING, ACCELERATION AND DECELERATION

The total coasting and braking time with anti-friction armature bearings alone showed a decrease of 2.9 per cent over plain bearings, although in theory there should have been an increase. Naturally this value would be small in any event in accordance with the small saving in power. Small variations in the proportion of series and multiple running periods easily might change this value from negative to positive, yet still show a saving in power.

With the addition of anti-friction bearings on the axle journals there was a large increase in coasting and braking time, amounting to an average of 31.2 per cent. All the values are positive, although they cause no appreciable difference in the average running times in Table III. This shows that the reduced friction of the journal bearings practically forced the

anti-friction bearings on the armatures and axle journals. At the same time, there was a saving in power of 18.5 per cent over the two-motor equipment with plain bearings. Almost all of this saving in power was due to the reduction of axle journal friction for the reasons before given.

The coasting and braking periods of the two-motor cars with plain bearings was 12.8 per cent less than for the four-motor equipments with plain bearings, but with both types of anti-friction bearings applied the coasting period for the two-motor equipments was increased 22.5 per cent over the four-motor plain bearing equipment and increased 42.8 per cent over the two-motor equipments with plain bearings.

Although the deceleration of the two-motor equipments with both types of anti-friction bearings showed a decrease of 2.1 per cent over the four-motor equipment with plain bearings, it showed an increase of 6.5 per cent over the two-motor equip-

TABLE III—TIME COASTING AND BRAKING. TIME GIVEN IN MINUTES.

Run.	FOUR-MOTOR EQUIPMENT.												TWO-MOTOR EQUIPMENT.					
	Plain			Ball				Roller					Plain			Roller		
	Running time.	Power on.	Coasting and braking.	Running time.	Power on.	Coasting and braking.	Per cent increase of coasting and braking.	Running time.	Power on.	Coasting and braking.	Per cent increase of coasting and braking.	Running time.	Power on.	Coasting and braking.	Running time.	Power on.	Coasting and braking.	Per cent increase of coasting and braking.
12th and 16th.....	73.9	33.0	40.9	69.8	34.5	35.3	-13.7	72.3	22.8	49.5	21.0	...	...	...	...	...	...	...
17th and 19th.....	87.1	42.8	44.3	84.5	42.2	42.3	-4.5	87.5	32.7	54.8	23.7	89.6	51.1	38.5	86.3	31.2	55.1	42.8
13th and 15th (League Id).....	99.3	51.1	48.2	99.1	52.4	46.7	-3.1	99.2	38.0	61.2	26.9	105.0	59.9	45.1	102.5	39.5	63.0	39.7
Baring (Subway).....	46.8	25.8	21.0	45.0	23.8	21.2	1.0	46.4	15.5	30.9	47.1	47.4	30.4	17.0	46.4	20.5	25.9	52.3
Lancaster (Subway).....	60.9	32.4	28.5	62.0	32.7	29.3	2.8	61.2	21.4	39.8	40.0	62.6	39.4	23.2	60.6	25.7	34.9	50.4
Darby.....	89.3	43.6	45.7	87.0	41.3	45.7	0.0	90.9	32.2	58.7	28.4	93.0	50.7	42.3	92.5	38.0	54.5	28.8
Averages.....	76.2	38.1	38.1	74.6	37.8	36.8	-2.9	76.2	27.1	49.1	31.2	79.5	46.3	33.2	77.7	31.0	46.7	42.8

NOTE—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings.

motorman to increase the coasting time in order to hold his car to schedule.

The acceleration and deceleration values shown in Table IV were obtained directly from the speed curves by measuring the angle between the curve and the base line. In the four-motor tests the acceleration and deceleration were but slightly affected by adding anti-friction armature bearings to the plain bearings, and naturally would be, but the addition of anti-friction journal bearings increased the acceleration 14.2 per cent with a decrease of only 4.3 per cent in deceleration.

TWO-MOTOR TESTS

On account of the low temperature rise of the four-motor

ment with plain bearings. This is but a small change in the deceleration in proportion to the great increase in acceleration. The two-motor equipment with anti-friction bearings showed an increased acceleration of 9 per cent over the four-motor plain bearings and a decrease of 4.6 per cent over the four-motor anti-friction bearings, with an increased acceleration of 35.3 per cent over the two-motor plain bearings.

SEMAPHORE SIGNAL FOR SMOKE FLUE DAMPER.

The smoke flues of the large boiler house of the Twin City Rapid Transit Company's main generating station are equipped

TABLE IV—ACCELERATION AND DECELERATION TESTS, CAR NO. 2140. ACCELERATION AND DECELERATION IN MILES PER HOUR PER SEC.

Run.	FOUR-MOTOR EQUIPMENT						TWO-MOTOR EQUIPMENT.					
	Plain		Ball		Roller		Plain			Roller		
	Accel.	Decel.	Accel.	Decel.	Accel.	Decel.	Accel.	Decel.	Accel.	Decel.	Accel.	Decel.
12th and 16th.....	2.19	1.83	2.41	1.87	2.54	1.68	...	...	...	...	...	...
17th and 19th.....	2.14	1.83	2.18	1.81	...	...	1.81	1.49	...	2.28	...	1.68
13th and 15th (League Id).....	2.13	1.88	2.28	1.90	2.51	1.66	1.85	1.68	...	2.40	...	1.65
Baring (Subway).....	2.37	1.82	2.35	1.83	2.60	1.81	1.80	1.61	...	2.37	...	1.80
Lancaster (Subway).....	2.27	1.86	2.28	1.88	2.61	1.83	1.76	1.86	...	2.65	...	1.90
Darby.....	2.43	1.83	2.18	1.90	2.57	1.82	1.82	1.75	...	2.54	...	1.92
Averages.....	2.25	1.84	2.28	1.86	2.57	1.76	1.81	1.68	...	2.45	...	1.79

NOTE—"Plain" refers to plain armature and axle journal bearings; "ball" refers to ball armature and plain axle journal bearings; "roller" refers to ball armature and roller axle journal bearings.

equipment with plain bearings, it was thought possible to operate cars similar to No. 2140 with only two motors by installing both types of anti-friction bearings and still keep the rise in temperature below a value consistent with low cost of maintenance. The results are shown in Table II.

The average rise in temperature of the motors of the two-motor equipment with plain bearings alone was 60.61 deg. C. This was reduced to 31.8 per cent, or 47.4 deg. C., by using

with Mason automatic damper regulators. The location of the flues is such that the firemen standing in front of the boilers cannot see the position of the damper, and so a semaphore blade has been mounted on a bracket near the middle of the boiler house and connected in such a way with the cables which operate the damper that the position of the semaphore blade will indicate the damper opening and show the firemen whether or not more coal should be fed to the grates.

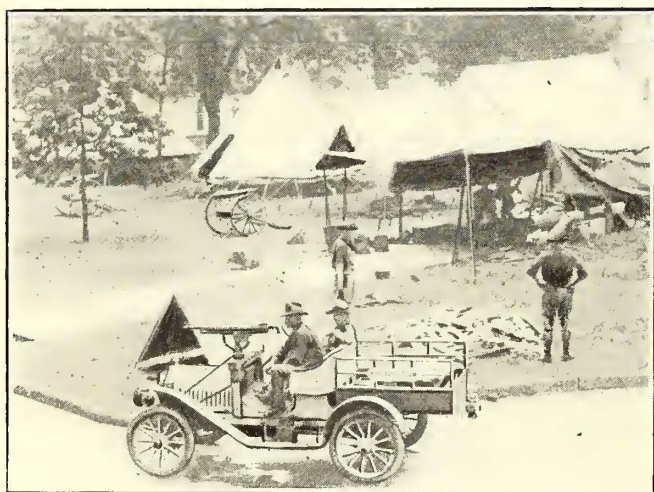


## THE STRIKE IN COLUMBUS

On Aug. 15 Governor Harmon, on his own initiative, called out 1000 soldiers to aid in preserving peace during the strike of the union employees of the Columbus Railway & Light Company. In doing this he virtually took matters out of the hands of Mayor Marshall, who, after a week of rioting, had declared that he had done all he could to preserve peace. The step was taken after several private business organizations of the city had demanded Mayor Marshall's resignation. The Builders' & Traders' Exchange attacked the course taken by the Mayor and accused him of co-operation with the element that has been engaged in rioting.

Gen. John C. Speaks is in charge of the troops and Adjutant-General C. C. Weybrecht is acting as the Governor's personal representative in control of the troops. It is Governor Harmon's intention to keep troops in the city until peace is permanently restored and General Weybrecht has announced that the soldiers are armed with riot ammunition, with orders to shoot to kill. At first the officials said that the troops would not be required to do patrol duty, but would be ready at all times to answer call of the city officials or the patrolmen on duty.

It has been announced that, if by chance any of the men are



Columbus Strike—Troops at Corner of State House Grounds

ever allowed to return, they will have to commence as new employees. Many of the men employed to operate the cars during the strike are taking their families to Columbus, with the intention of remaining permanently. These men will be allowed to retain their runs.

At 11 o'clock on the morning of Aug. 14 an attempt was made to dynamite the car houses on the West Side, and in the evening an attack was made on the South High Street car house. Not much damage was done in either case. Troubles were more frequent during the day than usual and attacks on cars were started early in the evening. This was probably due to the fact that many men were idle over Sunday and some of them took the opportunity to aid in the riots.

Governor Harmon and President C. J. Pretzman, of the Chamber of Commerce, are reported to have made an effort on Aug. 17 to induce a settlement. Governor Harmon, however, asserted later that he had not been interested in any plan of settlement.

The company put armed guards on the cars on the evening of Aug. 17, following the decision of the military authorities that they will furnish men to put down riots, but are not directly interested in the operation of cars. Men were also employed to mingle with the crowds and discover those who are engaged in throwing stones. The employees are instructed to defend themselves in case of attack. Four more men were arrested on the evening of Aug. 17 on the charge of throwing stones.

There was no violence on the evening of Aug. 18, as a close watch was kept on all the streets by the detectives and police.

Complaint has been made that members of a Cleveland detective agency have been committing depredations in order to induce the company to employ more men.

### MAINTENANCE OF SERVICE

Service has been maintained with unusual freedom from interruption. In spite of the lack of protection afforded by city authorities for the cars and passengers therein the company has been successful in securing temporary and permanent employees to operate the cars. On the direction of the authorities the company suspended part of its service in the early part of the strike, but restored full operation, despite the warnings of the officials of Columbus, that it was not safe to do so in view of the conditions prevailing in the city. The success with which full operation was maintained, during the day as well as through the evening hours until the runs were completed shortly after midnight, demonstrated the entire ability of the company to meet the situation created by the withdrawal of its men.

Patronage on the cars increased steadily after the arrival of the troops, although efforts to discourage it were continued by the strikers or their sympathizers. Both strangers and residents of the city were watched if they rode on the cars. A traveling salesman who visited a store in Columbus was told that the place would be boycotted if he rode on a car while in Columbus. Threats to residents of Columbus were common incidents of the strike.

As an example of the discouragement offered by the city authorities toward the resumption of full service the following letter, written on Aug. 16, by Mayor Marshall to E. K. Stewart, vice-president and general manager of the company, may be cited:

"I am still of the opinion that I am unable to give proper protection for the operation of cars after nightfall, and I therefore request that all cars operated by the Columbus Railway & Light Company be withdrawn from the streets before dark."

Mr. Stewart's reply, written the same day, said:

"Will say in reply that I am astounded at your acknowledgment as to the inefficiency of your police force.

"Nevertheless, this company proposes to operate its cars and will make every possible effort to do so, and will protect our employees and our property to the very best of our ability, and we demand protection from you."

### STRIKE POSTPONES A REDUCTION IN FARE

One of the principal lasting effects upon the people of Columbus as a result of the strike is the postponement of further reduction in the fare. Diminished traffic, due to the disorder and the threats upon passengers, has lessened the gross earnings to a point that reduces the probability of the increase necessary to secure the lower rate of fare for which the ordinance makes provision.

The ordinance passed on Feb. 4, 1901, provides that the Columbus Railway, an underlying property of the Columbus Railway & Light Company, shall charge 5 cents for a single cash fare and also sell seven tickets for 25 cents until the annual gross receipts from fares reach \$1,750,000; thereafter the rate for tickets is to be eight for 25 cents. It was expected that the normal increase in business in 1910 would raise the total revenue to more than \$1,750,000.

The following statement was issued by the company on Aug. 12:

"The ordinance of 1901, under which the street railway company is operating, provides that when the gross receipts from fares of the Columbus Railway Company lines amount in any year to the sum of \$1,750,000, the rate of fare shall be reduced from seven tickets for a quarter to eight tickets for a quarter, or, in other words, a reduction of 14.2 per cent.

"Gross receipts from fares on the lines of the Columbus Railway Company, now operated by the Columbus Railway & Light Company, for the year 1908, amounted to the aggregate sum of \$1,592,572.02. The gross receipts for the year 1909 amounted to \$1,687,341.25, an increase of \$94,769.21, or 5.9 per cent. At the same rate of increase the gross amount for the year 1910 would be \$1,786,894.43. Therefore, with a normal rate,



of increase during the year 1910, as compared with the year 1909, the company would be required to sell eight tickets for a quarter from and after Jan. 1, 1911, because at that rate of increase the gross receipts for the current year would amount to \$1,786,894.43, an excess of \$30,894.43 above the amount fixed by the ordinance as the basis of a reduction of fares to eight tickets for a quarter.

"It is apparent, therefore, that any interference with the business of the company which will diminish its gross receipts from fares on the lines of the Columbus Railway Company during the year 1910 more than \$36,894.43 will postpone the reduction of fares to the year 1912.

"During 1909 the number of fares collected was 45,695,926. If during the year 1910 there should be the same rate of gain as there was during 1909 the number carried in 1910 would be 48,392,915. At the same rate of increase the number of fares during the year 1911 would be 51,248,096. Approximately 5 per cent of the fares are paid in cash, at the present rate paid for tickets. When the price paid for tickets is reduced it is reasonable to infer that the percentage of cash fares will be reduced.

"But even if with a reduced rate of fare the ratio between tickets and cash fares would remain the same, the number of tickets used during the year 1911 would be 48,683,292. The difference between the cost of that number of tickets when sold seven for a quarter and their cost when sold eight for a quarter would amount to the sum of \$163,312.43. Therefore, a boycott on the street railway company, which would reduce its fares during the present year to the amount of \$36,894, would cost patrons of the company during the year 1911 \$163,312.

"It is obvious, therefore, that the boycott, if continued a week or two longer, will cost the patrons of the street cars more than \$163,000 next year, an item of expense which would bear most heavily on those who do not own their vehicles and must depend for transportation to and from their work on the street cars of this city. On the other hand, it is entirely problematical whether the direct pecuniary results of such a boycott will injure the stockholders of the company at all. That would depend upon whether the loss resulting from the reduction of the price of tickets would be more than counterbalanced by the number of tickets sold.

"The boycott, if continued much longer, must certainly result in a great financial loss to the traveling public, while it may not result in any financial loss to the street railway company. The loss to the public is capable of mathematical demonstration. The loss to the company is purely a matter of speculation."

**DIVIDENDS AND OTHER BENEFITS GIVEN THE MEN**

Prior to the development of the troubles leading to the present strike the relations of the Columbus Railway & Light Company and the trainmen had been unusually friendly. With the progress toward union activities these conditions became strained until the issue became one of whether the company should continue to operate its organization as in the past or should no longer recognize its employees as individuals but treat with them through a union.

The company has maintained a profit-sharing arrangement, whereby its employees receive dividends on their wages corresponding to the rates of dividends paid to holders of the stock of the underlying Columbus Railway Company and of the present corporation, the Columbus Railway & Light Company. The Columbus Railway pays 5 per cent dividends annually on its preferred stock and a like rate on its common stock. The Columbus Railway & Light Company paid in 1909 on its one class of stock 3 per cent. The 5 per cent on the preferred and common stock of the Columbus Railway is paid as rental to that company by the Columbus Railway & Light Company. The Columbus Railway then declares dividends to its stockholders.

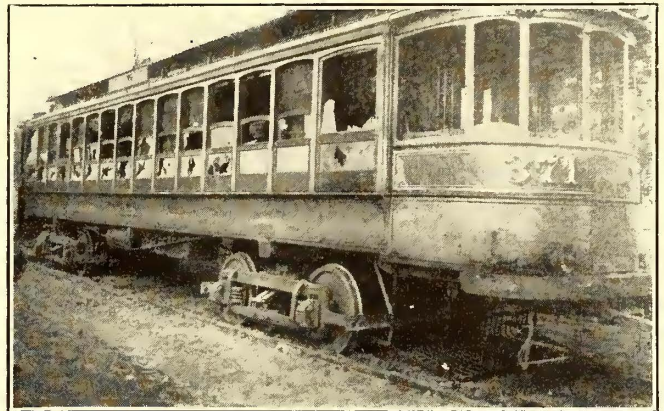
The Columbus Railway & Light Company gives to its employees, payable quarterly, the same ratio of dividends on wages earned when these dividends are paid to stockholders of the Columbus Railway Company, an amount annually equal, there-

fore, to 10 per cent on the wages earned for the year. In addition, whenever the Columbus Railway & Light Company pays a dividend on its stock the employees are given a dividend in the same ratio on wages earned.

In 1909 the total of dividends paid to employees was 13 per cent, or \$75,877. The dividends to employees have been paid by check in accordance with this plan for several years.

Besides this definite profit-sharing arrangement the company has followed the practice of furnishing conductors and motormen who have been in the employ five years one uniform suit each year. Those who have been in the employ of the company for 10 years have been given two uniform suits each year. Some instances have occurred where men have taken care of their uniforms and, instead of receiving the second uniform, have been paid the cost of a uniform in cash when a satisfactory showing of plenty of good uniforms was made.

For a number of years the company also gave each married employee a turkey at Christmas time and each single employee \$1 in silver. On account of the difficulty of securing a sufficient number of turkeys to meet the requirements and of proper distribution the company changed this plan several years ago and adopted instead the practice of depositing in a Columbus savings bank \$2 to the credit of each married man and \$1 to the credit of each single man. This plan appeared to meet



**Columbus Strike—Car Damaged by Strike Sympathizers**

with great satisfaction, and the management was surprised at the extent to which these accounts were increased by employees. The gift of the company started many men in the habit of keeping a savings account. Savings accounts were started in December, 1906. One of the trust companies with which accounts were opened for about three-fourths of the employees reported the following results as of Jan. 1, 1909:

Total number of accounts opened.....	1,581
Total deposits made by company for employees.....	\$2,800
Number accounts remaining on books.....	315
Total balance to credit of accounts.....	\$13,816.87

Another feature of the company's treatment of employees is an annual picnic. At the time of this picnic the employees and their families are furnished free transportation over the lines of the company and an outing. This usually takes place in one of the pleasure parks of the city, but the management of the park admits the employees and their families free to the park and the amusements therein.

Another concession is that employees ride on their badges when on or off duty.

The Columbus Street Railway Employees' Beneficial Association has been aided materially by the company, and has been a successful organization.

The schedule of wages for trainmen is as follows:

	Cents per hour.	With dividend. Cents per hour.
For the first three months.....	20	23
Next nine months.....	20 1/2	23 1/2
Next year and thereafter.....	21 1/2	24 1/2

**ATTITUDE OF POLICE AND TROOPS**

A remarkable feature of the strike has been the apathy of the police toward disorder by strike sympathizers and the zeal



with which they have repressed attempts of the men employed by the company to operate cars to defend themselves against attack. Many instances are reported where attacks of strike sympathizers upon cars and trainmen have been witnessed by police and allowed to develop without hindrance until they culminated in serious accident. Trainmen secured by the company to take the places of strikers have been arrested freely on the charge of carrying concealed weapons. In showing sympathy with the strikers the police have apparently been influenced by the attitude of their superiors.

The extraordinary refusal of 32 men out of the 140 regular policemen in the employ of the city to ride on the cars was followed by the belated dismissal of this part of the force sworn to protect life and property. When the men refused to obey the order of Mayor Marshall that they ride on the cars he issued a statement holding the men employed to take the places of strikers responsible for the rioting and, to the undoubted surprise of residents of Columbus as well as of other observers of the situation, expressing hope that the men would do all within their power to suppress rioting. Upon the failure of the men to obey the orders, the Mayor pleaded with them to ride on the cars for one night before they made up their minds definitely. The *Ohio State Journal* of Aug. 13, 1910, quoted Mayor Marshall as saying in reference to the mutiny of the men:

"I never met with anything like it. I see how some of the men look at the matter and deplore the affair, but there is nothing to do but to dismiss them from the service.

"The men will be given an opportunity to resign.

"I was never so stunned in my life. I had heard rumors during the afternoon that the men would refuse to obey orders, but I did not believe they would. I do not blame the men, personally. I argued with them and used all the persuasive powers I possess. I believe that they are conscientious in their refusal to go on cars.

"Of course, it will mean dismissal. Under the law the Mayor cannot dismiss men. The chief does that and then if they wish the men can appeal to the director of safety. After that there can be a hearing by the civil service commission. Personally I should be willing to let the men resign."

Notwithstanding the varying sentiments indicating the uncertainty of the action of the Mayor, the men were dismissed from the service.

The pronounced encouragement to the strikers caused by the attitude of the policemen has been seconded to some extent by the position of the State troops called to suppress the disorder, which the city authorities permitted to increase to the danger point. One regiment from Toledo contributed \$500 from the compensation received from the State and one of its officers was quoted in an interview in reference to the friendly feeling between the soldiers and the strikers. The policy adopted of reserving the State troops for emergency use, however, was regarded generally as effectual as a moral agency operating to deter extreme disorder. It was the prevailing opinion that strike sympathizers were uncertain as to the lengths to which the soldiers might go if disorder became rampant and that they therefore, curbed the tendencies to riotous attacks on life and property, which were unchecked when the city police were the only representatives of law and order to be considered. The correctness of this conclusion is shown by the fact that after the first outbreaks of disorder and the failure of the police to cope effectively with the breakers of law the troops called by Governor Harmon put a stop to the disorder. With the subsequent withdrawal of the troops rioting began anew and it continued until troops were ordered to Columbus again. It is the judgment of the people of Columbus from these experiences that the prevention of great disorder rests wholly upon the presence of the troops in the city.

To use its influence against rioting the company issued on Aug. 5 the following notice of reward for arrest and conviction of persons guilty of felonious acts:

"The Columbus Railway & Light Company hereby offers a reward of \$200, payable at any time within one year from this

date, for information which will lead to the arrest and conviction to the penitentiary of any person guilty of committing any felonious act against any of its employees or with reference to any of its property, in connection with the present strike, whether such act be a personal assault on any of its employees, or the shooting or throwing of stones or other missiles at any of its cars, or the placing of obstructions on its tracks, or interfering with its cars, tracks, rails, switches, buildings or other property, whether such unlawful act be committed in the city of Columbus or elsewhere in Franklin County."

#### EFFECT OF STRIKE IN COLUMBUS

The general population of Columbus has been greatly concerned over the effect of the disorder attending the strike upon the reputation of the city. Newspapers which have lamented the attacks upon life and property have called attention frequently to the widespread advertisements which have gone throughout the country and have made public the failure of the authorities to protect either the property of the company or innocent persons who traveled on the cars.

While leading citizens have deplored the unwholesome comment which this situation created, the merchants have felt greatly the effect upon their business. Some of the Columbus newspapers have a large circulation in the sections of Ohio tributary to the city and they have published freely cartoons calling attention to the prevailing condition of mob rule, starting headlines from newspapers in other cities and editorial comment. Strangers visiting Columbus and observing the disorder and residents of the city traveling in other parts of the country have talked without hesitation of the danger of the situation.

The merchants have felt the results in diminished purchases by residents of the city and in practically complete cessation of shoppers from outside. Travelers have found little or no business in the city, and have not remained long and the hotels have suffered from the decreased patronage. In certain localities the result of the suspended wages of trainmen who had been in the employ of the company has been felt in reduced sales by merchants, inflicting hardships upon owners of small stores. Quoted prices of real estate are said to have been reduced in districts where the greatest rioting prevailed.

Many letters have been received by the company approving its course. A typical communication said, in part:

"The strike, in my opinion, would have failed some time ago but for the encouragement given the strikers by officials, and the well-meant, but ill-gaged demands of prominent citizens for arbitration, thereby encouraging the strikers to hold out long after it was absolutely certain that their case was hopeless and that the company would not yield.

"It is clearly the duty of all good citizens to use every effort to end the strike. It is a lost cause. The city will not recover from the effects of it for years. Rioting and disorder will cease when the strike ends and not till then."

#### COMPANY WILL NOT ARBITRATE

On Aug. 17 the company, in a letter addressed to the City Council by Mr. Stewart, reiterated its declination to submit the issues to arbitration. The union representing the men had previously agreed to abide by a decision of the City Council upon the differences. Mr. Stewart said in his letter:

"This company is unwilling to submit any supposed differences between it and its employees to the decision of the City Council. In fact, there are no differences between the company and any of its present or former employees which should be submitted for decision to the City Council or to anyone else."

Various estimates have been made of the cost of the strike. The loss to the company will arise from the increased cost of operation as a result of the strike and attendant disorder, and the loss arising from destruction of property. For the latter loss the State, county or municipality may be held liable. The State has expended \$105,000 in connection with the use of the State troops and has asked for an additional \$100,000. Expenses of the city of Columbus as a result of the strike are estimated at \$75,000 to \$100,000. Bankers of Columbus have



donated \$12,500 to Franklin County, in which Columbus is located, to pay for special deputy sheriffs employed to quell disorder.

In order to secure revenue the strikers sell photographs on postal cards of incidents connected with the present strike and also with the previous strike. The illustrations on pages 326 and 327 are samples of the photographs sold by the men. Trips were made by the men to nearby cities to solicit contributions with which to support the movement.

### EXECUTIVE COMMITTEE MEETING OF THE TRANSPORTATION AND TRAFFIC ASSOCIATION

A meeting of the executive committee of the American Street & Interurban Railway Transportation and Traffic Association was held at the headquarters of the association, at 29 West Thirty-ninth Street, New York, on Tuesday, Aug. 23. Those of the committee in attendance at the meeting were: President Robert I. Todd, of Indianapolis; N. W. Bolen, of Newark; George W. Parker, of Detroit; J. N. Shannahan, of Baltimore, also the following chairmen of the committees: C. D. Emmons, of Fort Wayne, chairman of the committee on interurban rules; R. E. Danforth, of Newark, chairman of the committee on city rules; P. P. Crafts, of Clinton, Ia., chairman of the committee on express and freight traffic; M. R. Boylan, Newark, chairman of the committee on transfers and transfer information; J. H. Pardee, New York, chairman of the committee on topics.

President Todd stated that the first business before the committee was to consider the change in the name of the association to American Electric Railway Transportation & Traffic Association and the corresponding changes in the wording of the constitution which this change in the name would require. He stated that at the last meeting of the executive committee of the American Street & Interurban Railway Association a change in the name of that association to American Electric Railway Association was approved by the executive committee, which will recommend this change at the Atlantic City convention. If the parent association changes its name, it would naturally be desirable for the Transportation & Traffic Association to make a corresponding change in its name and in the clauses of its constitution where the association is mentioned by name. In addition, where the objects of the association are mentioned as now being that of taking up subjects connected with "the actual operation of street and interurban railway companies," the following words were to be added: "and the electrified sections of steam railways." Upon motion, the executive committee decided to recommend these changes to the Transportation & Traffic Association provided the proposed change should be made by the parent association.

The president then asked for reports from the chairmen of the different committees present.

#### CITY RULES

Mr. Danforth, chairman of the committee on city rules, stated that the code of city rules as revised at Denver had been carefully considered by the committee at several meetings and letters were mailed to all member-companies asking whether the code as so amended was satisfactory. Specific questions were asked and where no replies were received, follow-up letters and postal cards were sent. As a result, the committee received fairly full replies from 66 companies and 109 replies altogether. The principal amendments which the committee will recommend to the association are in Rule 2 on responsibility, Rule 10 on bell signals, Rule 101 on position of the conductor in the car, Rule 116 on making change, and Rule 213 on power off the line. The wording of Rule 2 which the committee expects to recommend is as follows:

"The motorman is held responsible (a) for the safe running of the car; (b) for the proper operation of the machinery of the car; (c) for running car according to schedule. The conductor is in charge of the passengers on the car and is held responsible (d) for the safety and convenience of the passengers;

(e) for the collection and proper accounting of fares. Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therefor."

The rule as it now appears in the code reads:

"The conductor is in charge of the car and is responsible (a) for the stopping and starting signals; (b) for the safety and convenience of the passengers; (c) for the collection and proper accounting of fares. The motorman is held responsible (a) for the safe running of the car; (b) for the proper operation of the car and its machinery; (f) for running the car according to schedule. Conductors and motormen will see that route and destination signs are properly displayed and will be held jointly responsible therefor."

Mr. Danforth said that the replies from the companies expressing an opinion on this matter were about evenly divided between the amended rule as proposed and the wording of the rule as it is at present in the rule book.

In the rule on bell signals, the committee was of the opinion that the rule should be changed so far as it relates to the backing of cars. Its proposed amendment reads as follows:

"When the car is standing and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify 'All is clear behind.' When it becomes necessary to reverse a car for a greater distance than 10 ft., motorman must take handles to the opposite end of car and operate it from that end. The conductor, under these circumstances, will change his position, that is to say, he will go to the opposite platform in order to give proper signals to motorman."

This rule as it now appears in the code reads:

"When the car is standing, and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify 'All is clear behind.' However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends."

Of the replies received, a large majority approved the amendment as recommended by the committee.

In Rule 21 on steps, the committee recommends that the rule be amended to read as follows:

"Permit no person to stand or ride on the steps, buffers, dashers, fenders or roof. Passengers should be fully inside the car or safely landed on the platform before the signal is given to start."

The rule as it now appears in the code reads:

"Permit no person to stand or ride elsewhere than in a safe place upon the car. The standing or riding of passengers upon buffers, dashers, fenders, roof or outside of a closed vestibule door is forbidden."

Of the 66 companies replying to the circular, 60 approved of the recommendation of the committee, 8 prefer the rule as printed in the code, 4 oppose the rule entirely, 1 suggested a change, and 1 stated no preference.

Through an error in the minutes of the 1909 convention, the following sentence was omitted, "Passengers should be fully inside the car or safely landed on the platform before the signal is given to start." The committee, therefore, will recommend that this sentence be added to the rule.

In Rule 101 the committee will suggest that the words "or at main entrance" be eliminated from the rule as there are comparatively few companies which use a center entrance exclusively. Mr. Danforth thought that the standard rule book of the association should be compiled and worded so as to suit the majority of companies, and if a few companies wished to modify the rules they can do so by a local rule.

In Rule 116 the committee proposes to omit the final paragraph reading "Previous to taking charge of the car, conductors will provide themselves with ——— dollars for the purpose of making change," as this is really a car-house rule and, instead, substitute the following, "Conductors will make change for passengers to the amount of ——— dollars."



The majority of those companies whose opinion could be obtained by correspondence approved this change.

For Rule 213, the committee decided to recommend the following rule:

"When the power leaves the line cars must be stopped clear of all crossings or danger points. The overhead switch must be thrown off and the light switch thrown on and the car started only when the lights burn brightly."

The rule as it now appears in the code reads:

"When the power leaves the line, the controller must be shut off, the light switch must be turned on and the car started only when the lights burn brightly, but motormen must never allow their cars to coast when power is off the line except to clear crossings or dangerous points."

In this case, the change was approved by a large majority of the companies who expressed a preference. The object of the change is to permit cars, where necessary, to coast into terminals, a short distance away, like ferries or railroad stations, to discharge passengers.

The report to be submitted by the committee at the Atlantic City convention will contain quotations from the letters received from different companies in favor and against the changes which will be recommended by the committee. This will allow the members of the association to be in possession before the meeting of the principal arguments for and against the proposed changes.

#### INTERURBAN RULES

C. D. Emmons, chairman of the committee on interurban rules, said that the committee had completed its report and was ready to submit it to the association. The committee had taken up the subject of the revision of the rules not only with member-companies of the association, but also with the State commissions from whom expressions of willingness to co-operate with the committee in the compilation and standardization of its rules had been received. Briefly, the work of the committee during the past year has been in the direction of harmonizing the rules with those of the American Railway Association. But Mr. Emmons thought that it was of even greater importance that the interurban rules should harmonize so far as possible with the city rules. It had not been possible to accomplish all that the committee wished to do during the current year, and the committee also wanted to learn whether the direction in which it had been working met the approbation of the association. It would, therefore, present a code with the modifications already made and a report of progress, hoping to have a full discussion of the rules and a vote of instructions for future work of the committee.

#### COMMITTEE ON TOPICS

J. H. Pardee, chairman of the committee on topics, presented the program of the meeting of the association printed in this paper last week. It was approved.

#### COMMITTEE ON TRANSFERS AND TRANSFER INFORMATION

M. R. Boylan, chairman of the committee on transfers and transfer information, said that some very interesting data had been received in reply to its data sheet No. 56, and that the answers showed a very wide diversity of practice. The committee expects to present an interesting report at Atlantic City.

#### COMMITTEE ON SCHEDULES AND TIME-TABLES

N. W. Bolen, chairman of the committee on schedules and time-tables, said that the committee had completed its work and its report was already in the hand of the secretary of the association. This report covers the following, among other, topics:

Schedules for different hours of the day, methods of checking the running time, practice in regard to changes in running time, methods of making passenger counts, practice in regard to the official or officials authorized to make changes in Sunday and holiday schedules, definitions of straight runs and swing runs, various methods of assigning regular runs, extra runs and tripper runs, the organization of the traffic departments of different companies, methods of constructing time-tables, etc.

#### COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC

P. P. Crafts, chairman of the committee on express and freight traffic, reported that the committee had held meetings in Cleveland and Toledo and had completed its report. This report was based on data sheet 59, and the answers received from companies showed a wide variety of practice in regard to the methods of separating the expenses of the passenger business from the freight and express business. In some cases companies divided the expenses on a basis of gross earnings, in other cases a mileage basis was used, in other cases combinations of the two previous methods were employed or there were arbitrary divisions. Mr. Crafts said that the committee soon concluded that the most important work which it could undertake was this question of the proper division of expenses, and its report will be devoted largely to a recommended basis for accomplishing this result.

#### COMMITTEE ON PASSENGER TRAFFIC AND THE TRAINING OF TRANSPORTATION EMPLOYEES

F. W. Coen, chairman of the committee on passenger traffic, and G. O. Nagle, chairman of the committee on the training of transportation employees, reported by letter to the president of the association that the reports of these committees were being compiled and would be forwarded to the secretary soon.

#### SPECIAL PAPERS AND OTHER BUSINESS

The secretary reported that he had received a paper from George L. Radcliffe, of Cleveland, on the use of metal tickets. This paper gives an extended history of the use of metal tickets in Cleveland, and discusses the relative merits of metal and paper tickets so far as difficulty of counterfeiting, cost of tickets, cost of counting tickets, etc., are concerned.

It was decided to distribute to the members of the association before the convention as many of the reports and papers as possible.

### CONFERENCE ON UNIFORM ACCOUNTS IN NEW JERSEY

A conference between the Board of Public Utility Commissioners of New Jersey and representatives of electric railway companies in reference to a uniform system of accounts was held at Trenton on Aug. 18. Commissioner Thomas N. Hillery presided over the meeting.

Philander Betts, chief inspector of the commission, recommended the adoption of the standard classification of accounts of the American Street & Interurban Railway Accountants' Association. He said that every company should keep a depreciation account. While the commission did not have power to fix rates, it had power, he said, to correct discriminations in rates and the maintenance of depreciation accounts made the income account show more fairly what the earnings were than if no provision for depreciation was made.

J. M. Campbell, of Atlantic City, suggested the adoption of a uniform fiscal year and the opinion was generally expressed that either June 30 or Dec. 31 should end the year.

Commissioner Hillery, in closing the conference, said that he would report to the commission and the subject would be given further consideration.

Among those present, representing the companies, were the following: C. L. S. Tingley, Bridgeton & Millville Traction Company; David C. Carver, Elizabeth & Trenton Railway; M. R. Boylan, Public Service Railway; G. B. Cade, Atlantic Coast Electric Railroad; J. B. Livingston, Jersey Central Traction Company; George H. Thomas, Millville Traction Company; J. A. McCarthy, New Jersey & Hudson River Railway & Ferry Company, and J. E. Price, Ocean Street Passenger Railway.

The progress of the Quebec Railway, Light & Power Company, Quebec, Que., was reviewed in the *Montreal Daily Witness* recently. Particular attention was given to the new work being done by the company, all of which is being carried out under the direction of C. E. A. Carr, general manager.



## MEETING OF THE STANDARDIZATION COMMITTEE OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

H. H. Buckman, chairman of the standardization committee of the Central Electric Railway Association, has called a meeting of the committee to be held at the Hotel Anthony, Fort Wayne, Ind., on Thursday, Sept. 1 at 9:30 a. m., for the purpose of discussing further the design of a standard coupler and attachments for electric railway cars. The committee desires to recommend something tangible at the next meeting of the Central Electric Railway Association to be held in Indianapolis on Sept. 22. An invitation is extended to all railroad representatives interested in this movement to be present at the meeting. The committee will be glad to have any members or others interested in the subjects to be discussed to contribute any information which they may have by letter, if they cannot attend in person. Communications may be addressed to any of the following members of the committee and should be sent not later than Tuesday, Aug. 29:

H. H. Buckman, chairman, Louisville & Northern Railway, New Albany, Ind.; R. N. Hemming, secretary, Ohio & Southern Traction Company, Columbus, Ohio; L. W. Jacques, Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.; L. M. Clark, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.; W. E. Ralston, Cleveland, Southwestern & Columbus Railway, Elyria, Ohio; Fred Heckler, Lake Shore Electric Railway, Fremont, Ohio; W. N. Crayden, Western Ohio Railroad, Wapakoneta, Ohio; R. C. Taylor, Indiana Union Traction Company, Anderson, Ind.

At the meeting of the Central Electric Railway Association held at Toledo on May 26, 1910, the standardization committee made the following recommendations with regard to automatic couplers:

1. The self-centering feature of couplers should be dispensed with.
2. Couplers must be made to couple and uncouple automatically with all types of M. C. B. contour couplers, whether used by steam or traction roads.
3. A device should be adopted for holding couplers on center when coupling with steam railroad cars.
4. An open knuckle for shackle bar connection should be used.
5. The draft rigging should meet M. C. B. requirements, and the drawbar anchorages should be equivalent in strength to M. C. B. requirements.
6. Couplers must not uncouple when cars are being pushed around a curve of 35 ft. center radius.
7. There should be an arrangement to open and release the knuckle without requiring the operator to pass between cars.
8. The depth of the face of the knuckle should be 11 in. minimum and 15 in. maximum. A flexible drawbar carrier should be installed and there should be a locking device in the coupler head to keep the couplers from uncoupling vertically.
9. The height of drawbar center should be 31½ in. minimum and 34½ in. maximum above the head of the rail.
10. The coupling center of the coupler should be at least 11 1/16 in. from the nearest point of the buffer face.
11. The air hose angle fitting should be placed with its coupling center 12 in. from the face of the angle air brake hose fitting and all hose and hose couplings should be M. C. B. standard.
12. Whenever possible the radius of the bumper should be 5 ft. to permit of uniformity in couplers and to maintain a uniform distance between bumper face and the coupling centers of couplers.
13. Adjustable continuous tie rods should be installed from coupler to coupler passing from the base, or extreme bottom of anchorage of the coupler, thence over the bolster to the coupler on the other end of the car.
14. Couplers should be placed on both ends of the cars.
15. The association should purchase and have on file at the secretary's office the dictionary and the proceedings of the M. C. B. Association.

16. The standards should be published after adoption.
- At this meeting, the following subjects were also recommended as suitable for study by the standardization committee:
1. A standard drawbar anchorage or attachment to be used with the proposed standard drawbar.
  2. A standard marker or tail lamp bracket suitable for either oil or electric lamps.
  3. A standard jumper connection for trail cars which will not pull out and will not endanger life.
  4. A uniform plug, socket and hanging device for electric headlights.
  5. Improved destination signs for cars.
  6. The design of a standard symbol which could be used as an identification mark for all electric railway material to be accompanied by the initial of the company to which the material belongs.

## POSSIBLE CONNECTION OF MR. BEGGS WITH THE ST. LOUIS CAR COMPANY

An important announcement was made last week that under certain circumstances, John I. Beggs, president and general manager, The Milwaukee Electric Railway & Light Company and a director in the North American Company which controls the United Railways of St. Louis, might become connected in an administrative and financial capacity with the St. Louis Car Company. Bankers in St. Louis who are financially interested in the St. Louis Car Company have for some time been conducting negotiations with George J. Kobusch, looking to the reorganization of the company and an extension of work through the introduction of considerable new cash capital. It is supposed to be largely through the influence of these bankers, coupled with the great interest which the North American Company has in the growth of St. Louis, that Mr. Beggs was led to consider the proposition. The conditions under which he will take an interest in the company are clearly defined in the following statement which was made Aug. 15 by him to the *St. Louis Post-Dispatch* and was published in the daily papers of St. Louis on Aug. 16:

"Finally yielding to long-continued and increasing pressure of many of the largest and most influential bankers, merchants and manufacturers of St. Louis who are vitally interested in its growth and prosperity and the strengthening and enlargement of its manufacturing interests, which, as you know, I have repeatedly and strongly urged for several years, I have tentatively agreed, under certain circumstances and if certain financial arrangements are perfected and consummated, to take, in association with Mr. Kobusch, a large financial and administrative interest in the reorganization, strengthening and enlargement of the St. Louis Car Company. This would not change my relations with the North American Company or the Milwaukee properties, at least not for a considerable length of time."

The St. Louis Car Company is greatly to be congratulated upon the tentative offer made by Mr. Beggs and if this proposed arrangement should become a reality, Mr. Beggs' well-known executive and administrative ability, as well as wide knowledge of railway conditions, will be of great value to the company as well as to the entire electric railway industry.

## HEADQUARTERS SELECTED FOR THE ENGINEERING ASSOCIATION

The headquarters of the American Street & Interurban Railway Engineering Association will be at the Chalfonte Hotel, Atlantic City, instead of at the Hotel Dennis, as originally announced.

During the month of June, 1910, 63,717 steam passenger trains were run in New York State and 88 per cent were on time at division terminals. In June, 1909, only 55,551 trains were run, and in June, 1908, 50,122 trains were run.



**CAPITALIZATION, CARS AND MILEAGE OF ELECTRIC RAILWAYS IN THE UNITED STATES**

Totals of some of the statistics published in the 1910 edition of the *American Street Railway Investments* have been compiled and are shown in the supplement published herewith. These show a total of 1253 railway companies in 1909 or an increase of one company over the preceding year. The number of miles of track was increased from 40,247 in 1908 to 40,490 in 1909 or 0.6 per cent. The total number of cars showed an increase somewhat larger than the addition in trackage. The number reported was 91,153 in 1909 as compared with 89,216 in 1908 or a gain of 2.1 per cent.

The amount of funded debt outstanding in the United States was \$2,224,800,236 in 1909, an increase for the year of \$112,356,150 or 5.3 per cent. The amount of capital stock outstanding, however, showed a decrease. It stood at \$2,427,935,397 in 1909, a decrease of \$13,956,660 for the year. This change is due largely to a different method of compilation of the statistics relating to Connecticut. The capital stock of street railway companies that were merged into the Consolidated Railway Company, which was later absorbed by the New York, New Haven & Hartford Railroad, cannot now be estimated with reasonable accuracy. The Connecticut figures, therefore, show \$22,322,300 stock in 1909 as compared with \$36,524,100 capital stock in 1908 or a decrease of \$14,201,800. Except for this inability to estimate the proportion of capital stock representing the street railway properties which have been absorbed in this manner, the total would probably show an increase. The funded debt of these lines is included as that is readily ascertainable from the figures at hand.

During the fiscal year covered by the figures of Massachusetts companies three or more railways in that State were consolidated, effecting a decrease in stock. There was also a decrease due to the fact that the stock of several companies whose securities are owned entirely by a holding company has been eliminated from the report for the first time this year. In this instance the stock of the holding company has been included although it was less than the total stock of the railway companies combined.

In the compilation of these statistics for the year 1908 the stock of the Public Service Corporation of New Jersey has been included, but in 1909 only the stock of the newly formed subsidiary Public Service Railway was used. The latter company now operates the electric railways controlled by the Public Service Corporation.

The large decrease in capital stock for companies in New York State is due to the elimination of two or more companies which are now a part of the New York State Railways but which were reported separately in the edition for the previous year. The large increase in outstanding bonds in New York is the result of new construction work, the completion of extensions and other improvements.

The mileage shown for lines in Ohio is believed to be nearly a correct estimate. It was compiled by investigations of the reports listed under Ohio and elimination of a reasonable proportion for the sections of railways located in other States. The same division of interstate properties explains the decrease in stock in Ohio.

The statement of funded debt in Maryland in 1909 does not include \$13,946,000 income bonds of the United Railways & Electric Company of Baltimore. These bonds were included in the previous year.

Changes in the totals of Virginia properties are due in part to the reorganization of the system in Richmond, which involved a scaling of securities.

In the compilation of the results for Nebraska the operations of one company, included in the 1908 returns, were allotted to the adjoining State of Iowa as the property, although located in two States, has most of its mileage in Iowa. Another company with over \$500,000 stock, included in the 1908 returns, was eliminated in 1909.

The 1909 returns of Utah are affected by the elimination of

one property which was included in the previous year. A decrease was shown in the outstanding bonds of another company.

The stock and mileage totals of Arkansas were reduced by the elimination of one company that was included in the previous year.

A projected railway, with \$8,000,000 of capital stock, included in the 1908 returns for Wisconsin, was eliminated in 1909.

In Kansas one company which showed in 1908 \$4,000,000 stock, reported in 1909 that no securities were outstanding and the totals for that State, therefore, are affected to a corresponding degree.

GROSS EARNING POWER OF URBAN ROADS

An article entitled "Gross Earning Power," which appears in the 1910 edition of *American Street Railway Investments*, showed the following 10 companies with gross revenues of \$6,000,000 or over in 1909: Boston Elevated Railway, Brooklyn Rapid Transit Company, Chicago Railways Company, Detroit United Railway Company, Interborough Rapid Transit Company, Philadelphia Rapid Transit Company, Pittsburg Railways Company, Twin City Rapid Transit Company, United Railways Company of St. Louis, and United Railways & Electric Company, Baltimore. The per cent of increase in gross revenue for the foregoing 10 companies was 12 per cent in 1906 over 1905, 7.7 per cent in 1907 over 1906, 2.3 per cent in 1908 over 1907, 3.6 per cent in 1909 over 1908 and 27.9 per cent in 1909 over 1905. The total gross earnings were, in 1905, \$105,223,534; in 1906, \$117,829,774; in 1907, \$126,934,285; in 1908, \$129,878,049; in 1909, \$134,615,487.

The following 20 companies with gross revenues of less than \$5,000,000 but not below \$500,000 were also shown:

Birmingham Railway, Light & Power Company, Capital Traction Company, Washington, D. C., Cincinnati Traction Company, Columbus Railway & Light Company, Denver City Tramway Company, Georgia Railway & Electric Company, Grand Rapids Railway Company, Houston (Tex.) Electric Company, Indianapolis Traction & Terminal Company, Knoxville Railway & Light Company, Louisville Railway Company, Milwaukee Electric Railway & Light Company, Mobile Light & Railroad Company, New Orleans Railway & Light Company, Schenectady Railway Company, Scranton (Pa.) Railway Company, Toledo Railways & Light Company, United Traction Company, Albany, N. Y., United Traction Company, Reading, Pa., Worcester (Mass.) Consolidated Street Railway Company.

The per cent of increase for these was 11.3 per cent in 1906 over 1905, 10 per cent in 1907 over 1906, 0.5 per cent in 1908 over 1907, 6.4 per cent in 1909 over 1908, and 30.8 per cent in 1909 over 1905.

The total gross earnings were, in 1905, \$33,674,607; in 1906, \$37,465,016; in 1907, \$41,215,904; in 1908, \$41,405,119; in 1909, \$44,051,719.

COMPANIES WITH GROSS REVENUES OF OVER \$1,000,000

The 1910 edition of *American Street Railway Investments* contained the following table of companies with gross revenues in 1909 of over \$1,000,000.

	1908.	1909.
ALABAMA.		
Birmingham Railway, Light & Power Co.....	\$2,167,546	\$2,286,369
CALIFORNIA.		
Pacific Gas & Electric Co., San Francisco.....	12,853,817	13,332,501
United Railroads of San Francisco.....	6,866,303	7,455,965
United Rys. Investment Co., San Francisco.....	1,558,789	1,830,685
COLORADO.		
Denver City Tramway Co.....	3,152,567	3,374,132
CONNECTICUT.		
Connecticut Company (The), New Haven.....	6,961,436	6,841,425
DISTRICT OF COLUMBIA.		
Capital Traction Co., Washington.....	1,855,974	2,038,210
Washington Railway & Electric Co.....	3,720,573	4,080,064
GEORGIA.		
Georgia Railway & Electric Co., Atlanta.....	3,339,021	3,673,007
ILLINOIS.		
Aurora, Elgin & Chicago R. R. Co., Chicago....	1,400,892	1,467,215
Chicago City Railway Co.....	*9,195,783	9,094,048
Chicago Consolidated Traction Co.....	11,235,307	2,135,583
Chicago Railways Co.....	11,037,071	12,442,882
East St. Louis & Suburban Co., E. St. Louis...	2,009,514	2,035,790
Illinois Traction Co., Champaign.....	4,098,621	4,752,082
Met. W. Side Elevated Ry. Co., Chicago.....	2,746,840	2,818,430

\*13 months ending Jan. 31, 1909.  
 †June 25 to Dec. 31, 1908.



	1908.	1909.
Northwestern Elevated R. R. Co., Chicago.....	2,463,188	2,540,883
South Side Elevated Railroad Co., Chicago.....	2,241,690	2,234,973
Union Railway, Gas & Electric Co., Rockford.....	.....	2,820,349
Western Railways & Light Co., Galesburg.....	1,094,570	†1,262,096
INDIANA.		
Ft. Wayne & Wabash Val. Trac. Co., Ft. Wayne.	1,322,720	1,414,526
Indiana Union Traction Co., Anderson.....	1,902,330	2,103,018
Indianapolis Traction & Terminal Co.....	2,673,436	2,861,283
Terre Haute, Indianapolis & Eastern Traction Co., Indianapolis .....	.....	2,456,995
Terre Haute Traction & Light Co.....	1,028,157	1,072,169
IOWA.		
Tri-City Railway & Light Co., Davenport.....	1,819,077	2,039,488
KENTUCKY.		
Louisville Railway Co.....	2,758,555	2,909,132
LOUISIANA.		
New Orleans Railway & Light Co.....	5,968,498	6,034,325
MARYLAND.		
United Railways & Electric Co. of Baltimore....	6,838,042	7,212,474
MASSACHUSETTS.		
Boston Elevated Railway Co.....	14,074,696	14,493,853
Boston & Northern Street Ry. Co., Boston.....	4,662,562	4,791,809
Massachusetts Electric Companies, Boston.....	7,809,010	8,052,355
Old Colony Street Railway Co., Boston.....	2,935,599	2,934,281
Springfield Street Railway Co.....	1,317,371	1,412,684
Worcester Consolidated Street Railway Co.....	1,026,143	1,702,657
MICHIGAN.		
Detroit United Railway.....	7,114,760	8,047,555
Grand Rapids Railway Co.....	940,645	1,029,011
Michigan United Railways Co., Jackson.....	943,324	1,026,796
MINNESOTA.		
Twin City Rapid Transit Co., Minneapolis.....	6,399,509	6,969,775
MISSOURI.		
Kansas City Railway & Light Co.....	6,175,796	6,627,977
United Railways Co. of St. Louis.....	10,593,166	11,111,431
NEBRASKA.		
Omaha & Council Bluffs St. Ry. Co., Omaha....	2,304,162	2,328,951
NEW JERSEY.		
Public Service Corp. of New Jersey, Newark...	24,267,687	26,560,451
Public Service Railway Co., Newark.....	10,989,970	12,008,680
West Jersey & Seashore R. R. Co., Camden.....	5,114,889	5,542,101
NEW YORK.		
American Light & Traction Co., New York.....	2,723,064	3,345,441
Brooklyn Heights Railroad Co.....	7,101,313	6,833,232
Brooklyn, Queens County & Suburban Railroad Co., Brooklyn .....	1,789,980	1,355,267
Brooklyn Rapid Transit Co.....	20,548,390	20,300,270
Brooklyn Union Elevated Railroad Co.....	6,853,057	7,029,474
Coney Island & Brooklyn R. R. Co., Brooklyn..	1,592,001	1,479,173
Forty-second Street, Manhattanville & St. Nicholas Avenue Ry. Co., New York.....	1,171,463	1,240,583
Interborough-Metropolitan Co.....	3,348,044	3,317,581
Interborough Rapid Transit Co., New York.....	25,279,469	27,160,036
Long Island Railroad Co., Long Island City....	9,818,544	10,898,371
Metropolitan Street Railway Co., New York....	.....	13,194,733
Nassau Electric Railroad Co., Brooklyn.....	3,434,132	3,847,662
New York State Railways, Rochester.....	2,991,051	3,803,427
North American Co., New York.....	1,723,186	2,023,418
Schenectady Railway Co.....	850,440	1,015,400
Syracuse Rapid Transit Railway Co.....	1,300,326	1,417,063
Third Avenue Railroad System, New York.....	\$2,231,303	3,579,585
Union Railway Co., New York.....	1,590,156	1,921,359
United Traction Co., Albany.....	2,145,220	2,165,261
Utica & Mohawk Valley Railway Co., Utica.....	1,089,343	1,193,806
OHIO.		
Cincinnati Traction Co.....	4,428,278	4,731,731
Cleveland Railway Co.....	5,062,878	6,311,022
Columbus Railway & Light Co.....	2,289,296	2,577,203
Mahoning & Shenango Railway & Light Co., Youngstown .....	1,747,927	1,966,066
Northern Ohio Traction & Light Co., Akron....	1,890,473	2,177,642
Ohio Electric Railway Co., Cincinnati.....	.....	2,963,246
Toledo Railways & Light Co.....	2,542,111	2,733,177
OREGON.		
Portland Railway, Light & Power Co.....	4,351,676	4,818,022
PENNSYLVANIA.		
Lehigh Valley Transit Co., Allentown.....	1,087,277	1,103,421
Philadelphia Co., Pittsburg.....	16,583,425	18,247,516
Philadelphia Rapid Transit Co.....	18,557,503	18,797,993
Pittsburg Railways Co.....	9,846,984	9,342,677
Scranton Railway Co.....	1,183,687	1,172,953
West Penn Railways Co., Pittsburg.....	1,551,138	1,275,173
Wilkes-Barre & Wyoming Valley Traction Co., Wilkes-Barre .....	1,000,273	1,017,475
RHODE ISLAND.		
Rhode Island Co. (The), Providence.....	4,217,022	4,192,958
TENNESSEE.		
Memphis Street Railway Co.....	1,627,648	1,719,609
Nashville Railway & Light Co.....	1,597,030	1,724,380
TEXAS.		
Dallas Electric Corporation.....	1,169,967	1,320,122
Galveston-Houston Electric Co., Galveston....	1,088,447	1,206,543
Northern Texas Electric Co., Fort Worth.....	1,080,577	1,259,551
UTAH.		
Utah Light & Railway Co., Salt Lake City.....	1,925,935	2,053,511
VIRGINIA.		
Norfolk & Portsmouth Traction Co., Norfolk....	1,877,930	1,911,938
WASHINGTON.		
Puget Sound Electric Railway Co., Tacoma.....	1,694,973	1,869,096
Seattle Electric Co.....	4,520,488	5,854,175
Spokane & Inland Empire R. R. Co., Spokane...	1,146,177	1,269,100
Washington Water Power Co., Spokane.....	2,464,118	2,794,159
WISCONSIN.		
Milwaukee Electric Railway & Light Co.....	3,991,105	4,355,007
Milwaukee Light, Heat & Traction Co.....	1,471,477	1,519,781
CANADA.		
Dominion Pwr. & Transm. Co., Hamilton, Ont..	1,600,312	1,691,696
Montreal Street Railway Co.....	3,677,432	3,874,838
Toronto Railway Co.....	3,610,273	3,926,828
Winnipeg Electric Railway Co.....	2,206,095	2,623,731
CUBA.		
Havana Electric Railway Co.....	2,002,108	2,192,835
PHILIPPINE ISLANDS.		
Manila Elec. R. R. & Ltg. Corp. (The).....	1,127,341	1,141,688

†11 months ending Nov. 30, 1909.  
\$Jan. 12 to Sept. 30, 1908.

## TRANSPORTATION ARRANGEMENTS FOR ATLANTIC CITY CONVENTION

The president of the American Street & Interurban Railway Association has appointed the following local committees on transportation arrangements at the time of the Atlantic City convention next October:

New York City: W. G. Gove, chairman, Brooklyn, N. Y.; J. H. Pardee, New York, N. Y.; T. N. McCarter, Newark, N. J.; E. C. Foster, New York, N. Y.

New York State, exclusive of New York City: M. C. Brush, chairman, Buffalo, N. Y.; E. F. Peck, Schenectady, N. Y.; E. S. Fassett, Albany, N. Y.

Philadelphia and vicinity: Chas. O. Kruger, chairman, Philadelphia, Pa.; H. J. Crowley, Philadelphia, Pa.; John Blair MacAfee, Norfolk, Va.; John A. Rigg, Philadelphia, Pa.

New England States: C. H. Hile, chairman, Boston, Mass.; Calvert Townley, New Haven, Conn.; H. C. Page, Worcester, Mass.; L. S. Storrs, Springfield, Mass.; Robert S. Goff, Boston, Mass.

Middle Atlantic States, including Delaware, Maryland, Virginia and District of Columbia: H. W. Fuller, chairman, Washington, D. C.; J. N. Shannahan, Baltimore, Md.; Wm. Northrop, Richmond, Va.; E. C. Hathaway, Norfolk, Va.

Southeastern States, including North Carolina, South Carolina, Georgia and Florida: G. W. Brine, Atlanta, Ga.

Central Electric Railway Association Territory, including Indiana, Ohio, Michigan and Western Pennsylvania: Geo. Whysall, chairman, Marion, Ohio; Robert I. Todd, Indianapolis, Ind.; C. D. Emmons, Ft. Wayne, Ind.; Dana Stevens, Cincinnati, Ohio; P. N. Jones, Pittsburgh, Pa.; F. W. Brooks, Detroit, Mich.; E. F. Schneider, Cleveland, Ohio; F. W. Brown, Jackson, Mich.; H. A. Nicholl, Anderson, Ind.; M. J. Insull, New Albany, Ind.

Chicago, including northern Illinois and Wisconsin: J. M. Roach, Chicago, Ill.; E. C. Faber, Wheaton, Ill.

Central Northwestern States, including Minnesota, North Dakota, South Dakota and Iowa: L. D. Mathes, Dubuque, Ia. St. Louis and Kansas City, including Missouri and southern Illinois: Capt. Robert McCulloch, chairman, St. Louis, Mo.; L. C. Haynes, East St. Louis, Ill.; C. F. Holmes, Kansas City, Mo.

Southwestern States, including Oklahoma, Arkansas, Louisiana, Texas and Arizona: D. A. Hegarty, chairman, Little Rock, Ark.; H. T. Edgar, Ft. Worth, Tex.; W. J. Jones, Austin, Tex.

Colorado, Utah, Nebraska and Kansas: C. K. Durbin, chairman, Denver, Col.; J. H. Humpe, Lincoln, Neb.

California: C. N. Black, chairman, San Francisco; Howard E. Huntington, Los Angeles, Cal.; John A. Britton, San Francisco, Cal.

Washington, Oregon and Montana: F. I. Fuller, chairman, Portland, Ore.

Canada: W. G. Ross, Montreal, Que.

The American Street & Interurban Railway Manufacturers' Association has appointed the following chairmen and members of local committees in each of the districts who will serve jointly with the committees appointed by the American Association:

New York City: W. L. Conwell, chairman, C. R. Ellicott, Bertram Berry, Thomas Farmer, Jr.

New York State and Canada: Cornell S. Hawley, chairman. Philadelphia, Middle Atlantic and Southeastern States: William H. Heulings, Jr., chairman.

Central Electric Railway Association Territory, St. Louis, Kansas City and Southwestern States: Arthur S. Partridge, chairman.

New England States: Charles C. Peirce, chairman.

Chicago, Western and Northwestern States and California: J. W. Porter, chairman; L. E. Gould and Hiram Kenfield.

Special trains will be run from New York, Boston, Chicago and St. Louis. The only arrangements completed so far for



COMMUNICATION

NOSING OF ELECTRIC LOCOMOTIVES

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY,  
PITTSBURGH, PA., Aug. 18, 1910.

TO THE EDITORS:

In the issue of the ELECTRIC RAILWAY JOURNAL for Aug. 6 there is an editorial on the subject "Electric Locomotive Problems." Several points in this editorial invite comment.

1st. Does the drawbar angularity produce nosing on curves? This can be answered in the negative, because nosing does not occur on curves. A locomotive, whether steam or electric, that is nosing on tangent track will steady down when it runs into a curve, even though the running speed is not reduced. Also a

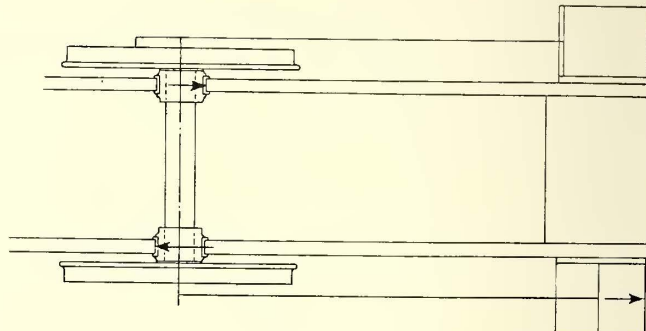


Fig. 1

locomotive when running with no trailing load will nose at least as badly as when hauling a car, which of itself has good riding characteristics.

2d. Does the unbalanced piston load on the two sides of the cylinder saddle produce nosing? This involves a definition of the term "nosing."

The spring-borne parts of the locomotive may skew and slide sideways relative to the wheels with a pendulum regularity, keeping time with the reversals of the piston loads, without particularly effecting the flange pressure exerted by the various wheels against the rail head. This action is not nosing in the sense in which the term is used in this discussion. Nosing is a more or less destructive action in which the rails are alternately subjected to flange pressures tending to spread the gage.

Fig. 1 shows that in a horizontal plane, the piston load, con-

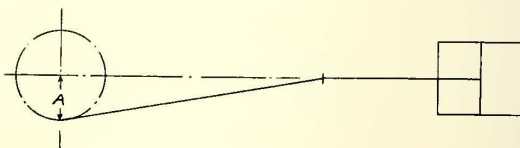


Fig. 2

sidered statically, produces only internal stress in the locomotive framing and can have no effect in skewing the entire locomotive in the gage.

When the driver hub plates are new, so that the transverse clearances between them and the journal boxes are small, and when the brasses fit snugly on the journals, there will be little transverse movement of the spring borne parts, for it is evident that the various forces indicated are in equilibrium.

As the engine wears, however, there will be a general increase in all clearances. Then the tendency of the unbalanced piston loads will be to skew the spring-borne parts and axles relative to each other, also to produce a transverse sliding of the spring borne parts on the axles.

If these movements are violent enough to take up the clearances, bringing up with a shock at the limit, before the moved parts are caught and returned by the next reversal of the piston loads, then a transverse blow is delivered to the rail and a true nosing tendency may exist. This has been noted somewhat at length in order to show that the apparent nosing, so frequently

these special trains are for the special train to be run from St. Louis. The train will be run over the Pennsylvania Lines and will be in charge of the following committee:

Capt. Robt. McCulloch, chairman, president, United Railways Company, St. Louis.

L. C. Haynes, vice-president, East St. Louis & Suburban Railway Company, East St. Louis, Ill.

John M. Egan, president, Metropolitan Street Railway, Kansas City, Mo.

C. F. Holmes, president, Kansas City-Western Railway, Kansas City, Mo.

D. A. Hegarty, general manager, Little Rock Railway & Electric Company, Little Rock, Ark.

Anton H. Classen, president, Oklahoma Railway, Oklahoma City, Okla.

H. T. Edgar, manager, Northern Texas Traction Company, Ft. Worth, Tex.

W. J. Jones, president, Austin (Tex.) Electric Railway.

Arthur S. Partridge, street railway supplies, St. Louis.

It will be composed of a composite car with bathroom, barber, buffet, and library, a library smoking car, baggage car, standard Pullman sleeping cars, compartment observation sleeping car and dining cars. A maid will be in attendance on the train. All cars will be lighted with electricity with lights in each berth and electric fans in each car. By special arrangement, members of the party will have access to their baggage in the baggage car, if desired. Dining cars will serve meals à la carte, en route, except a special table-d'hôte dinner the first night.

The train will run on the following schedule:

Leave St. Louis, Saturday, Oct. 8, 1 p. m.

Leave Terre Haute, Ind., Saturday, Oct. 8, 5:10 p. m.

Leave Indianapolis, Ind., Saturday, Oct. 8, 7:10 p. m.

Leave Columbus, Ohio, Sunday, Oct. 9, 12:30 a. m.

Leave Pittsburgh, Pa., Sunday, Oct. 9, 7:05 a. m.

Leave Philadelphia, Pa., Sunday, Oct. 9, 3:20 p. m.

Arrive Atlantic City, Sunday, Oct. 9, 5:42 p. m.

The railroad fare from St. Louis to Atlantic City and return will be \$33.40. Tickets will be sold at this low rate from Oct. 6 to 9, good returning up to Oct. 18. The sleeping car rates from St. Louis to Atlantic City will be: Berth, \$6; compartment, \$17; drawing-room, \$21. The return trip will be made on regular trains. Sleeping car reservations for the return trip can be made after arrival at Atlantic City through J. S. Murphy, passenger agent of the Pennsylvania Railroad at Atlantic City. Applications for sleeping car accommodations on the special train from St. Louis should be sent in at an early date to Arthur S. Partridge, New Bank of Commerce Building, St. Louis, Mo.

SUBURBAN ELECTRIC RAILWAY MAGAZINE OF AMERICA

A number of manufacturers of electric railway apparatus have received during the past two weeks a request for advertisements from a paper with the name given above and purporting to be issued in Syracuse. The magazine is said to have a circulation of 10,000 copies, to reach all general electric railway officers and to be "in close touch with the Beebe electric railway system." It is also said to be the official publication of the Suburban Electric Railways Association of New York State, and the claim is made that electric railway companies of the State are interested in the magazine and that the Beebe lines are pushing it as best they can, and contribute very largely to its success.

Investigation showed that the interest of the Beebe lines is limited to \$15, which was paid for a page advertisement in the magazine and that the magazine has no official connection with the so-called Beebe syndicate lines; nor is it published, so far as could be learned, with the authority of any of the other New York State railways. So far as we know, also, no association of electric railway companies in New York State has been formed under the name of the Suburban Electric Railways Association.



noted in steam locomotives, may have no damaging effect on the track.

The vertical component of the pressure on the cross-head, indicated by *A* in Fig. 2, has a tendency to oscillate the spring borne parts, around an axis parallel to the rails. This force, however, is small compared with the piston load and is built up much more gradually than the piston load. Furthermore, at high speed this component is reduced on account of the earlier cut-off and any wire-drawing of the steam that may occur. There is, however, some possibility that this component will



Fig. 3

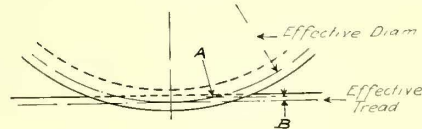


Fig. 4

noticeably contribute to the production of nosing actions and the unbalanced reciprocating parts of the steam locomotive unquestionably tend to set up nosing actions.

All the nosing tendencies referred to above are in phase with the wheel revolutions and are independent of track irregularities and of the time of transverse vibration, which is characteristic of the locomotive as a whole. This point will be referred to again later.

3d. Why does nosing occur in an electric locomotive? Before suggesting a possible reason it will be well to note that when a locomotive is nosing and the power is cut off, the nosing disappears before any material reduction of speed occurs. The nosing action represents a definite loss of energy and a continual energy input is required to maintain this nosing action.

When a track defect starts an unfortunately proportioned locomotive to nosing, then it is entirely possible for a locomotive on tangent track, which is fully up to the standard, to not only maintain a nosing action, but to hit the rail harder with every swing. If the nosing is cumulative and the power is not shut off a derailment will result.

Irrespective of the wheel arrangement on the locomotive; let the leading driver on the right side be suddenly displaced transversely by a rail defect with a sufficient force to crowd its mate hard against its rail, then the fillet of the left leading driver will ride up onto its rail. As the fillet climbs the rail the tangent to the surface of contact between the rail and the wheel becomes more and more inclined as indicated in Fig. 3. This elevation of the wheel and any deflection of the rail, wheel, axle, locomotive frame, etc., represent stored energy. The elevated wheel is then rolling on a diameter larger than the tread this being marked the effective diameter in Fig. 4. The actual contact *A*, between the flange and rail will occur at a point above the effective tread and through the distance *B*, a climbing tendency will exist. This tendency will co-operate with the original disturbing transverse force to still further elevate the wheel with an accompanying storage of energy.

As soon as the wheel reaches the highest point to which it can climb under the existing conditions, it is in a state of unstable equilibrium and starts downward and toward the other rail, this action being assisted by the fact that the effective diameter, which is larger than the tread on the right-hand wheel, has been swinging the left-hand wheel ahead and to the right, as far as the clearances will permit.

As the wheel that was elevated drops and retreats from its rail, the stored energy, less friction loss, is redelivered and accelerates the return to the right-hand rail.

If the return to the right is as severe as the first displacement to the left, then a nosing action has been established. If the return is more severe than the original disturbance then the action is cumulative. There are other forces of minor importance that might be considered in connection with nosing action but which would be out of place in this brief discussion.

If we assume, say the M. C. B. standard shape of flange, nosing is a function of flange pressure and cannot occur with any given locomotive until flange pressures of a certain sever-

ity are in evidence. Then any feature of design tending toward the reduction of flange pressure will tend to eliminate nosing.

Some of the features which do tend to this reduction of flange pressure are:

(A) Increase of distance between the center of gravity of spring-borne parts and the point of transverse restraint of spring-borne parts.

(B) In truck vehicles, an increase of the truck center distance.

(C) The addition of idle guiding wheels, etc.

It seems entirely reasonable that electric locomotives, with perfect balance, and no inherent harmonic vibration, excepting such as may be started by the track, should be more liable to develop nosing action than is a steam locomotive having the inherent vibrations, noted early in this discussion, because these vibrations will generally be out of phase with the tracking vibrations and will therefore tend to break up their sequence.

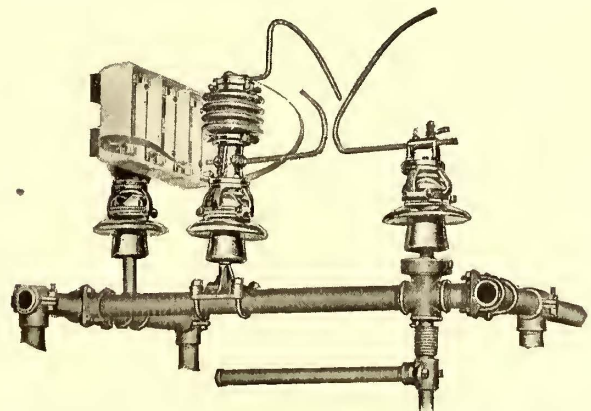
4th. What did the Pennsylvania tests indicate regarding the relative tracking characteristics of engines with symmetrical and unsymmetrical wheel arrangements? The tests indicated that the unsymmetrical engines which were tested ran better than did the symmetrical engines which were tested. Incidentally the symmetrical engines were short coupled bogie truck machines with no idle guiding wheels and with a comparatively low center of gravity both of spring-borne parts and of the entire locomotive, while the unsymmetrical machines were equipped with guiding trucks and had a higher center of gravity. Therefore the tests did not prove anything conclusive regarding the relative merits of symmetrical vs. unsymmetrical wheel arrangements, other things being equal.

It would be very profitable if other engineers would advance theories for this nosing tendency in electric locomotives as there is much to learn on the subject, and this subject is of most vital importance in the developing of new locomotive designs.

G. M. EATON.

### ALUMINUM LIGHTNING ARRESTERS FOR UNDERGROUND CABLES

One of the most serious problems which operators of underground cable systems have to meet is the protection of the cables against internal surges and against lightning in cases where the underground circuits are connected to overhead lines. During the past two years the General Electric aluminum arrester has been given a very wide application in the protection of cable and mixed overhead and cable circuits. One important characteristic of the arrester for this duty is



Horn Gap with Charging Resistance for Cable System

the daily charging of the cells—a process which consists simply of subjecting the stacks of aluminum cones to the line voltage and short-circuiting the series horn-gaps for a brief period. This charging process, as well as the normal discharges resulting from high-voltage disturbances, is accompanied by a slight arcing at the horn-gaps. On cable systems where the electrostatic capacity is large compared with the inductance of the



circuit, it is advisable to take every possible precaution to limit the charging current to a minimum value. In this aluminum arrester this limitation is accomplished by a special horn-gap used with a charging resistance. The resistance limits the charging current and even if the cells are in poor condition smooths out the wave-shape of the current and damps out any tendencies to oscillate. At the same time it does not prevent the cells from taking their full charge. These auxiliaries are so arranged as to give selective paths to the cells; one through a horn-gap without resistance which is the same as in the arresters for overhead circuits, and the other through a resistance and a horn-gap, the setting of which is slightly less than that of the gap without resistance. With this arrangement the daily charging current and the average surge discharge take the path through the resistance. This resistance is adjusted to a value which will so modify the nature of the charging arcs that there is no liability of resonance. It also makes the charging more uniform and reliable.

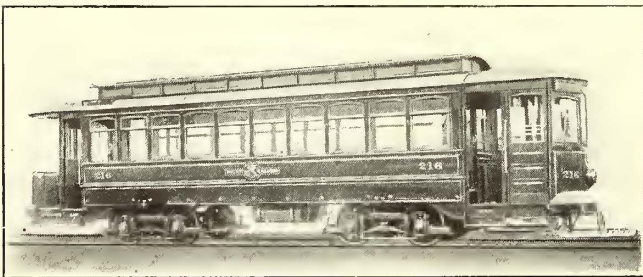
Heavy discharges which will be impeded somewhat by the resistance will be shunted through the principal horn-gap and have a free path without resistance. The arc from this discharge, rising on the horns, will be intercepted by the horn blade, which is connected to the resistance; hence the current is limited at the end of the discharge and as the arc breaks. The surging which would be produced by the breaking of a large current arc in air, therefore, is entirely eliminated by suppressing the arc and current. Thus the safety horn-gap with the charging resistance combines a number of valuable features in safety of operation without in any way decreasing the efficiency of the arrester as a protector of cable systems.

**PAY-AS-YOU-ENTER CARS FOR WICHITA, KAN.**

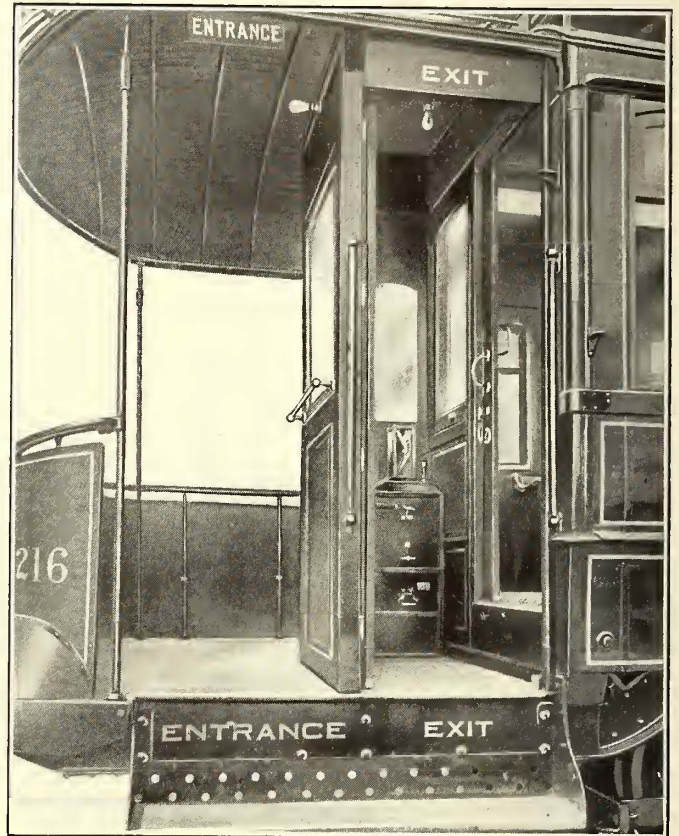
The Wichita (Kan.) Railroad & Light Company has recently received from the American Car Company, St. Louis, Mo., four single-end, double-truck closed pay-as-you-enter cars which have

opening through which passengers can deposit their fares in a fare box. A double folding door forms the outside wall of the vestibule above the exit step. An incandescent lamp is mounted under the hood above the center of the vestibule and another lamp on the vestibule partition illuminates the remainder of the platform and the entrance step. The vestibule may be removed in summer and a pipe railing installed in its place to separate the exit and entrance passageways.

The car body is 28 ft. long and 8 ft. 4 in. wide over posts. Both the front and rear platforms are 6 ft. 6 in. long, the front platform being entirely enclosed. Cross seats for 26 passengers are provided in forward end of the car, while two longitudinal seats for four passengers each are placed at the rear. Generous free space has been provided for near all entrance and exit doors. The interior finish is plain golden ash



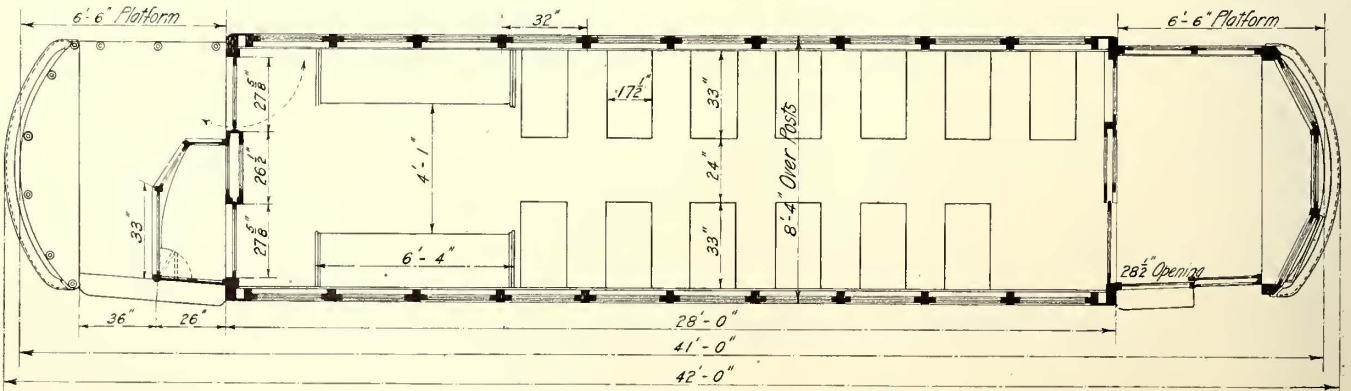
Pay-As-You-Enter Car for Wichita, Kan.



Rear Platform of Wichita Pay-As-You-Enter Car

a novel rear platform arrangement. As shown on the floor plan and engraving from a photograph, the rear platform is not enclosed, but a small vestibule for the conductor is built out

with inlaid borders. The seats are upholstered in rattan. The special equipment includes Brill four-tilt fare boxes, Brill 27-G1 trucks, Hunter destination signs, Pantasote curtains with



Floor Plan of Wichita Pay-As-You-Enter Car

from the end bulkhead. This vestibule consists of wooden panels up to a height of about 36 in. with glass above, so that the conductor can see all passengers as they enter. The sash next to the entrance door is arranged to drop so as to provide an

Forsythe No. 88 ring fixtures, Dedenda gongs and Nichols-Lintern sanders.

The cars were built under license of the Pay-as-You-Enter Car Corporation.



## ELECTRIC RAILWAY LEGAL DECISIONS

## CHARTERS, ORDINANCES AND FRANCHISES

**Michigan.**—Operation—Regulation—Additional Service—Constitutional Law—Obligation of Contracts—Impairment—Street Railroad Franchise.

A provision, in an ordinance, granting a street railway franchise, requiring the company to maintain two lines crossing each other at right angles and to give transfers, fixing the fare, and stipulating that the rates of fare shall not be reduced, which reserves to the city the right to make, by ordinance, reasonable rules to protect the interests of or accommodation and running of cars for the public, does not authorize the city to compel the establishment of an additional route, which route will be a combination of portions of both the original lines, and thereby compel an unnecessarily frequent schedule on parts of the lines, or an infrequency of cars on others, and deprive the company of its right to collect a second fare from passengers transferring to other lines intersecting.

An ordinance making such a requirement would be void as violating the constitutional provision against impairing the obligation of a contract.—(People v. Detroit United Ry., 121 N. W. Rep., 321.)

**Mississippi.**—Street Railroads—Franchises—Rights Acquired—Municipal Corporations—Powers of Mayor and Aldermen—Power to Bind Successors—Public Improvements—Surrender of Power—Ordinances—Grant of Exemptions—Estoppel—Against City—Ultra-Vires Contracts—Notice of Limitation of Powers—Street Improvements—Local Assessment—Property Subject to—Paving Tracks—Work Done by City—Recovery of Expenses—Right of Property Owners to Make Improvement.

A street railway company, obtaining from a city a franchise, can only obtain such powers as the city may lawfully grant, and the company must take its franchise subject to the limitations imposed on the mayor and board of aldermen in the exercise of their powers to grant a franchise.

The powers delegated to a city by Code 1892, sec. 2925 et seq., conferring on the mayor and board of aldermen the control of the city and its property, with power to adopt ordinances for purposes named, and to alter, modify, and repeal ordinances, and providing that the powers granted shall be held and exercised by the mayor and board of aldermen as trustees for the city, are given for the benefit of the city, and are to be exercised in the discretion of the mayor and board of aldermen in power at the time, and each mayor and board of aldermen may in their discretion determine when the powers shall be exercised, and one mayor and board of aldermen may not bind their successors.

A city may not contract away its charter powers to require the paving of streets and assess a part of the cost on abutting property.

Exemptions of any character claimed under a municipal ordinance can only be claimed when the intent to grant the exemptions is expressed in the clearest and most unambiguous terms.

A settlement by a city, seeking to collect a specified sum from a city railway company due the city for paving done, is valid so far as the claim is concerned; but a stipulation therein surrendering the right of the city in the future to pave streets at the cost of abutting property cannot be enforced because beyond the power of the city authorities.

An ultra-vires contract, made with agents of a city, does not operate as an estoppel on the city.

All persons dealing with a city must take note of its charter and the powers of its officers.

A street railway company having a franchise to operate a street railroad in a street has property rights in the street which are subject to local assessment for a city improvement.

A city, desiring to pave a street on which street car tracks are maintained under a franchise, must grant to the street railway company the right to lay the pavement for itself; and the company is not liable for the cost of pavement laid by the city without previous notification to the company to lay the same.

A city has no power to pave a street at the cost of abutting property until after notification to and refusal of abutting owners to do the paving.—(Edwards Hotel & City R. Co. et al. v. City of Jackson, 51 Southern Rep., 802.)

**New York.**—Regulations—Validity—Ejection of Passengers.

A general rule of a street railroad requiring passengers to deposit the fares in a box on entering the car, and forbidding conductors from handling fares, is a reasonable one, and while exceptional circumstances may arise which will make the strict enforcement of the rule vexatious, the railroad need not provide for all the possible exceptions, justifying a suspension of the rule.

A conductor of a car operated under a rule requiring passengers to pay as they enter by depositing fares in a box on the rear platform, and forbidding conductors from handling fares, who receives a transfer from a passenger, has a reasonable time to examine it, and where he soon discovers that the transfer is wrong, and then notifies the passenger and demands fare, the passenger must pay fare and comply with the rule by depositing it in the box, and where he refuses to do so the conductor may eject him, without using violence.—(Elder v. International Ry. Co., 122 N. Y., Suppl., 880.)

**New York.**—Taxation—Corporations—Gross Earnings Tax—Estoppel to Dispute Liability—"Gross Earnings"—Obligation of Lessor—"Gross Receipts."

Where a street railroad company whose road was operated by a lessee, notwithstanding this, filed gross earnings reports with the City Comptroller, and the city had received gross earnings taxes paid in accordance with such reports, the railroad company was not estopped thereafter to claim that it was not liable for such tax because it did not operate the road in resistance of the city's claim for more taxes on the theory that the reports were untrue, under the rule that there can be no estoppel unless the party asserting it has been induced by the representation relied on to change its position.

Laws 1884, c. 252, sec. 8, provides that every railroad corporation organized, constructed, or extended thereunder shall pay a 3 per cent gross earnings tax for the year ending the next preceding 30th day of September, and, after the expiration of five years, shall pay a 5 per cent tax. Held, that the term "gross earnings" as so used was synonymous with "gross receipts" to be derived from fares; and hence the statute should be construed as applicable only to the company operating a railroad so organized, and not to its lessor.—(City of New York v. Thirty-fourth St. Crosstown Ry Co., 122 N. Y. Rep., 344.)

**Wisconsin.**—Eminent Domain—Right to Condemn Street for Interurban Railway—Condemnation of Street for Interurban Railway—Institution of Proceedings by Person Damaged.

The right of any street or interurban railway company to condemn the right to use city streets, not being authorized till adoption of Laws 1901, p. 686, c. 465 (St. 1898, sec. 1863a), which grants the right on the express condition that the use thereof shall first be granted by a franchise duly passed by the common council, and a company prior to Jan. 7, 1907, or at latest July 20, 1908, only having authority to operate a street railway for transporting passengers, which authority gave it no right to institute condemnation proceedings as an interurban railway company, its right to condemn the use for interurban business of a city street on which it had laid its tracks was not obtained till ordinances were passed on the dates specified, granting the right to use it for such purpose.

Delaying for more than four months after right accrued to institute proceedings to condemn a street for use of the business of an interurban railway is sufficient to warrant a party entitled to damages in proceeding in the matter as authorized by St. 1898, sec. 1852, when the company delays or omits to prosecute the same.—(In re Plowright, 122 N. W. Rep., 1043.)

## LIABILITY FOR NEGLIGENCE

**California.**—Damages—Personal Injuries—Excessiveness.

Plaintiff, a female child 13 years of age, of robust health,



was thrown from an electric car and injured. Her physician testified: That her face was torn to ribbons; that the only part could be recognized as a face was one eye and the teeth; that two of the tendons of the right wrist were cut, and an artery injured; that the left wing of the nose was split through to the bone; that he found the upper lip in her throat; that there was an area of two by three inches on the right side that was lost entirely; that she sustained a fracture of the orbital plate of the frontal bone, and also had a comminuted fracture of the ankle, and would be permanently disfigured. Three years after the injury, she testified that her ankle was still weak, and that she experienced difficulty in walking. Held, that a verdict for \$15,000 was not excessive.—(James v. Oakland Traction Co. (Civ. 501.), 103 Pac. Rep., 1082.)

**California.—Death—Excessive Damages.**

Decedent was 26 years old at his death. He was employed in a hardware store at a salary of \$75 a month, had the full confidence of his employers, and was considered well acquainted with the hardware business for one of his experience. Held, that in an action by his widow and child for his death, a judgment for \$12,000 will not be reversed as excessive.—(Hale et al. v. San Bernardino Valley Traction Co., 106 Pac. Rep., 83.)

**Delaware.—Letting Off Passengers—Care Required—Setting Down Passengers—Sudden Start—Duty—Alighting from Car—"Reasonable Care"—Knowledge—Negligence—Presumptions—Concurrent Negligence—Decrees of Negligence—Damages—Personal Injuries—Element.**

A street railway company, in letting off passengers, is bound to stop at usual stopping places, and wait a reasonable time for passengers to alight, and use reasonable care to secure their safety.

If a street car slows up or stops at an unusual place, so as to clearly invite a passenger to alight, and the passenger attempts to do so, using due care, it is the carrier's duty not to suddenly start the car, so as to endanger the passenger's safety.

A carrier of passengers is bound to exercise great care and diligence in their safe transportation, but is not an insurer of their safety under all circumstances, being responsible only for negligence.

A passenger is bound to act with prudence and use the means provided for transportation with reasonable care, and if his negligent act causes or contributes to the injury of which he complains he cannot recover.

"Reasonable care," which a street car passenger is required to exercise in alighting from a car, is such care as a person of ordinary prudence would exercise under similar circumstances; such care being proportioned to the risk incurred.

A street car passenger, familiar with the railway at the place of the accident and the operation of car there, is bound to avail himself of such knowledge.

No presumption of negligence, either of plaintiff or defendant, arises from the fact that plaintiff was injured while alighting from defendant's street car, on which she was a passenger.

Where an injury was occasioned by plaintiff's negligence, or the concurrent negligence of both parties, plaintiff cannot recover, as the law will not measure degrees of negligence attributed to each.

In an action for injuries, plaintiff is entitled to such sum as would reasonably compensate her for her injuries, including past pain and suffering, and such as may come to her in future from the injuries sustained, and also for any impairment to her ability to earn a living in the future, or any expenses incurred for medical or surgical services in endeavoring to effect a cure.—(Elliott v. Wilmington City Ry. Co., 73 Atl. Rep., 1040.)

**Georgia.—Carriers—Ejection of Passenger—Actions—Admissibility of Evidence—Damages—Wounded Feelings—Double Recovery.**

In a suit by a passenger against a common carrier for an illegal ejection from the conveyance because of his refusal to accede to a wrongful demand for fare, evidence that immediately after the ejection the passenger tendered a second fare, and attempted to re-enter the conveyance, is admissible

for the purpose of showing aggravating circumstances authorizing the recovery of punitive damages.

It is erroneous to instruct the jury that they can give compensatory damages for wounded feelings and additional punitive damages in the event aggravating circumstances appear for the purpose of deterring the wrongdoer or compensating the plaintiff for wounded feelings. There can be no double recovery of damages for the purpose of compensating the plaintiff for wounded feelings.—(Georgia Ry. & Electric Co. v. Davis (No. 1,712.), 65 S. E. Rep., 785.)

**Massachusetts.—Negligence in Starting Car.**

It is a matter of common knowledge that electric cars sometimes start with a jerk or jolt; but, unless the jerk or jolt in starting a street car is so unreasonable or excessive as to show negligence, it is no ground of recovery for injuries to a passenger caused thereby. (Tupper v. Boston Elevated Ry. Co., 90 N. E. Rep., 422.)

**Michigan.—Contributory Negligence—Negligence.**

A passenger on an electric car, who had given notice on paying her fare where she wished to alight, was not negligent as matter of law in leaving her seat, and passing to the door while the car was still in motion, as it approached the station platform and slackened its speed.

A carrier is not bound to take notice that a passenger on an electric car will leave her seat and move to the door as the car slackens its speed and approaches the place where she has announced that she wished to alight; so that acceleration of the speed of the car while, unknown to any servant of defendant, she is in such position, is not negligence, where it would have been negligence had she not assumed such position. (Schultz v. Michigan United Rys. Co., 123 N. W. Rep., 594.)

**Missouri.—Damages—Excessive—Personal Injuries.**

Plaintiff, while driving a steam roller, was thrown therefrom by a street car colliding with it. He testified that prior to his injury he was in good health; that he had operated a steam roller about eight months in a season; that he received from \$3.50 to \$4 a day; that since his injury he was disabled in his limbs; that he had tried to work, but, owing to his disabilities, had been unable to do anything except light work and for short periods; that he had lost wages for nearly two years; that he continued to suffer pain. A physician who treated him testified that he would never fully recover, and another physician that his injuries were permanent. He incurred a doctor's bill of \$50 to \$75, and a bill of \$100 for medicine. Held, that a verdict of \$2,000 was not excessive.—(Slezak v. St. Louis Transit Co., 121 S. W. Rep., 1095.)

**Nebraska.—Damages—Excessive—Compensatory.**

Plaintiff received the personal injury complained of in the suit when she was 22 years of age. From that time until the trial of the case, six years thereafter, she suffered continually from the effects of the injury. Her mental and physical faculties were impaired. She had at no time been able to engage in her usual avocations, and during portions of the time she was unable to care for herself. The undisputed and convincing evidence was that no recovery could follow, but that she was thus injured for life. Held, that the sum of \$12,750, which included medical attendance, was no more than compensatory.—(123 N. W. Rep., 305.)

**South Carolina.—Collision with Vehicle—Action—Evidence—Wantonness.**

In an action for damages to a wagon from a collision with a street car alleged to have been caused by the wanton, willful negligence of defendant, where the evidence merely showed the plaintiff's driver saw a car pass as he approached the crossing, and, assuming that it would be some time before another would come, drove on the track; that the driver could not see an approaching car until he got very close to the track; and the motorman testified for plaintiff that he was running 6 or 8 miles an hour, first saw the wagon when about two car lengths from it, and immediately reversed the power, but too late to avoid the accident—a nonsuit was promptly ordered for failure of proof of wantonness or willfulness.—(Harris v. Greenville Traction Co., 65 S. E. Rep., 818.)



# News of Electric Railways

## Opinion of New York Commission on the Application of Third Avenue Bridge Company

An abstract of the opinion of Milo R. Maltbie, of the Public Service Commission of the First District of New York, on which the commission based its decision to grant a certificate of public necessity to the Third Avenue Bridge Company to operate an electric railway over the Queensboro Bridge from Manhattan to Long Island City, and to grant the company permission to exercise its franchise and to enter into a contract with the Third Avenue Railroad for the operation of its proposed road follows:

"It is evident that if this line is constructed, a service may be operated between Jackson Avenue, Queens, and Third Avenue, Manhattan, or through cars may be run from the Third Avenue Railroad over the bridge to Jackson Avenue and return. The Queensboro Bridge at present contains two sets of tracks available for surface or subway transportation. The outer set of tracks was designed for rapid transit purposes to connect with a subway in Manhattan. At present these tracks are used by surface cars, but when a rapid transit line is built, the surface cars must be placed elsewhere, for it would doubtless be unsafe to allow swiftly moving trains to use the same tracks that are used by trolley cars, even, if the tracks were of sufficient capacity for both.

"The great advantages that any new line may offer are through transportation and a ride from the Queens plaza to any point upon the lines of the Third Avenue Railroad and its subsidiaries for a single fare of 5 cents. Consequently, it is necessary to consider, in connection with the application for a certificate of public convenience and necessity, the terms of the franchise under which this company is to operate and the provisions of the contract which provide for the leasing of its lines to the Third Avenue Railroad.

"It would doubtless be preferable if the franchise had been granted to the Third Avenue Railroad so that the line would have been an extension of that system. If a new company is to be given this short line, the company's franchise contract with the city appears to go as far as possible under the circumstances toward guaranteeing through service at a 5-cent fare. The franchise requires that transfers shall be exchanged with the Third Avenue Railroad, the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, the Kingsbridge Railway and the Dry Dock, East Broadway & Battery Railroad, whereby passengers shall be given a continuous ride over all of these lines, including the lines of the Third Avenue Bridge Company, for a single fare of 5 cents, it being stipulated, however, that this shall not include a transfer and ride over the Williamsburg Bridge for a single fare. It is provided that in the event of the failure of the company or of any of the other companies referred to, to exchange transfers as above provided the company's franchise shall ipso facto become void and forfeited. The franchise contract also reserves to the city the right to grant to any other company the use of the railway constructed by this company upon the payment of certain stipulated rentals. The company is also bound to consent to the construction or operation of any other railway that may necessitate the use of any portion of East Fifty-ninth and Sixtieth Streets covered by this franchise. The city also reserves the right to grant to other companies the use of the tracks on the bridge that may be assigned to this company by the Commissioner of Bridges. The Board of Estimate and Apportionment reserves the option upon six months' notice to the company, whenever in its judgment the use of the tracks or any part of the tracks belonging to the company or assigned to the company on the Queensboro Bridge would interfere with the operation or construction of a rapid transit railroad over the bridge, either to rescind and revoke the franchise or to designate other tracks to be used by the company.

"The contract between the Third Avenue Bridge Company and the receiver of the Third Avenue Railroad, ap-

proval of which is also requested, provides that the receiver shall construct the company's road, maintain it in good condition, comply with the obligations of the company's contract with the city, pay all bridge tolls and percentages of gross receipts required to be paid under the contract with the city so far as relates to cars operated by the receiver, etc. Charges for such cars and services are to be at a reasonable rate to be hereafter agreed upon or to be fixed by arbitration. The Third Avenue Bridge Company also retains the nominal right to operate cars, but the terms of the contract do not give any assurance that the Third Avenue Bridge Company will operate any cars on its own account. The contract provides for an exchange of free transfers between the Third Avenue Bridge Company's line and the lines of the Third Avenue Railroad substantially in accordance with the requirement of the company's city franchise. The contract is to go into effect as soon as the company is lawfully authorized to construct its road, and is to continue in effect until May 1, 1920. It should be noted that the company's franchise runs to Dec. 31, 1934, unless sooner revoked on account of the city's rapid transit plans.

"At the hearings attention was called to the conditions upon which the company may be deprived of the use of the outer set of tracks, assuming that this set of tracks will be assigned to the company by the Bridge Commissioner and removed to another set of tracks on the bridge. It was stated by counsel for the applicant that the city could revoke the franchise and stop the company from operating entirely, or it could remove the company to other tracks in the discretion of the Board of Estimate and Apportionment. This is specifically provided for in the franchise.

"The South Shore Traction Company urged that at some future time it might wish to extend its lines into Manhattan via Sixtieth Street, and, therefore, would desire to build a track upon the southerly side of Sixtieth street, using the track of the Third Avenue Bridge Company for westerly service, and its own southerly track for easterly service, turning down Second avenue at Sixtieth street and then crossing the tracks of the Second avenue line for a connection with the bridge in Fifty-ninth street. As there is no application before us from the South Shore Traction Company, as the plan it suggests has objectionable features, and as there are other ways by which the South Shore Traction Company could obtain access to Manhattan, it does not seem desirable to require the Third Avenue Bridge Company to locate its track as suggested by the South Shore Traction Company.

"In view of the provisions in the franchise and in the contract providing for through service at a 5-cent fare and free transfers to all the lines of the Third Avenue Railroad in the Borough of Manhattan and in view of the provisions of the Public Service Commissions Law, which give this commission jurisdiction over service and rates, it is believed that a certificate of public convenience and necessity should be issued and that the franchise and contract should be approved."

## Transit Affairs in New York

Proposals submitted to the Public Service Commission for a change of route of the New York, Westchester & Boston Railroad set forth that the plans of the company are to provide an integral portion of a comprehensive rapid transit system for the zone lying east of White Plains Road and north of the Bronx River. L. S. Miller, president of the company, asks for the establishment of a new terminal at 180th Street, to be used jointly by the Interborough Rapid Transit Company and the New York, Westchester & Boston Railroad. Among the changes in route suggested, he says, his company, instead of building new tracks, proposes to run its line over the six tracks of the New York, New Haven & Hartford Railroad from Willis Avenue to 174th Street. It is also proposed to build a two-track elevated railroad from the main line, near Unionport Road,



up White Plains Road, or at the choice of the commission some street further east, with a connection with the Harlem River branch of the New Haven near Van Nest station. Moreover, it is stated, an exchange of traffic will be arranged with the Broadway and Lexington Avenue subway line, if that road is built, in the vicinity of Westchester Avenue and Edgewater Road. Instead of the line to Throgg's Neck, the company proposes to run a much straighter and shorter line, along East 177th Street, with a branch south in White Plains Road to Clason's Point.

The stockholders of the Second Avenue Railroad have adopted a resolution which provides for the abandonment of franchises for the construction of tracks on certain streets, and for the abandonment of lines already constructed in certain other streets. It is pointed out that some of the franchises have never been exercised and that some of the trackage is not suitable for use as part of an electrically operative line and that, furthermore, it cannot be profitably operated by horses.

Replying to criticisms which have been made in the last few months regarding the delays in starting the new tri-borough subway and explaining why construction work had ceased on some parts of the Fourth Avenue subway in Brooklyn, Chairman Willcox of the Public Service Commission said:

"The plans, specifications and forms of contract for the tri-borough system of subways have been completed for three or four weeks and ready for advertising so far as the commission is concerned. As soon as the Corporation Counsel has approved the form of contract, as required by law, bids will be asked upon these contracts.

"The routes embraced in the tri-borough system have been approved by the Board of Estimate and Apportionment and the work of preparing these plans and specifications has been going on for many months. Nothing has ever been done upon these plans by our predecessors. The plans call for building nearly twice as many miles of subway as compose the system of the Interborough Rapid Transit Company, and the details have been made much more explicit than any former contracts. The work of preparation has been enormous.

"It will be remembered that it was late in the spring when the Legislature passed the law setting forth the method which should be followed in exempting revenue producing bonds from the constitutional provisions affecting the debt limit. It was some time in the month of June that application was made by the Comptroller to the Appellate Division of the Supreme Court under the terms of this law, so that municipal funds have only been available for rapid transit purposes a very short time.

"The commission awarded contracts for the construction of this Fourth Avenue subway more than a year before the Board of Estimate found it possible to approve the same. Such approval was made only last fall and work was commenced soon afterward.

"As to the reported delay upon the work of the second and third sections of this subway it may be said that on these sections it is necessary to condemn certain easements for private property and that the condemnation proceedings are conducted by the Corporation Counsel before commissioners appointed by the Court.

"On June 10, 1910, the commission asked the Corporation Counsel to begin these proceedings regarding certain easements necessary on Fulton Street and the Corporation Counsel has duly advertised such application before the court, but the same will not take place until the first week in September. As soon as the commissioners are appointed and their oaths of office filled the property vests in the city and work can at once be begun.

"So far as the work on Ashland Place is concerned it can be said that after several hearings it was determined to change the line in the Ashland Place portion of the subway about 10 feet. As soon as the condemnation commissioners are appointed and oaths of office taken work can go ahead on that particular part of that section. Generally speaking the work on the Fourth Avenue subway is ahead of the schedule time.

"The Centre Street loop, contracts for which were awarded before this commission came into office, has proceeded and all work would have been entirely completed but the delay asked by Mayor McClellan on account

of the foundations of the Municipal Building delayed that particular subway for more than a year. It is now nearly completed."

**Rutland Strike Ended**—The Rutland (Vt.) Street Railway has filled the places of its employees who went on strike recently, and the regular schedule has been in force now for some time.

**Vote on New Franchise in Mason City**—The Mason City & Clear Lake Railway, Mason City, Ia., has applied to the City Council of Mason City for an extension of its franchise for 25 years, and the question will be submitted to the voters at an election to be held on Sept. 1, 1910.

**Another Arnold Report on Street Railway Service in Pittsburgh**—During the week ended Aug. 27, 1910, B. J. Arnold made public another section of his report on the Pittsburgh traction situation. It is devoted almost entirely to a history of the organization of the railway companies operating in the Pittsburgh district.

**Electrification of Lackawanna Discussed**—It is stated that at a conference held in Scranton, Pa., on Aug. 19, 1910, between representatives of the Delaware, Lackawanna & Western Railroad, the General Electric Company and the American Locomotive Company, the electrification of the Delaware, Lackawanna & Western Railroad east from Scranton to Lehigh and west from Scranton to Clark's Summit was discussed.

**Strike on Ohio Electric Railway**—The Ohio Electric Railway has filled the places of the employees on its Dayton and Columbus divisions who went on strike recently, and the regular schedule is being maintained. The men on strike demanded that the company re-employ nine men that they claimed had been discharged because of their affiliation with a union organized among the men. The company says that the men discharged were dismissed for infractions of the rules. A number of the old men have returned to work.

**New York State Committee on Subjects**—John H. Pardee, president of the Street Railway Association of the State of New York, has appointed the following committee on subjects to select topics to be considered at the next quarterly meeting of the association in November: Joseph K. Choate, general manager, Otsego & Herkimer Railroad Company; J. C. Calisch, vice-president and assistant treasurer, Buffalo & Lake Erie Traction Company, and W. H. Collins, general superintendent, Fonda, Johnstown & Gloversville Railroad.

**Chicago Consolidated Traction Ordinance**—At a special meeting of the committee on local transportation of the City Council of Chicago, Ill., on Aug. 18, 1910, the proposed ordinance in favor of the Consolidated Traction Company was recommended for passage and it was expected that a special meeting of that body would be held during the week commencing Aug. 22, 1910, to take steps to enact the measure. In accordance with the rules of the Council, definite action will be delayed for one week in order to give the aldermen time to familiarize themselves with the contents of the ordinance. At the meeting on Aug. 18, 1910, discussion centered largely around the question of where rehabilitation work should begin. It was agreed that of the 27 miles of track to be constructed on or before Jan. 28, 1911, 20 miles will be laid along thoroughfares where through routes are to be operated, and the remainder divided between Milwaukee Avenue, Belmont Avenue and Irving Park Boulevard. An effort also was made to have the committee exact a promise from the Chicago Railways, which will pay for the rehabilitation work, to pay for damage claims against the Consolidated Traction Company which have not yet been adjusted. The principal features of the ordinance, as approved on Aug. 18, 1910, follow: Operation of 215 double-truck cars in addition to those now in use; 172 single-truck cars now in service to remain at discretion of board of supervising engineers. Acceptance of ordinance within 60 days of its passage. Ordinance shall not extend beyond Feb. 1, 1927. Valuation of Consolidated properties fixed at \$3,957,454.49. Chicago Railways must obtain a clear title to the Consolidated properties; if it does not it can be required to enter upon streets now occupied by the Consolidated Traction Company as rapidly as the latter's franchises expire.



# Financial and Corporate

## New York Stock and Money Market

August 23, 1910.

While there undeniably has been a better tone in the stock market during the past week prices have continued to be irregular and trading is dull. The general improvement in crop reports and the reawakening of business to some extent have encouraged Wall Street to anticipate the return of outsiders to the market.

Time money is quoted at rates not out of line with previous seasons. Quotations to-day were: Call, 1/4 to 1/2 per cent; 90 days, 3/2 to 3/4 per cent.

### Other Markets

The Philadelphia market has been dull during the past week and price changes have been insignificant. Within the past few days both Rapid Transit and Union Traction have been a trifle easier and prices are off about 1 point from those quoted a week ago. There is very little stock coming forward.

Tractions have played a very small part in the trading on the Boston Exchange during the past week. A few small lots of Massachusetts Electric and scattering sales of Boston Elevated have practically covered the transactions. Prices are without important change.

In Chicago the principal trading of the week has been in Series 1 and 2 of the Chicago Railways Company. The latter of these has been the more active and has shown some disposition to recede in price. Changes, however, have been fractional.

Trading in the stock of the United Railways Company, which was active in the Baltimore market a few weeks ago, has almost stopped. The bonds continue to be dealt in liberally and prices for these are a trifle lower.

	Aug. 23.	Aug. 16	Aug. 23.
American Railways Company.....	a43 1/2	a43 1/2	a44 1/2
Aurora, Elgin & Chicago Railroad (common).....	*50 3/4	*50 3/4	*50 3/4
Aurora, Elgin & Chicago Railroad (preferred).....	*90	*90	*90
Boston Elevated Railway.....	126 1/4	126	126
Boston & Suburban Electric Companies.....	*15	*15	*15
Boston & Suburban Electric Companies (preferred).....	*74	*74	*74
Boston & Worcester Electric Companies (common)....	a10	a10	a10
Boston & Worcester Electric Companies (preferred)..	36	36	36
Brooklyn Rapid Transit Company.....	77 3/4	75 3/4	75 3/4
Brooklyn Rap. Transit Company, 1st pref. conv. 4s....	82 3/4	82 3/4	82 3/4
Capital Traction Company, Washington.....	*129	a130	a130
Chicago City Railway.....	a185	a185	a185
Chicago & Oak Park Elevated Railroad (common)....	*3 1/2	*3 1/2	*3 1/2
Chicago & Oak Park Elevated Railroad (preferred)..	*7 1/4	*7 1/4	*7 1/4
Chicago Railways, pteptg., ctf. 1.....	a75	a71 1/2	a71 1/2
Chicago Railways, pteptg., ctf. 2.....	a16 3/4	a16	a16
Chicago Railways, pteptg., 3.....	a12	a12	a12
Chicago Railways, pteptg., ctf. 4s.....	a6	a5 1/2	a5 1/2
Cleveland Railways.....	*91 1/2	*91 1/2	*91 1/2
Consolidated Traction of New Jersey.....	*7	a73	a73
Consolidated Traction of N. J., 5 per cent bonds....	*103	a103	a103
Detroit United Railways.....	*45	*45	*45
General Electric Company.....	145	144	144
Georgia Railway & Electric Company (common).....	106 1/4	107 1/2	107 1/2
Georgia Railway & Electric Company (preferred)....	a86	*86	*86
Interborough-Metropolitan Company (common).....	17 1/2	17 3/4	17 3/4
Interborough-Metropolitan Company (preferred)....	48 1/2	48	48
Interborough-Metropolitan Company (4 1/2s).....	78 3/4	79 3/8	79 3/8
Kansas City Railway & Light Company (common)....	a25	a25	a25
Kansas City Railway & Light Company (preferred)....	*79 1/2	a78	a78
Manhattan Railway.....	130 1/2	131	131
Massachusetts Electric Companies (common).....	a17 1/2	a18	a18
Massachusetts Electric Companies (preferred).....	81	a83	a83
Metropolitan West Side, Chicago (common).....	a20	a20	a20
Metropolitan West Side, Chicago (preferred).....	a65	a65	a65
Metropolitan Street Railway.....	*15	*15	*15
Milwaukee Electric Railway & Light (preferred)....	*110	*110	*110
North American Company.....	69 1/2	*69 1/2	*69 1/2
Northwestern Elevated Railroad (common).....	a18	a20	a20
Northwestern Elevated Railroad (preferred).....	a60	a60	a60
Philadelphia Company, Pittsburg (common).....	a45	a44	a44
Philadelphia Company, Pittsburg (preferred).....	a42	a42	a42
Philadelphia Rapid Transit Company.....	a19 3/8	a18 3/4	a18 3/4
Philadelphia Traction Company.....	a83	a84	a84
Public Service Corporation, 5 per cent col. notes....	*96	a95	a95
Public Service Corporation, ctf. s.....	*99	a100	a100
Seattle Electric Company (common).....	*109	*109	*109
Seattle Electric Company (preferred).....	*98 1/2	*98 1/2	*98 1/2
South Side Elevated Railroad (Chicago).....	a60	a60	a60
Third Avenue Railroad, New York.....	8 1/2	*8 1/2	*8 1/2
Toledo Railways & Light Company.....	*7	*7	*7
Twin City Rapid Transit, Minneapolis (common)....	*106 1/2	*106 1/2	*106 1/2
Union Traction Company, Philadelphia.....	a45 1/4	a43 1/4	a43 1/4
United Rys. & Electric Company, Baltimore.....	14 1/2	a15	a15
United Rys. Inv. Co. (common).....	31	*31	*31
United Rys. Inv. Co. (preferred).....	59 1/2	56	56
Washington Ry. & Electric Company (common).....	*33	a33	a33
Washington Ry. & Electric Company (preferred)....	*87 1/2	a90	a90
West End Street Railway, Boston (common).....	a88	a88	a88
West End Street Railway, Boston (preferred).....	*100	*100	*100
Westinghouse Elec. & Mfg. Company.....	60 1/2	*60 1/2	*60 1/2
Westinghouse Elec. & Mfg. Company (1st pref.)....	*125	*125	*125

a Asked. \* Last Sale.

## Annual Report of the Brooklyn Rapid Transit Company

Gross earnings of the Brooklyn Rapid Transit Company for the year ended June 30, 1910, were \$20,906,930, an increase of \$1,212,468 over the previous year. Operating expenses amounted to \$11,726,392, an increase of \$331,738, or 2.91 per cent. Net earnings were \$9,180,538, a gain of \$880,730, or 10.61 per cent. As income from other sources showed a material gain and the deductions for taxes, interest and rentals increased but 2 per cent, the net income increased 34.85 per cent. Special appropriations of \$108,560 were made, leaving available a surplus of \$2,503,035. To this there was added a profit of \$69,185 from real estate disposed of during the year. A comparative statement follows:

	1910.	1909.	Increase.
Gross earnings:			
Passenger .....	\$20,477,145	\$19,038,693	\$1,438,452
Freight, mail and express.....	272,140	254,643	17,497
Advertising .....	157,645	155,860	1,785
American Railway Traffic Company..	.....	225,266	*225,266
Total earnings from operation.....	\$20,906,930	\$19,694,462	\$1,212,468
Operating expenses:			
Maintenance of way and structure....	\$1,309,719	\$1,194,014	\$115,705
Maintenance of equipment.....	2,068,271	1,690,916	377,355
Operation of power plant.....	1,498,712	1,596,759	*98,047
Operation of cars.....	5,061,150	4,812,556	*248,594
Damages and legal expenses.....	921,538	1,129,396	*207,858
General expenses.....	689,522	676,666	12,856
Freight, mail and express—expenses..	174,288	138,644	35,644
American Railway Traffic Company— expenses .....	3,192	155,703	*152,511
Total operating expenses.....	\$11,726,392	\$11,394,654	\$331,738
Net earnings from operation.....	\$9,180,538	\$8,299,808	\$880,730
Income from other sources:			
Rent of land and buildings.....	\$69,087	\$74,949	*5,862
Rent of tracks and structure.....	103,370	104,997	*1,627
Miscellaneous .....	366,970	425,871	*58,901
Total income.....	\$9,719,965	\$8,905,625	\$814,340
Deductions:			
Taxes .....	\$1,454,213	\$1,337,620	\$116,593
Interest and rentals (net).....	5,654,157	\$5,631,396	22,761
Total deductions.....	\$7,108,370	\$6,969,016	\$139,354
Net income.....	\$2,611,595	\$1,936,609	\$674,986
Special appropriations.....	108,560	65,430	43,130
Surplus .....	\$2,503,035	\$1,871,179	\$631,856
Profit from real estate disposed of... ..	69,184	.....	69,184
Total surplus for year.....	\$2,572,219	\$1,871,179	\$701,040
Surplus at June 30, 1909-08.....	4,387,230	3,583,460	533,770
Surplus June 30, 1910, and June 30, 1909 .....	\$6,959,449	\$5,724,639	\$1,234,810
Of this amount there has been appro- priated:			
For discount on bonds sold.....	.....	\$89,575	*\$89,575
Old accounts written off.....	\$636	8,728	*8,092
Additional reserve for special franchise taxes in litigation... ..	232,917	238,457	*5,540
Expenses of prior years adjusted	13,281	20,197	*6,916
Supercession losses, etc.....	25,293	83,376	*58,083
Dividend on B. R. T. stock out- standing .....	1,906,287	897,076	1,009,211
Total appropriations.....	\$2,178,414	\$1,337,409	\$841,005
Balance surplus June 30, 1910, and June 30, 1909.....	\$4,781,035	\$4,387,230	\$393,805

\* Decrease.

Edwin W. Winter, the president, says in the report, in part:

"Expenditures for maintenance of way and structures increased \$115,705. The increase is chiefly due to quite extensive rebuilding of trolley tracks.

"Maintenance of equipment shows an increase of \$377,355. The unit cost of shop work was materially less than in 1909; the increase lies mainly in cost of changing air brake equipment on elevated cars, and the substitution of steel for iron wheels, together with over \$100,000 charged off and carried in accrued amortization of capital.

"The increase of over \$200,000 in operation of cars is largely accounted for by advance in wage scale.

"There was a decrease of \$207,858 in the combined items of damages and legal expenses. The cost of damage settlements and judgments amounted to 2.66 per cent, and legal and claim department expenses 1.43 per cent of gross earnings from operation. There was a further reduction in number of suits brought, and barring slightly over \$25,000 in judgments on appeal there is no outstanding judgment against any company in the system.

"Compared with last year there was a decrease of 6-10



of a mill in the average gross receipt per passenger and 9-10 of a mill in operating charges. Taxes increased 1-10 of a mill, interest and rentals decreased 7-10 of a mill, making a total reduction of 1.5 mills in cost per passenger, and increase in surplus of 9-10 of a mill or 25.7 per cent per passenger carried.

"The total power house output measured at the switchboard was 326,894,950 kw-hours. Average cost of power house operation, including power house and substation repairs, was 0.567 cent per kw-hour. Although the output was nearly 16,000,000 kw-hours in excess of last year the cost of operation of power plant was \$98,000 less. In the four years ending June 30 there has been a reduction of slightly above 20 per cent in unit cost of power at the switchboard. A lower consumption of power per car-mile through improvement of appliances and better methods of operation has contributed to favorable results in this department of the service.

"A pension system was inaugurated on Jan. 1, 1910, the affairs of which are administered by a board of pensions consisting of the vice-president and general manager, the secretary and treasurer of the Brooklyn Rapid Transit System, and the president of the Brooklyn Rapid Transit Employees' Benefit Association. The amount of pension is based upon the average monthly wage received by the pensioner during the 10 years immediately preceding retirement and graduated from a minimum of 30 to a maximum of 50 per cent of this rate, according to length of service. At the end of the first six months 26 employees had qualified and were receiving pension allowances.

"In addition to \$51,428 insurance reserve fund accumulated prior to the agreement entered into on Nov. 15, 1907, by the companies composing the system, there has been earned \$183,897, making a total to credit of the reserve fund of \$235,325. The balance sheet reflects but \$180,979 for the reason that the difference, \$54,345, while earned, is not distributable until the close of the insurance year, November, 1910. There has been invested by the trustees in interest-bearing securities \$190,243, representing a par value of \$201,000, yielding an income of \$8,895 per annum.

"No important construction work was undertaken during the year.

"Thirteen thousand five hundred ft. of elevated structure was reinforced, making a total of 61,000 ft. of structure reinforced to June 30, 1910.

"A new freight house and yard were constructed at the Sea Beach Terminal, Coney Island, and rented property abandoned.

"Two thousand six hundred and seventy-nine surface and 828 elevated cars were put through the shops for overhauling, repainting and varnishing."

Following are additional statistics from the report:

	1910.	1909.	1908.
Passengers carried.....	569,438,773	530,149,597	515,184,067
Increase over preceding year, per cent .....	7.41	2.93	0.65
Transfers redeemed.....	131,279,806	141,326,128	128,650,863
Increase over preceding year, per cent .....	7.04	9.82	5.57
Revenue mileage.....	77,984,651	74,200,436	73,674,770
Increase over preceding year, per cent .....	5.10	0.71	7.91
Earnings per revenue mile, cents...	26.3	25.7	25.7
Units per passenger—cents.			
Passenger earnings.....	3.60	3.60	3.68
Miscellaneous earnings.....	.17	.23	.31
Total earnings.....	3.77	3.83	3.99
Operating charges.....	2.03	2.17	2.36
Taxes .....	.26	.25	.18
Interest and rentals.....	.99	1.06	1.69
Total .....	3.33	3.48	3.63
Surplus .....	0.44	0.35	0.36
Charges per cent of operating earnings.			
Repairs and renewals.....	16.16	14.65	14.39
General operating.....	35.52	37.48	39.45
Damages .....	2.66	3.66	4.14
Legal expense.....	1.75	2.07	2.11
Total operating.....	56.09	57.86	60.09
Taxes .....	6.96	6.79	4.68
Interest and rentals (net).....	24.46	25.52	24.80
Special appropriations.....	.52	.33	1.15
Surplus .....	11.97	9.50	9.28
	100.00	100.00	100.00

**Action of the New Jersey Public Utility Board in Burlington County Transit Application**

A short note was published last week of the action of the Board of Public Utility Commissioners of New Jersey on the application for the issue of securities by the Burlington County Transit Company. This is a new company organized to take over the property formerly owned by the Burlington County Railway. The authorized capitalization of the latter company consisted of \$550,000 of capital stock, made up of 5500 shares of a par value of \$100 each, of which 4847.9 shares were issued and \$550,000 of mortgage bonds, of which \$475,000 were issued. On Sept. 8, 1909, a receiver was appointed for the company. Soon after his appointment the receiver had an appraisal made of the assets and franchises of the company and filed with the court a statement that they were valued at \$227,817. On June 16, 1910, the property was sold to pay a judgment for \$502,108.56, the amount due April 23, 1910, for principal and interest on the mortgage bonds. The highest bid received was \$120,000 and the road was sold at that price. The purchasers thereupon paid \$10,000 in cash and by a subsequent decree they were permitted in lieu of the payment of the rest of the purchase price to deposit with the special master first mortgage bonds of the old company to the amount of \$470,000, with coupons attached which fell due and became payable on Sept. 1, 1909, and subsequent coupons.

The purchasers organized the Burlington County Transit Company and applied to the Board of Public Utility Commissioners for the authority to issue 3325 shares of capital stock of par \$50 each, the whole constituting \$166,250, which, they stated, was considerably less than the appraised value of the property, according to the appraisal made by the receiver.

The board declined, however, to authorize the issue of more than \$120,000 capital stock. Upon this point, the board said:

"In application before the board the purchase money was \$120,000, which to the extent of \$10,000 was paid in cash and the balance of which was made up by the surrender of bonds.

"It is probably true that the fair value of the property purchased exceeds \$120,000.

"It is likewise probable that the fair value of the bonds surrendered exceeds \$110,000.

"The purchase money to which the purchasers contributed, however, is the sum bid at the sale, namely, \$120,000, and the capital stock issued to the purchasers cannot exceed that sum.

"The application for approval of an issue to such purchasers, of capital stock in amount \$166,250, must be denied; the board, for the reasons stated, not being satisfied that such proposed issuance is to be made in accordance with the provisions of law relating thereto."

The organizers of the Burlington County Transit Company thereupon amended their petition so that it applied for permission to issue 2400 shares at par \$50 each, or a total of \$120,000. This application was considered by the board on Aug. 9 and was granted.

**Chicago (Ill.) Consolidated Traction Company**—Suit has been brought in the Municipal Court at Chicago by holders of \$125,000 of the general mortgage bonds of the Chicago Consolidated Traction Company to recover from the Chicago Railways that amount and two years' defaulted interest, making a total of \$139,000. The bonds are of the same series involved in the decision of Judge Ball in a case now in the Appellate Court brought by Attorney John Barton Payne, in which the court held that the Chicago Railways was responsible for the issue of \$6,750,000 because the obligation had been taken up by its predecessor, the Union Traction Company, in 1900. Isaac H. Mayer, of the firm which brought the suit in the Municipal Court at Chicago, is reported to have said in explanation: "Our clients are satisfied that the proposed reorganization plan now under way is unfair to the holders of the bonds of the Chicago Consolidated Traction Company. We have, therefore, determined to enforce collection of these bonds from the Chicago Railways and its directors. We shall further insist that all of the Chicago Railways' bonds were wrongfully issued and that the entire issue of



\$6,750,000 of the Chicago Consolidated Traction Company's bonds are a lien on the Chicago Railways' property ahead of all that company's own bonds."

**Chicago & Milwaukee Electric Railroad, Chicago, Ill.**—Andrew Cooke, vice-president of the Harris Trust Company, Chicago, Ill.; George M. Reynolds, president of the Continental & Commercial National Bank; Frank A. Vanderlip, president of the National City Bank, New York; John M. Gibson, Lieutenant-Governor of Ontario, and E. B. Osler, president of the Dominion Bank, Toronto, are working out the finances of the Chicago & Milwaukee Electric Railroad. Mr. Cooke, the chairman of the committee mentioned, is reported to have said that nothing of an authoritative nature can be given out at the present time regarding the financial plan which has been agreed upon. According to *The Economist*, it seems probable that the settlement with the bondholders of both the Wisconsin and the Illinois divisions of the company will be effected through a new bond issue on the entire property and a first and second preferred stock issue.

**Chicago & Southern Traction Company, Chicago, Ill.**—William S. Reed, Chicago, Ill., has filed suit for \$125,000 in the Circuit Court at Chicago against the Chicago & Southern Traction Company, alleging that the amount mentioned is due him for work in connection with the construction of the company's line. Mr. Reed alleges that on July 5, 1905, the Chicago & Southern Traction Company entered into a contract with him to obtain all the rights of way and franchises necessary for the operation of the road and proceed to build the road and bridges from Harvey to Kankakee, a distance of 38½ miles, and that he gave all his time to this work until May, 1907, but received no compensation. Receivership proceedings are now pending.

**Forty-Second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.**—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, under foreclosure, has been postponed from Sept. 1, 1910, to Sept. 26, 1910.

**Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.**—A report has been filed in the Superior Court at Indianapolis by Charles L. Henry, receiver for the Indianapolis & Cincinnati Traction Company, in which he asks the court to order the sale of the property of the company, the proposed plans of reorganization having failed on account of the refusal of the holders of \$142,305 of receiver's certificates to enter into an agreement with W. T. Durbin, J. J. Appel, Claude Cambern, T. F. Rose and Geo. A. Ball, trustees representing stockholders and bondholders, to take new bonds in place of receiver's certificates. The indebtedness of the company is \$1,113,805. The amount of certificates issued is \$927,973.26, and the floating indebtedness is \$76,032, on which interest for more than two years is due. A hearing will be held before Judge Carter on Sept. 7, 1910.

**Milford & Uxbridge Street Railway, Milford, Mass.**—The Massachusetts Railroad Commission has authorized the Milford & Uxbridge Street Railway to issue \$85,000 of 20-year 5 per cent bonds to pay floating debt.

**Missoula (Mont.) Street Railway**—The capital stock of the Missoula Street Railway has been increased from \$100,000 to \$500,000.

**Underground Railways Company, Ltd., London, Eng.**—The Underground Railways Company, Ltd., has declared an initial semi-annual dividend of ½ of 1 per cent on the income bonds for the half year ended June 30, 1910. This payment will be made in New York at the office of New York Trust Company, at the rate of \$4.8666 per pound sterling.

**Union Street Railway, New Bedford, Mass.**—The stockholders of the Union Street Railway and of the Dartmouth & Westport Street Railway will vote shortly on the question of consolidating the companies. The capital stock of the Union Street Railway will be increased from \$1,125,000 to \$1,625,000, the \$500,000 of new stock to be exchanged, dollar for dollar, for the stock of the Dartmouth & Westport Street Railway.

**United Electric Company, Dennison, Ohio**—The property of the United Electric Company, which includes the electric railway between Uhrichsville and Dennison, has been purchased by Brooks & Company, Scranton, Pa.

# Traffic and Transportation

## Transfer Charge Continuance Sustained on Middlesex & Boston Street Railway

The Massachusetts Railroad Commission issued an order on Aug. 9, 1910, extending for one year the right of the Middlesex & Boston Street Railway, Newtonville, Mass., to charge 6 cents for every fare with which a transfer is issued, on the lines formerly operated by the Newton Street Railway. At a hearing given by the board on Aug. 8, 1910, Carl A. Sylvester, general manager of the company, filed a statement showing the earnings, expenses and traffic records of the lines in question for the 10 months ended June 30, 1910.

In explanation of the data filed Mr. Sylvester said that during the period from September, 1907, to June, 1908, the gross passenger receipts were \$285,689, and that during the corresponding period ended June 30, 1910, the gross passenger receipts were \$293,974, showing an increase of \$8,285, or about 2.9 per cent. During 1907-8 the company carried 6,434,602 passengers, and in 1909-10, it carried 6,439,806 passengers, an increase of 5204 passengers, or 0.08 per cent. During 1907-8 the company received 623,556 transfers against 561,042 passengers in 1909-10, there being a decrease of 62,514 transfers, or about 11 per cent. During the period 1907-8 the company issued 733,733 transfers against 580,985 in 1909-10, showing a decrease of 152,748 transfers, or about 26 per cent below the former period. During the period from Sept. 1, 1909, to June 30, 1910, the company received as additional revenue on account of the 1-cent additional charge for each transfer issued \$5809.85. The Lexington & Boston Street Railway was paid on 33,385 transfers at ½ cent each, \$166.93. The Newton & Boston division was paid on 195,586 transfers at ½ cent each, \$97,793, making a total deduction of \$1144.86 out of the \$5809.85 received, showing a net gain to the Newton Street Railway division on account of the additional charge of 1 cent each of \$4664.99. Comparing the period from September, 1908, to June, 1909, the net gain on the Newton Street Railway division on account of the additional charge was \$4398.06. The gain of the second period, from Sept. 1, 1909, to June 30, 1910, shows an additional income over the first period of \$266.93. Mr. Sylvester said that in order to secure, with least burden upon the public, a proper and just return upon capital actually invested it is necessary to continue the charge of 1 cent, as during the past year. There was no opposition.

## Toronto Railway Wages Question Settled

The differences between the Toronto (Ont.) Railway and its employees regarding wages, hours of labor, uniforms and other matters have been satisfactorily adjusted. The award of the board of conciliation which has been considering these matters was made public at Toronto on Aug. 19, 1910, and accepted by the employees of the company by a vote of 1200 to 200. The agreement is to continue in force for two years from June 16, 1910. The wages per hour for motormen and conductors, shedmen and motor and truck repairmen under the award, the present rate of wages and the scale which was asked for follow:

	Awarded.	Present scale.	Asked for.
<b>Motormen and conductors.</b>			
First year.....	21	20	25
Second year.....	23	22	28
Third year and after.....	25	23½	28
<b>Shedmen.</b>			
Foremen.....	25	..	..
Assistants.....	22	21	25
Car washers.....	21	20	25
<b>Motor and truck repairmen.</b>			
First year.....	21	20	25
Second year.....	23	22	28
Third year and after.....	25	23½	28

It has been agreed that "the general superintendent or manager shall receive a committee of employees at any reasonable time to discuss any matters arising out of this agreement."

## Meeting of Central Electric Traffic Association

The Central Electric Traffic Association met at the Anthony Hotel in Fort Wayne, Ind., on Aug. 16. One



session was held from 8 to 12 a. m., and there was a good attendance of representative traffic men. The subjects discussed were: (1) The advisability of publishing a carefully made map showing all the lines in the Central Electric territory, and (2) the advisability of arranging for the monthly publication of an official interurban railway guide to show the time of all trains in the Central Electric territory. It was proposed that a guide of standard folder size be published by an official printer, the contents to be made up of the time-tables of the interurban lines, each road to pay its proportion according to the number of pages used or the mileage of the road; and also to include in the book advertisements of the hotels and miscellaneous advertisements. The advertising matter would be grouped at the front and back of the guide and the time-tables would appear on consecutive pages as the body of the publication. It was suggested that such a guide could be published monthly and be put on sale at all ticket offices.

The decision regarding the publications of the maps and the guide was deferred until the next meeting of the Traffic Association, which will be held at Winona Lake, Ind., on Sept. 27, 1910.

**Through Service Between Indianapolis and Goshen**—The Winona Interurban Railway, Winona Lake, Ind., and the Indiana Union Traction Company, Anderson, Ind., have established through service between Indianapolis and Goshen, via Noblesville, Peru, Warsaw and Winona. At Peru connection is made with the lines of the Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.

**Chicago Meeting of Central Electric Accounting Conference**—At the meeting of the Central Electric Accounting Conference, which will be held in Chicago on Sept. 10, 1910, it is planned to discuss the subject, "Uniform Statistics." The Chicago & Milwaukee Electric Railroad has offered the members of the conference the courtesy of a special car between Milwaukee and Chicago.

**Illinois Traction System Carries Vice-President and Party**—Vice-President Sherman, who is touring Illinois and Missouri, was announced as the principal speaker for Aug. 27, 1910, at a Chautauqua being held near Clinton, Ill., on the Bloomington-Decatur division of the Illinois Traction System. The vice-president and his party plan to travel from Clinton to Decatur and thence to St. Louis, Mo., over the lines of the Illinois Traction System.

**Suspension of Subway Service Order Continued**—The Public Service Commission of the First District of New York has extended until Sept. 5, 1910, the order suspending the order of April 5, 1910, as to service in the subway, at least that portion of the order which requires that the maximum headway during the non-rush hours in the daytime should be 2½ minutes. The order was originally suspended for 30 days from July 12, 1910, and last week an application for an extension was submitted by the Interborough Rapid Transit Company.

**Long Island Railroad Files Terminal Rates**—The Long Island Railroad has filed with the Public Service Commission a schedule of passenger fares to be charged to the new Pennsylvania Terminal, to which trains will be run on and after Sept. 8, 1910. The rates to the terminal on single tickets will be 5 cents more than the present rates to Long Island City. This will be two cents more than to the Manhattan end of the Thirty-fourth Street Ferry, as an extra 3 cents is now charged for the ferry trip. The increase in commutation tickets to the terminal is a trifle more than 1½ cents a trip.

**Complaint Against Westchester Electric Railroad**—The Public Service Commission of the Second District of New York has received a complaint from the municipal authorities of Eastchester, Westchester County, against J. Addison Young, receiver of the Westchester Electric Railroad, Mount Vernon, N. Y., in regard to lack of waiting room at Waverly Square, where passengers change cars; and to the unsanitary condition of the passenger car operated between Tuckahoe station and Waverly Square. The commission issued an order to the Westchester Electric Railroad on July 25, 1910.

**Passes Discontinued in Baltimore**—William A. House, president of the United Railways & Electric Company,

Baltimore, Md., recently sent the following letter to the holders of passes issued by that company: "This company, having received a letter from the Public Service Commission stating that, under the advice of its counsel, the issuance and use of complementaries is in conflict with the provisions of the Public Service Commission Law, and supplementary to that letter notice having been received to-day from the commission that such passes should not be accepted for transportation after Aug. 20, I beg to advise that the coupons of such book should not be tendered to conductors after that date."

**Summer Boarding Folder**—The Pittsburgh & Butler Street Railway, Pittsburgh, Pa., has issued a 24-page folder, entitled "Summer Boarding and Tent Life on the Butler Short Line." Attention is called to the value of living in the open, and advice is given about selecting a place for spending a vacation. A list is published of the boarding places in towns along the company's line, a brief description of the accommodations available and the rates per week being given. The publication is concluded with some advice to campers. The cover design is in white, green and gray, and the subjects of the front cover and the rear cover are suggestive of the contents of the folder.

**Opening of McKinley Bridge**—Announcement is made that the McKinley bridge, of the Illinois Traction System, will be opened for interurban traffic only on Oct. 1, 1910. This bridge, which was described in the ELECTRIC RAILWAY JOURNAL of Jan. 22, 1910, page 138, affords a through route from the south end of the Illinois Traction System, with its 550 miles of interurban track, to the wholesale and retail business center of St. Louis. A new terminal building, a large freight warehouse on 24 acres of property at the Missouri end of the bridge, a passenger station at Broadway and Salisbury Streets, an express terminal 80 ft. x 200 ft. at Twelfth Street and Lucas Street, and a passenger terminal at the latter location, which is one and a half blocks north of the Jefferson Hotel, will all be erected. The first of the three 521-ft. river spans of the bridge was completed in January, 1910, but high water delayed the erection of falsework during the spring. The center river span has just been swung and the falsework for the remaining space has been finished. The bridge builders announce that this last span will be completed by Sept. 15, 1910, and two weeks is allowed in which to lay one track across the bridge. It is not expected that the roadways or the second track which will be needed for carrying material will be finished by Oct. 1, 1910. At a later date the bridge will be formally opened with appropriate dedicatory ceremonies.

**Brooklyn Bridge Traffic**—The Department of Bridges of New York has issued a statement which shows a decrease in the number of elevated trains and surface cars operated across the Brooklyn Bridge during July, 1910, as compared with July, 1909. According to the report there were in July, 1909, 130,264 trips across the bridge, while in July, 1910, there were only 118,501, including the local bridge line, operated from the Brooklyn terminal to the Park Row terminal. In July, 1909, there were 31,302 trains of an aggregate of 138,336 cars, which crossed the span, while this year, in the same month, the number was reduced to 30,491 trains, with an aggregate of 132,339 cars. In connection with this report the Brooklyn Rapid Transit Company has issued the following statement: "There has been no change in the schedule of elevated trains or surface cars over the Brooklyn Bridge during the rush hours in the last year. The same number were operated during the morning and evening rush hours in July, 1909, and July, 1910. Whatever decrease there may have been in the schedule, for either elevated or surface lines was for the non-rush hours, and during these hours the company has always provided every passenger with a seat. A part of the decrease in the elevated service, as noted in the report of the Department of Bridges, was due to the fact that in July, 1910, there were several delays on the bridge, which prevented the regular and full operation of the elevated service until the tracks were cleared. The large increase in the number of surface cars and elevated trains operated across the Williamsburg Bridge in the last 12 months shows that the Brooklyn Rapid Transit Company is meeting the expanding traffic over that structure."



## Personal Mention

**Mr. William R. Alberger**, traffic manager of the Tonopah & Tidewater Railway, Los Angeles, Cal., has been elected vice-president and a director of the Oakland (Cal.) Traction Company.

**Mr. H. Askin** has resigned as superintendent of the Atchison Railway, Light & Power Company, Atchison, Kan., to become general manager of the Bartlesville (Okla.) Interurban Railway.

**Mr. E. H. Clark**, formerly master mechanic of the Cleveland & Erie Railway, Girard, Pa., has been appointed master mechanic of the Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.

**Mr. F. T. Loftus** has been appointed acting auditor of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., to succeed Mr. W. B. Wright, who has become connected with the *Toledo Blade*. Mr. Loftus will have his headquarters at Rushville, Ind.

**Mr. Fred C. Randall** has resigned as general superintendent of the Galveston (Tex.) Electric Company, and has opened an office as consulting and constructing engineer, First National Bank Building, Houston, Tex. He will devote himself particularly to electric railway, lighting and power plant engineering work.

**Mr. Horatio A. Foster**, who is associated with Bion J. Arnold, of Chicago, is in Los Angeles, in connection with the appraisal of some electric properties in that region. Owing to many developments of water power in that particular region some of these properties spread over a great deal of territory covering the ground from the Kern River power station, about 120 miles north of Los Angeles, to Redlands, about 70 miles east of the same city, and to Santa Ana, some 35 miles south.

**Mr. J. W. Hewitt**, for a number of years connected with the Seattle (Wash.) Electric Company, as inspector, and later as superintendent of employment, has been appointed superintendent of transportation of the Oregon Water Power division of the Portland Railway, Light & Power Company, Portland, Ore. Previous to entering upon his duties as superintendent of transportation of the Oregon Water Power division of the Portland Railway, Light & Power Company, Mr. Hewitt served as trainmaster of the company.

**Mr. J. H. M. Andrews** has been appointed assistant to the chief engineer of the Philadelphia Rapid Transit Company. Mr. Andrews is a graduate of Pennsylvania State College in the class of 1898, and from 1903 to 1909 was connected with the engineering department of the Philadelphia Rapid Transit Company, first as draftsman and engineer in the roadway department and later in charge of inspection, maintenance, renewal and repair of special work. About a year ago he resigned to become connected with the Lorain Steel Company, from which he resigned to accept the position with the Philadelphia Rapid Transit Company mentioned above.

**Mr. J. J. Johnson** has been appointed assistant to Mr. Anton H. Classen, president of the Oklahoma Railway, Oklahoma City, Okla. Mr. Johnson entered railway work in February, 1889, as stenographer and clerk in the office of superintendent of the St. Louis Southwestern Railway, at Tyler, Tex. He filled various clerical positions in the accounting and auditing departments of the St. Louis Southwestern Railway, finally being elected vice-president and general solicitor of the company. Mr. Johnson resigned from the St. Louis Southwestern Railway to become connected with the operating department of the Mexican Central Railway in the City of Mexico, but resigned this position to enter the legal department of the Missouri Pacific Railway at St. Louis. On Oct. 1, 1906, he resigned from the Missouri Pacific Railway to become chief clerk to Mr. Classen, president of the Oklahoma Railway. In 1907 Mr. Johnson was appointed assistant secretary of the Oklahoma Railway. Later he was elected secretary of the company, which office he still retains.

**Mr. M. S. Ralls** has been appointed engineer of maintenance of way of the Michigan United Railways, Lansing, Mich. During the last 2½ years Mr. Ralls has been engineer in charge of track special work and subway construc-

tion for the Chicago (Ill.) Railways. Mr. Ralls began his engineering career in 1887, with the Union Pacific Railroad, but resigned from the company in 1890 to become assistant city engineer in Salt Lake City. In 1892 he accepted a position with the World's Columbian Exposition, but resigned in 1893 to accept a position with the Lake Street Elevated Railroad, Chicago, Ill., as principal assistant engineer. He was appointed chief engineer of the Trans-Mississippi and International Exposition at Omaha, in 1897, and on the completion of this work in 1900 he became connected with Riggs & Sherman, Toledo, Ohio, engineers, on railroad location and construction. In 1905 Mr. Ralls resigned from Riggs & Sherman to accept a position with the South Side Elevated Railroad, Chicago, Ill., with which he remained until the spring of 1908, when he entered the service of the Chicago Railways.

**Mr. George F. Faber** has been appointed superintendent of transportation of the Michigan United Railways, Lansing, Mich. Mr. Faber was formerly traffic manager of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. Mr. Faber began his railroad career with the Pennsylvania Railroad as clerk in the superintendent's office, where he served from 1890 to 1892. He resigned from this position to become connected with the accounting department of the East Cleveland Railroad, for which, during 1893 and 1894, he filled several minor offices of responsibility and trust. From 1894 to 1901 Mr. Faber was associated with the Warner & Swasey Company, Cleveland, Ohio. During 1900 and 1901 Mr. Faber had charge of the company's department of record of costs on all apparatus manufactured. His object in resigning from this company was to re-enter the electric railway field, and he accepted a position with the so-called Appleyard Lines in Ohio, and afterward acted as superintendent of two of the properties until the termination of the receivership. Mr. Faber then accepted the position of superintendent of the Elgin-Belvidere Electric Railway, which was at that time under construction. After the completion of this property he organized and operated the road for a year, leaving the company to become general superintendent of the Western Ohio Railway, Lima, Ohio, in charge of transportation, car shops and power station. Early in 1909 Mr. Faber accepted the position of traffic manager of the Chicago, Lake Shore & South Bend Railway.

## OBITUARY

**William H. Silverthorn**, president and a member of the executive committee of the Railway Steel-Spring Company, New York, N. Y., died at his home in Painesville, Ohio, on Aug. 13, 1910. For the last 36 years Mr. Silverthorn was associated with Mr. Julius E. French, chairman of the board of directors of the Railway Steel-Spring Company. His first work in the railway supply field was with the Paige Car Wheel Company, of which he was general manager. In 1897 this concern was consolidated with a number of other makers of wheels into the Steel Tired Wheel Company, and Mr. Silverthorn became its general manager. In June, 1902, the Steel Tired Wheel Company was merged into the Railway Steel-Spring Company, and Mr. Silverthorn was elected a director and, later, president of the company.

**Theodore P. Bailey**, assistant manager of the Philadelphia district of the General Electric Company, Schenectady, N. Y., a pioneer in electric lighting and electric railways, is dead. Mr. Bailey was born in Covington, Ky., on Aug. 17, 1856. In 1883 he became identified with the Van Depoele Electric Company, and after the purchase of that company in 1885 by the Thomson-Houston Company he became its Western representative. When the Thomson-Houston Company was merged into the General Electric Company Mr. Bailey continued in immediate charge of the street railway business in the Chicago district. Later he became assistant manager of that office. In 1905 he resigned to go into the railway contracting business as vice-president and general manager of the L. E. Myers Company, Chicago, Ill., where he remained until 1907. In the fall of 1908, after being in charge of the automobile department of the St. Louis Car Company about a year, Mr. Bailey returned to the General Electric Company as assistant manager of the Philadelphia district. He is survived by a widow and one child.



## Construction News

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

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

### RECENT INCORPORATIONS

**Charlotte (N. C.) Rapid Transit Company**—Application has been made by this company for charter to build a street railway in Charlotte and its suburban districts. Authorized capital stock, \$150,000. Applicants for the charter are Cameron Morrison and Paul Chatham, Charlotte; Hugh Chatham, Elkin, and J. E. Kavanaugh, Winston-Salem. [E. R. J., June 18, '10.]

### FRANCHISES

**\*Selma, Ala.**—A franchise has been granted to Ernest Lamar and associates for the construction of a street railway in Selma. It is the intention of the promoters to extend the line to the Birmingham district.

**Jonesboro, Ark.**—The City Council has granted an electric railway franchise to Preston Thatcher for a line in Jonesboro. [E. R. J., Nov. 6, '09.]

**San Diego, Cal.**—The San Diego Electric Railway has asked the Council for a franchise extending from the intersection of Fifteenth Street and K Street to M Street.

**\*Santa Barbara, Cal.**—It is announced that Henry P. Post, representing a group of capitalists, will soon apply for franchises for a street railway that will parallel the lines of the Santa Barbara Consolidated Railway. It is said to be the intention to build one line out toward Goleta, and another line toward Montecito.

**Joliet, Ill.**—The City Council has granted to the Chicago & Joliet Electric Railway a franchise to double-track its lines on Cass Street, Jefferson Street and Chicago Street.

**Iowa City, Ia.**—At a special election held in Iowa City on Aug. 10, the Iowa City, Ottumwa & Southwestern Electric Railway was voted a franchise for a line in that city. [E. R. J., July 16, '10.]

**Mason City, Ia.**—The Mason City & Clear Lake Railway has applied for 25-year extension of its franchise in Mason City. The matter will be voted upon at a special election to be held on Sept. 1.

**Minneapolis, Minn.**—The Electric Short Line Railroad has petitioned the City Council for a franchise to cross city streets to its proposed terminal at Seventh Street and Third Avenue North. E. D. Luce, president. [E. R. J., Aug. 28, '08.]

**Virginia, Minn.**—W. M. Prindle, Duluth, has applied for an extension of his franchise until Aug. 24, 1911, in which to begin work on the proposed street railway in Virginia. [E. R. J., Feb. 29, '10.]

**\*St. Louis, Mo.**—A. A. Busch, H. B. Hawes, C. A. Lemp and Frank Weber have petitioned the County Court for a franchise to build an electric railway from the city limits to Fenton on the Gravois road.

**East Grand Forks, N. D.**—The Grand Forks Transit Company has been granted a 50-year franchise for a street railway in East Grand Forks.

**Butler, Pa.**—The City Council has granted a 50-year franchise to the Pittsburgh, Butler, Slippery Rock & Grove City Railway for a street railway in Butler.

**San Antonio, Tex.**—The City Council has granted a franchise to the San Antonio Traction Company to extend its South Flores Street line from its present terminus to the city limits.

**\*Provo, Utah**—Abel J. Evans has applied to the County Commissioners on behalf of himself and associates for a right-of-way for an interurban railroad along the highways of Utah County.

**Chehalis, Wash.**—The City Council has granted a franchise to the Twin City Light & Power Company, Centralia, to construct a street railway over certain streets in Chehalis. [E. R. J., Apr. 2, '10.]

### TRACK AND ROADWAY

**\*Nanaimo, B. C.**—It is stated that the Dominion Stock & Bond Corporation, Vancouver, is planning to construct a street railway in Nanaimo.

**Glendale & Eagle Rock Railway, Glendale, Cal.**—This company has recently completed and placed in operation an extension to Verdugo Park. It now operates 5½ miles of track.

**Petaluma & Santa Rosa Railway, Petaluma, Cal.**—This company is said to be making surveys for an extension of its line from the present terminus at Forestville to Mirabel Park, 1½ miles distant and construction will be begun this fall. It is intended to build the line down the river westward and touch all the principal summer resorts as far as Monte Rio.

**Stockton Terminal & Eastern Railroad, Stockton, Cal.**—It is stated that this company has completed the first section of its line from Stockton to Linden. It is expected that work will be begun at once on the extension of the railway from Linden to Jenny Lind. The line will be 27 miles long. Gasoline motor cars will be used. R. N. Griffith, president. [E. R. J., May 28, '10.]

**Southern Pacific Company, San Francisco, Cal.**—The work of equipping the suburban steam lines of the Southern Pacific Company in Alameda, Cal., with electricity is nearing completion. Practically all of the tracklaying has been finished and nearly all of the grading is done. Trolley poles have been installed and the feeders placed in position. The auxiliary electric power plant on the north side of the tidal canal near the Fruitvale Avenue bridge, Alameda, is approaching completion, and the steel framework of the car house at Alameda Point is in position. The ballasting of the double track roadbed on the extension loop from Eagle Avenue and Broadway around the east end of the city to the eastern end of Encinal Avenue is under way. On the Alameda mole the trolley wires and power cable will be carried on trusses already in position.

**\*West Palm Beach, Fla.**—It is stated that the Palm Beach Farms Company is financing a projected narrow gage interurban railway to extend from West Palm Beach to Deerfield, running parallel with the Florida East Coast Railroad, and about 5 miles west of this line. The C. T. McCrimmon Company, Miami, will construct the line.

**Chicago, Aurora & De Kalb Railroad, Aurora, Ill.**—This company has placed in operation its newly electrified line between Aurora and De Kalb. It is said to be the intention to extend the line from De Kalb to Rockford, a distance of 30 miles.

**Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.**—This company has secured the services of H. A. Strauss, vice-president and chief engineer, Falkenau Electrical Construction Company, Chicago, as consulting engineer to undertake the design of its proposed extension to Jerseyville, involving about 20 miles of roadbed, track and overhead construction, together with power house. Work on this extension will begin within the next few days.

**Sterling-Moline Traction Company, Sterling, Ill.**—This company has awarded the contract to the Northwestern Construction Company, Milwaukee, Wis., for the construction of its projected line between Sterling and Prophetstown. Preliminary surveys have been completed between Sterling and Moline, including two surveys between Sterling and Prophetstown. It is said that \$100,000 has been subscribed toward the building of the line. It is planned to construct a power plant and dam on the Rock River at Lyndon. A. Van Petten, Sterling, general manager. [E. R. J., Aug. 20, '10.]

**Louisville & Eastern Railroad, Louisville, Ky.**—This company placed in operation on Aug. 20 its entire line between Louisville and Shelbyville, a distance of 30 miles. It is reported that the company, in the near future, will construct a line from Shelbyville to Frankfort, connecting with the Bluegrass Traction Company.

**Midland Power & Traction Company, Cambridge, Md.**—It is stated that this company will soon begin the construction of a 6-mile extension from Byersville to Pleasant City.

**\*Hedgesville, Md.**—It is reported that citizens of Black Creek Valley are planning to construct an electric railway through that section. J. B. Clary, Hedgesville, is said to be interested in the project.

**Boston & Providence Interurban Electric Railroad, Boston, Mass.**—This company has petitioned for a location in North Attleboro to operate its proposed interurban railway. It is the intention of the company to seek a location



at the extreme easterly portion of the town, near the Attleboro line. The company has been granted locations in the other towns along the line. Among the directors of this company are F. S. Pratt, H. Newton, Russell Robb and Richard M. Saltonstall.

**Berkshire Street Railway, Pittsfield, Mass.**—This company is said to be preparing plans for several new extensions to its lines to be built within three years. There are four of these, and work on one, a line from Great Barrington to South Egremont, a distance of  $3\frac{1}{2}$  miles, has already begun. The next extension will be 12 miles long and will reach from Great Barrington to the State line, where it is expected to run through Connecticut territory to Canaan, the Connecticut right being held by the Canaan & Berkshire Tramway. The third extension will be a line from Huntington to Lee, a distance of about 23 miles. The fourth extension will be a line up Mt. Greylock, between North Adams and Cheshire, Mass.

**Pittsfield (Mass.) Street Railway**—This company has awarded a contract to Fred T. Ley & Company, Springfield, to run additional feed wires and repair the overhead construction on its Dalton-Hinsdale line.

**St. Louis, St. Charles & Northern Traction Company, Mexico, Mo.**—Surveys and estimates have been completed for this company for its 98-mile railway to connect St. Louis and Loddonia. R. E. Race, Mexico, has succeeded C. B. Duncan as president and general manager of the company. [E. R. J., June 11, '10.]

**North Missouri Central Railway, Mexico, Mo.**—M. M. Stephens, president of this company, which proposes to build an electric railway from Mexico to Jefferson City via Columbia, asked Columbia, Mexico, Ashland and Jefferson City to raise \$500,000 to be invested in stock or second mortgage bonds to secure the immediate construction of the line. [E. R. J., May 14, '10.]

**Montana Rapid Transit Company, Helena, Mont.**—Press reports state that W. A. Clark has subscribed \$3,000,000 of the proposed bond issue of this company. The line will be 75 miles long. It will be operated by power generated at a dam across the Missouri river near Helena. It is expected that the construction of the line will be undertaken during the fall. [E. R. J., Mar. 12, '10.]

**Public Service Railway, Newark, N. J.**—This company is said to be considering the construction of an extension of its line from Woodbury to Paulsboro. It is probable that the line will be ultimately extended to Pennsgrove.

**Cleveland (Ohio) Railway**—This company recently placed in operation an extension of its Lorain Avenue line from Ninety-eighth Street to 117th Street.

**Cleveland, Van Wert & Indianapolis Traction Company, Norwalk, Ohio**—Press reports state that this company has revived the project of building an interurban railway between Norwalk and Bluffton, Ind., 147 miles, to connect Cleveland with Indianapolis. J. Y. Todd, Spitzer Building, Toledo, is said to be interested. [E. R. J., Oct. 24, '08.]

**Coos Bay Traction Company, North Bend, Ore.**—This company, recently incorporated to build an electric railway from Roseburg to Coos Bay, announces that it is the intention to begin the construction of the line within 60 days. The following officers have been elected: Geo. T. Averill, president; J. H. Somers, vice-president; W. P. Evans, secretary; N. B. Campbell, treasurer; J. H. Robinson, chief engineer. [E. R. J., Aug. 13, '10.]

**Scranton (Pa.) Railway**—It is stated that the contract for building the new Mulberry Street viaduct in Scranton will be let within the next few days. The Scranton Railway will bear, it is said, \$100,000 of the cost of the structure in return for the use of the viaduct.

**West Penn Railways, Pittsburgh, Pa.**—It is stated that this company will begin work within the next few weeks on a new extension between Leisenring and Uniontown, 8 miles, and 3,300 ft. of new double track is to be built between Uniontown and Brownsville Junction. It is said that the entire system of the company is to be ultimately double-tracked.

**Waynesburg & Blackville Street Railway, Waynesburg, Pa.**—This company has let a contract to David Smith for 8,000 ties to be used in the construction of its proposed line from the Pennsylvania-West Virginia State line bound-

dary to Waynesburg, 14 miles. The company will also build about 50 miles of extensions. [E. R. J., July 30, '10.]

**Lake View Traction Company, Memphis, Tenn.**—This company has completed track laying between Memphis and Lakeview, Miss., and the ballasting has been done on about 4 miles. The distance is  $10\frac{1}{4}$  miles, and the ballasting will have been completed within the next two weeks. The poles have been placed and the stringing of wire will begin in a few days. It is expected to place the line in operation by Sept. 15.

**Houston-Bay Shore Traction Company, Houston, Tex.**—This company has awarded the contract for the first 7 miles of the grading between La Porte and South Houston to E. Gay & Sons, Houston. Construction has been begun at the La Porte end of the line. The company proposes to build a line extending from Houston to La Porte via Harrisburg. A. F. Irwin, president. [E. R. J., June 25, '10.]

## SHOPS AND BUILDINGS

**Dartmouth & Westport Street Railway, New Bedford, Mass.**—This company has awarded the contract to John Crowe, Fall River, for the construction of its new freight station at Sixth Street and Bedford Street, Fall River.

**Marion, Bluffton & Eastern Traction Company, Bluffton, Ind.**—Construction is said to have been begun in Bluffton of a union passenger station for the joint use of the Marion, Bluffton & Eastern and the Bluffton, Geneva & Celina traction companies.

**Omaha & Council Bluffs Street Railway, Omaha, Neb.**—This company has submitted plans and specifications to contractors asking for bids for the construction of a new car house, 100 ft. x 250 ft., to be located between Avenue B and Avenue C. The walls of the new building will be of reinforced concrete and steel construction for all the remainder. It will afford trackage for about 100 cars.

## POWER HOUSES AND SUBSTATIONS

**Alton, Jacksonville & Peoria Railway, Jerseyville, Ill.**—This company, which proposes to extend its lines from Godfrey to Jerseyville, will also erect a power station at Jerseyville to furnish power for the entire line. At present power is leased from the Alton Gas & Electric Company.

**Springfield (Mass.) Street Railway**—This company is said to be considering plans for remodeling the boiler house at its power station on Margaret Street. It is said that the improvements to be made will cost, it is estimated, \$60,000.

**Western Massachusetts Street Railway, Westfield, Mass.**—The additions being made to this company's power plant at Westfield include a boiler room 30 ft. x 40 ft., and an engine room 40 ft. x 50 ft. The new machinery includes a 500-hp Hamilton-Corliss cross-compound engine, which is to be directly connected to a 350-kw General Electric generator. Two new boilers of 150 hp each will be placed in the boiler room.

**North Jersey Rapid Transit Company, Paterson, N. J.**—This company, which is building an electric railway from Paterson to Suffern, N. Y., has ordered 2 300-kw. rotary converters, 6 transformers and switchboard apparatus from the Westinghouse Electric & Manufacturing Company.

**New York Central & Hudson River Railroad, New York, N. Y.**—This company has placed an order with the General Electric Company for four 2000-kw rotary converters. Three of these rotaries are to be used in the substation which is now being constructed at Irvington, and one will be placed in the present substation at Glenwood. It is expected to have them all in service by next spring. The company proposes to extend if possible within the present year the electric zone from Yonkers to Hastings, a distance of about 4 miles, for the service of multiple-unit trains. The electric zone will eventually be extended to Croton, and a new substation will be erected at Ossining.

**Third Avenue Railroad, New York, N. Y.**—This company has ordered from the General Electric Company a 1500-kw. rotary converter, with transformers and switchboard, for installation at its 129th Street substation. The company has also purchased from the General Electric Company 4 100-kw. rotary converters with series boosters for charging the storage battery cars which it is now building.



# Manufactures & Supplies

## ROLLING STOCK

**Burlington (Vt.) Traction Company** has ordered three semi-convertible cars from J. M. Jones' Sons.

**Moose Jaw Electric Street Railway, Saskatchewan, Can.,** which has under construction a 7-mile line in Moose Jaw, will purchase six new cars.

**Beech Grove Traction Company, Indianapolis, Ind.,** will purchase eight cars for use on its line now being built from Indianapolis to Beech Grove.

**Richmond & Henrico Railway, Richmond, Va.,** which is building an electric railway in Richmond and its suburbs, is contemplating the purchase of 16 cars.

**Chicago (Ill.) Railways,** it is reported, will buy 200 double-truck cars as soon as the merger of the company with the Chicago Consolidated Traction Company is effected and the rehabilitation ordinance is passed by the Chicago City Council.

**United Railways, Portland, Ore.,** has placed an order with The J. G. Brill Company for two 51-ft. 8-in. combination passenger and smoking cars. One of these cars will be for first-class passengers and the other will be for second-class passengers.

**Knoxville Railway & Light Company, Knoxville, Tenn.,** noted in the *ELECTRIC RAILWAY JOURNAL* of June 11, 1910, as contemplating the purchase of 15 cars, has placed an order with the McGuire-Cummings Manufacturing Company for 15 single-truck closed cars. General Electric motor equipments will be installed on these cars.

**New York & Queens County Railway, Long Island City, N. Y.,** has specified the following details for the 25 double-truck city cars which it has recently ordered from the Jewett Car Company:

Seating capacity.....44	Bumpers .....plate
Weight (car body only), 17,000 lb.	Car trimmings .....bronze
Bolster centers, length, 18 ft. 7¼ in.	Couplers .....Hovey
Length of body.....30 ft.	Curtain fixtures..Cur. S. Co.
Over vestibule.....41 ft.	Destination signs, Ry. Co.'s Std.
Width over sills.7 ft. 11¼ in.	Fenders.....Ry. Co.'s Std.
Over posts at belt, 7 ft. 11¼ in.	Hand brakes.....geared
Height from top of rail to sills .....32 13-16 in.	Heaters .....electric
Body .....wood	Motors .....2 G. E. 210 E.
Interior trim.....cherry	Sanders .....Jewett
Underframe .....wood	Seats .....longitudinal
Air brakes.....West.	Seating material .....rattan
	Trucks, type..Max. traction
	Wheels .....34 in.

## TRADE NOTES

**Safety Foot Guard & Railway Appliance Company, Columbus, Ohio,** has been incorporated with a capital stock of \$10,000. The incorporators are H. D. Ridenour and others.

**Kellogg Switchboard & Supply Company, Chicago, Ill.,** has been made exclusive agent of the United States Electric Company, New York, N. Y., for the sale of railway telephone equipments, including the Gill selector.

**Wheeler Condenser & Engineering Company, Carteret, N. J.,** announces that it is now prepared to furnish Conover condensers and their repair parts, as it has recently acquired the patterns and drawings of this condenser.

**Crocker-Wheeler Company, Ampere, N. J.,** has recently received a large number of orders for direct-current and alternating generators, ranging in size from 120 kw to 750 kw. They aggregate a capacity of 6190 kw. The company also reports the receipt of several orders for direct-current motors aggregating a capacity of 4050 hp.

**New England Engineering Company, New Haven, Conn.,** has removed its engineering offices, under the management of L. L. Gaillard, from New Haven to 50 Church Street, New York, N. Y. The company announces that the following additions have been made recently to its engineering staff: J. W. Thomas, formerly of the engineering staff of Westinghouse, Church, Kerr & Company, New York,

has been appointed mechanical engineer, and L. R. Parker, formerly connected with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has been appointed electrical engineer.

**Kasson Mica Company, Camden, N. J.,** has been incorporated by A. R. Kasson, H. R. Staley and W. B. Wolcott, Camden, with a capital stock of \$50,000, to manufacture and deal in mica. A. R. Kasson, president of the company, has been in the electrical insulation business for the past six years and has recently purchased mica mines in Franklin, N. C., which will be operated by the new concern. Mr. Kasson has been operating these mines for the past three months, and it is said that they are producing a fine quality of mica in satisfactory quantities. It is the intention to install pulverizers in the company's factory at Camden, in order to utilize its waste product and place on the market a superior grade of ground mica. The officers of the company are: A. R. Kasson, president, and H. R. Staley, secretary and treasurer.

**Western Electric Company, Chicago, Ill.,** reports that for the eight months to Aug. 1, 1910, gross sales have been running at the rate of \$61,000,000 per annum, an increase of 48 per cent over the same period of 1909. The per cent of increase in sales in July, 1910, over July, 1909, was about 50 per cent. The company now has 23,000 employees on its pay rolls, an increase of 3000 in the last four months. Last fall the company had 17,000 employees. The addition to working forces in the last few months has been necessitated largely by the increasing use of telephone apparatus in train dispatching. If the present movement holds, it is believed that inside the next five years more than 50 per cent of American railway mileage will be operated by telephone rather than telegraph.

**Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.,** has purchased a 70-acre tract of land at Trafford City, adjoining the property owned by the Westinghouse Machine Company, for the purpose of erecting a large foundry. The cost of the property is said to have been about \$250,000. Nearly 2500 men will be employed at the plant. The Westinghouse Electric & Manufacturing Company has also purchased the controlling interest in the Inter-Works Railroad, which extends from East Pittsburgh through the Boroughs of Turtle Creek, Wilmerding, Pitcairn and Trafford City, a distance of 7 miles. When the new foundry is completed the road will be used to carry material between East Pittsburgh and Trafford City. It will also be equipped with several passenger cars for accommodation of workmen and visitors to the various Westinghouse works. The road has been principally used for testing electric locomotives and other electric motive power.

## ADVERTISING LITERATURE

**Wickes Brothers, Saginaw, Mich.,** have issued their August "Monthly Stock List of Power Equipment."

**Lindsley Brothers Company, Spokane, Wash.,** is mailing a card calling attention to its cedar poles, piling and fir cross-arms.

**Crane Company, Chicago, Ill.,** in the *Valve World* for July, presents an illustrated account of the celebration attending its fifty-fifth anniversary.

**Yale & Towne Manufacturing Company, New York, N. Y.,** has issued a new loose-leaf catalog, No. 20, on locks and builders' hardware. The publication contains 900 pages and more than 4000 new illustrations. A loose-leaf price book has been prepared for use in connection with the catalog.

**De Laval Steam Turbine Company, Trenton, N. J.,** has issued a 96-page catalog entitled "High Efficiency of Centrifugal Pumps," in which the various types of De Laval centrifugal pumps are described and illustrated. It also contains several charts, which show the characteristic curves and efficiencies obtained in tests made on De Laval pumps of various sizes and types.

**Goldschmidt Thermit Company, New York, N. Y.,** has issued a 20-page bulletin in which is described the Thermit process of welding, particularly as applied to repairing electric motor cases, truck frames and armature shafts. It also contains lists of prices of appliances used in connection with the company's welding process.



# STRETTALIZATION

STATES	NUMBER OF RAILWAY COMPANIES		OUTSTANDING		TOTAL STOCK AND BONDS OUTSTANDING		
			MI T	INCREASE	TOTAL		INCREASE
					1908	1909	
Year.....	1908	1909	1908	1909	1908	1909	
<b>New England States</b>							
Connecticut.....	14	13	1,039,400	\$1,424,022	\$73,869,478	\$61,091,700	*\$12,777,778
Maine.....	16	18	494,000	2,206,500	22,872,213	25,341,113	2,468,900
Massachusetts.....	69	66	2,988,500	*5,261,850	171,814,800	158,251,550	*13,563,250
New Hampshire.....	20	20	297,000	43,000	10,994,200	11,575,132	580,932
Rhode Island.....	10	11	466,000	*137,500	43,646,200	43,828,300	182,100
Vermont.....	11	10	121,500	426,000	7,295,500	8,082,000	786,500
<b>Total.....</b>	<b>140</b>	<b>138</b>	<b>5,396,400</b>	<b>*1,299,828</b>	<b>330,492,391</b>	<b>308,169,795</b>	<b>*22,322,596</b>
<b>Eastern States</b>							
Delaware.....	4	4	734,000	1,195,000	9,679,000	10,874,000	1,195,000
District of Columbia.....	8	10	393,518	*6,306,569	83,853,187	80,546,818	*3,306,369
Maryland.....	14	12	566,000	*14,945,000	99,758,050	83,717,050	*16,041,000
New Jersey.....	48	51	1,288,600	*14,659,900	221,408,480	197,375,830	*24,032,650
New York.....	168	155	4,720,530	68,576,857	951,143,125	999,969,547	48,826,422
Pennsylvania.....	170	175	4,210,456	10,490,225	514,559,918	536,654,816	22,094,898
Virginia.....	24	23	470,100	*3,670,000	67,627,700	59,327,750	*8,299,950
West Virginia.....	24	22	350,150	801,500	26,227,900	27,934,200	1,706,300
<b>Total.....</b>	<b>460</b>	<b>452</b>	<b>12,063,248</b>	<b>41,482,113</b>	<b>1,974,257,360</b>	<b>1,996,400,011</b>	<b>22,142,651</b>
<b>Central States</b>							
Illinois.....	65	79	3,015,385	26,467,017	370,303,340	413,315,817	43,012,477
Indiana.....	53	50	2,320,905	6,685,300	178,091,010	184,789,330	6,698,320
Iowa.....	30	29	760,200	4,497,500	61,492,700	65,650,300	4,157,600
Kentucky.....	13	12	380,700	3,786,000	43,351,900	50,059,400	6,707,500
Michigan.....	28	26	1,358,000	*1,182,000	99,896,800	96,032,500	*3,864,300
Minnesota.....	10	10	560,800	*360,000	56,370,000	54,615,000	*1,755,000
Missouri.....	27	27	1,088,600	*2,253,000	187,164,700	185,825,500	*1,339,200
Ohio.....	105	100	4,457,540	*1,590,460	369,108,973	357,721,538	*11,387,435
Wisconsin.....	23	25	790,190	884,500	83,374,400	77,578,900	*5,795,500
<b>Total.....</b>	<b>354</b>	<b>358</b>	<b>14,723,347</b>	<b>36,934,857</b>	<b>1,449,153,823</b>	<b>1,485,588,285</b>	<b>36,434,462</b>
<b>Southern States</b>							
Alabama.....	11	11	302,800	684,000	30,259,000	30,473,000	214,000
Arkansas.....	9	8	132,600	65,000	10,089,800	9,114,800	*975,000
Florida.....	10	11	150,850	291,500	8,171,000	8,520,500	349,500
Georgia.....	13	18	395,750	1,917,500	46,235,794	50,565,094	4,329,300
Louisiana.....	8	8	250,580	2,934,808	84,896,900	90,204,108	5,307,208
Mississippi.....	10	10	96,200	385,500	7,417,870	7,715,370	297,500
North Carolina.....	14	14	150,380	*33,000	12,313,000	12,060,500	*252,500
South Carolina.....	7	7	140,300	*90,000	9,789,280	9,699,280	*90,000
Tennessee.....	11	11	360,800	199,000	42,155,600	48,957,900	6,802,300
<b>Total.....</b>	<b>93</b>	<b>98</b>	<b>1,975,883</b>	<b>6,354,308</b>	<b>251,328,244</b>	<b>267,310,552</b>	<b>15,982,308</b>
<b>Western States</b>							
Arizona.....	4	5	370,000	.....	960,000	860,000	*100,000
California.....	53	55	2,530,362	13,973,200	260,398,400	280,394,300	19,995,900
Colorado.....	17	17	472,000	2,660,000	43,752,200	50,381,700	6,629,500
Idaho.....	7	5	145,130	174,000	4,199,400	4,697,000	497,600
Kansas.....	17	17	295,110	*644,000	15,406,000	13,504,295	*1,901,705
Montana.....	6	7	81,600	10,000	4,409,615	4,639,615	230,000
Nebraska.....	10	8	240,530	526,000	24,614,400	23,184,000	*1,430,400
Nevada.....	2	2	113,000	.....	1,230,000	1,172,000	*58,000
New Mexico.....	2	2	115,000	.....	700,000	650,000	*50,000
North Dakota.....	3	3	180,000	.....	660,000	614,980	*45,020
Oklahoma.....	15	15	215,135	1,292,500	8,325,000	10,862,300	2,537,300
Oregon.....	12	12	390,990	7,025,000	46,184,000	57,199,000	11,015,000
South Dakota.....	4	3	30,500	.....	150,000	650,000	500,000
Texas.....	29	33	550,586	3,320,000	44,036,000	49,259,200	5,223,200
Utah.....	5	4	166,210	*2,664,000	16,097,500	12,658,500	*3,439,000
Washington.....	18	18	900,870	3,412,000	77,706,810	84,465,100	6,758,290
Wyoming.....	1	1	50,000	.....	75,000	75,000	.....
<b>Total.....</b>	<b>205</b>	<b>207</b>	<b>6,096,729</b>	<b>29,084,700</b>	<b>548,904,325</b>	<b>595,266,990</b>	<b>46,362,665</b>
<b>United States</b>							
	1,252	1,253	40,247,800	112,356,150	4,554,136,143	4,652,735,633	98,599,490
Hawaii, Porto Rico and Philippine Islands & West Indies..	11	11	185,541,000	*412,500	26,014,500	25,491,000	*523,500
Canada and Newfoundland...	52	55	1,250,276,887	4,425,475	104,437,074	106,395,497	1,958,423
Cuba.....	4	4	140,227,731	1,304,550	40,785,681	42,590,231	1,804,550

\* Decrease







# STREET AND ELEVATED RAILWAY MILEAGE, CARS AND CAPITALIZATION

COMPILED FROM "AMERICAN STREET RAILWAY INVESTMENTS," EDITION OF 1910

Year	NUMBER OF RAILWAY COMPANIES		ELECTRIC RAILWAYS							CAPITAL STOCK OUTSTANDING			FUNDED DEBT OUTSTANDING		TOTAL STOCK AND BONDS OUTSTANDING				
			MILES OF TRACK		ELECTRICALLY EQUIPPED CARS, TROLLEYS AND LOCOMOTIVES		SERVICE AND OTHER CARS		TOTAL CARS		TOTAL		INCREASE	TOTAL		INCREASE	TOTAL		INCREASE
			1908	1909	1908	1909	1908	1909	1908	1909	1908	1909		1908	1909		1908	1909	
<b>New England States</b>																			
Connecticut	14	13	1,035	1,037	1,930	2,163	170	314	2,100	2,477	\$36,524,100	\$22,322,300	*\$14,201,800	\$37,345,378	\$38,769,400	\$1,424,022	\$73,869,478	\$61,091,700	*\$12,777,778
Maine	16	18	495	495	530	550	225	210	755	760	10,904,713	11,167,113	262,400	11,967,500	14,174,000	2,206,500	22,872,213	25,341,113	2,468,900
Massachusetts	69	66	2,980	2,985	8,260	8,265	2,250	2,255	10,510	10,520	99,074,450	99,773,050	*8,301,400	72,740,350	67,478,500	*5,261,850	171,814,800	158,251,550	*13,563,250
New Hampshire	20	20	295	297	450	385	45	45	495	430	6,570,200	7,108,132	537,932	4,424,000	4,467,000	43,000	10,994,200	11,575,132	580,932
Rhode Island	10	11	460	461	1,000	1,015	200	170	1,200	1,185	26,192,700	26,512,300	319,600	17,453,500	17,316,000	*137,500	43,646,200	43,828,300	182,100
Vermont	11	10	125	114	130	130	20	20	150	150	3,970,000	4,330,500	360,500	3,325,500	3,751,500	426,000	7,295,500	8,082,000	786,500
<b>Total</b>	<b>140</b>	<b>138</b>	<b>5,390</b>	<b>5,389</b>	<b>12,300</b>	<b>12,508</b>	<b>2,910</b>	<b>3,014</b>	<b>15,210</b>	<b>15,522</b>	<b>183,236,163</b>	<b>162,213,393</b>	<b>*21,022,768</b>	<b>147,256,228</b>	<b>145,956,400</b>	<b>*1,299,828</b>	<b>330,492,391</b>	<b>308,169,795</b>	<b>*22,322,596</b>
<b>Eastern States</b>																			
Delaware	4	4	75	75	155	155	16	16	171	171	4,350,000	4,350,000		5,329,000	6,524,000	1,195,000	9,679,000	10,874,000	1,195,000
District of Columbia	8	10	393	393	1,015	1,018	435	445	1,450	1,463	42,048,100	45,048,300	3,000,200	41,805,087	35,498,518	*6,306,569	83,853,187	80,546,818	*3,306,369
Maryland	14	12	560	560	1,990	1,890	185	180	2,175	2,070	26,808,050	25,712,050	*1,096,000	72,950,000	58,005,000	*14,945,000	99,758,050	83,717,050	*16,041,000
New Jersey	48	51	1,285	1,320	2,825	2,745	365	225	3,190	2,970	105,549,980	96,177,230	*9,372,750	115,858,500	101,198,600	*14,659,900	221,408,480	197,375,830	*24,032,650
New York	168	155	4,720	4,750	13,700	14,450	4,290	4,050	17,990	18,500	495,714,675	475,964,240	*19,750,435	455,428,450	524,005,307	68,576,857	951,143,125	999,969,547	48,826,422
Pennsylvania	170	175	4,210	4,215	8,475	8,270	1,150	1,100	9,625	9,370	302,411,687	314,016,360	11,604,673	212,148,231	222,638,456	10,490,225	514,559,918	536,654,816	22,094,898
Virginia	24	23	470	470	670	670	210	210	880	880	32,766,600	28,136,650	*4,629,950	34,861,100	31,191,100	*3,670,000	67,627,700	59,327,750	*8,299,950
West Virginia	24	22	350	315	435	480	35	40	470	520	14,217,900	15,122,700	904,800	12,010,000	12,811,500	801,500	26,227,900	27,934,200	1,706,300
<b>Total</b>	<b>460</b>	<b>452</b>	<b>12,063</b>	<b>12,098</b>	<b>29,265</b>	<b>29,678</b>	<b>6,686</b>	<b>6,266</b>	<b>35,951</b>	<b>35,944</b>	<b>1,023,866,992</b>	<b>1,004,527,530</b>	<b>*19,339,462</b>	<b>950,390,368</b>	<b>991,872,481</b>	<b>-41,482,113</b>	<b>1,974,257,360</b>	<b>1,996,400,011</b>	<b>22,142,651</b>
<b>Central States</b>																			
Illinois	65	79	3,015	3,034	5,100	5,550	2,260	2,290	7,360	7,840	172,956,500	189,501,960	16,545,460	197,346,840	223,813,857	26,467,017	370,303,340	413,315,817	43,012,477
Indiana	53	50	2,320	2,328	2,000	1,990	440	458	2,440	2,448	102,297,260	102,310,280	13,020	75,793,750	82,479,050	6,685,300	178,091,010	184,789,330	6,698,320
Iowa	30	29	760	765	860	870	130	135	990	1,005	36,588,200	36,248,300	*339,900	24,904,500	29,402,000	4,497,500	61,492,700	65,650,300	4,157,600
Kentucky	13	12	380	460	625	800	300	305	925	1,105	23,620,900	26,542,400	2,921,500	19,731,000	23,517,000	3,786,000	43,351,900	50,059,400	6,707,500
Michigan	28	26	1,355	1,445	1,915	1,935	500	505	2,415	2,440	42,666,800	39,984,500	*2,682,300	57,230,000	56,048,000	*1,182,000	99,896,800	96,032,500	*3,864,300
Minnesota	10	10	560	560	790	850	50	45	840	895	32,912,000	31,517,000	*1,395,000	23,458,000	23,098,000	*360,000	56,370,000	54,615,000	*1,755,000
Missouri	27	27	1,088	1,090	2,320	2,260	390	300	2,710	2,560	87,975,700	88,889,500	913,800	99,189,000	96,936,000	*2,253,000	187,164,700	185,825,500	*1,339,200
Ohio	105	100	4,455	4,245	5,100	5,135	620	645	5,720	5,780	234,240,973	224,443,998	*9,796,975	134,868,000	133,277,540	*1,590,460	369,108,973	357,721,538	*11,387,435
Wisconsin	23	25	790	790	835	800	115	116	950	916	38,477,000	31,797,000	*6,680,000	44,897,400	45,781,900	884,500	83,374,400	77,578,900	*5,795,500
<b>Total</b>	<b>354</b>	<b>358</b>	<b>14,723</b>	<b>14,717</b>	<b>19,545</b>	<b>20,190</b>	<b>4,805</b>	<b>4,799</b>	<b>24,350</b>	<b>24,989</b>	<b>771,735,333</b>	<b>771,234,938</b>	<b>*500,395</b>	<b>677,418,490</b>	<b>714,353,347</b>	<b>36,934,857</b>	<b>1,449,153,823</b>	<b>1,485,588,285</b>	<b>36,434,462</b>
<b>Southern States</b>																			
Alabama	11	11	302	302	410	412	190	192	600	604	15,475,000	15,005,000	*470,000	14,784,000	15,468,000	684,000	30,259,000	30,473,000	214,000
Arkansas	9	8	132	100	193	217	35	35	228	252	5,491,800	4,451,800	*1,040,000	4,598,000	4,663,000	65,000	10,089,800	9,114,800	*975,000
Florida	10	11	150	153	175	178	60	45	235	223	5,132,000	5,074,000	58,000	3,097,000	3,388,500	291,500	8,171,000	8,520,500	349,500
Georgia	13	18	395	430	570	573	105	142	675	715	24,378,294	26,790,094	2,411,800	21,857,500	23,775,000	1,917,500	46,235,794	50,565,094	4,329,300
Louisiana	8	8	250	254	640	635	60	62	700	697	53,395,900	55,768,300	2,372,400	31,501,000	34,435,808	2,934,808	84,896,900	90,204,108	5,307,208
Mississippi	10	10	96	100	155	160	20	18	175	178	3,421,370	3,333,370	*88,000	3,946,500	4,382,000	385,500	7,417,870	7,715,370	297,500
North Carolina	14	14	150	150	185	222	40	51	225	273	6,842,000	6,622,500	*219,500	5,471,000	5,438,000	*33,000	12,313,000	12,060,500	*252,500
South Carolina	7	7	140	140	160	160	30	25	190	185	4,369,280	4,369,280		5,420,000	5,330,000	*90,000	9,789,280	9,699,280	*90,000
Tennessee	11	11	360	360	680	685	65	70	745	755	19,346,600	25,949,900	6,603,300	22,809,000	23,008,000	199,000	42,155,600	48,957,900	6,802,300
<b>Total</b>	<b>93</b>	<b>98</b>	<b>1,975</b>	<b>1,989</b>	<b>3,168</b>	<b>3,242</b>	<b>605</b>	<b>640</b>	<b>3,773</b>	<b>3,882</b>	<b>137,794,244</b>	<b>147,422,244</b>	<b>9,628,000</b>	<b>113,534,000</b>	<b>119,888,308</b>	<b>6,354,308</b>	<b>251,328,244</b>	<b>267,310,552</b>	<b>15,982,308</b>
<b>Western States</b>																			
Arizona	4	5	37	42	30	33	7	6	37	39	860,000	760,000	*100,000	100,000	100,000		960,000	860,000	*100,000
California	53	55	2,530	2,537	2,579	2,629	1,330	1,620	3,909	4,249	162,435,400	168,458,100	6,022,700	97,963,000	111,936,200	13,973,200	260,398,400	280,394,300	19,995,900
Colorado	17	17	472	535	445	520	480	570	925	1,090	24,192,200	28,161,700	3,969,500	19,560,000	22,220,000	2,660,000	43,752,200	50,381,700	6,629,500
Idaho	7	5	145	150	65	70	50	50	115	120	2,460,400	2,784,000	323,600	1,739,000	1,913,000	174,000	4,697,000	4,199,400	497,600
Kansas	17	17	295	295	235	260	95	90	330	350	8,751,000	7,493,295	*1,257,705	6,655,000	6,011,000	*644,000	15,406,000	13,504,295	*1,901,705
Montana	6	7	81	107	117	118	20	25	137	143	2,759,615	2,979,615	220,000	1,650,000	1,660,000	10,000	4,409,615	4,639,615	230,000
Nebraska	10	8	240	235	460	465	60	50	520	515	14,587,400	12,631,000	*1,956,400	10,027,000	10,553,000	526,000	24,614,400	23,184,000	*1,430,400
Nevada	2	2	11	11	10	10	2	2	12	12	1,100,000	1,042,000	*58,000	130,000	130,000		1,230,000	1,172,000	*58,000
New Mexico	2	2	11	11	10	10	1	1	11	11	350,000	300,000	*50,000	350,000	350,000		700,000	600,000	*100,000
North Dakota	3	3	18	18	45	45	5	5	50	50	360,000	314,980	*45,020	300,000	300,000		600,000	614,980	*85,020
Oklahoma	15	15	215	215	140	180	30	50	170	230	5,604,000								



