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JAMES H. MCGRAW, President.

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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.

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CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
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Prompt Investigation of Accidents

The old saying, "Forewarned is forearmed," should be the slogan of every electric-railway claim department. Some claim agents do not think it necessary to follow up an accident as soon as the telephone account is received, but wait until the formal reports of the platform men involved have been submitted. Others seek no further data when the accident reports seem to show that the accident is slight. This policy of delay may easily prove mistaken economy. The time to secure all possible testimony is immediately after the accident, when the injured persons, the damaged property and the witnesses of the occurrence are still on the ground or within easy call. The excitement of the moment often provides the only opportunity to secure a truthful account before the memories of the onlookers become clouded by time and prejudice. If the depositions of the witnesses are reinforced by drawings and photographs of the scene of the accident, which may easily be made at the time, and by a "pedigree" of the possible plaintiff the claim agent can surely afford to bide his time serenely before disputing the case either in or out of court. Anticipation of trouble may increase the total cost of field and office investigation, but it offers the opportunity of decreasing the large sums which otherwise are paid out for settlements and counsel fees.

Raising the Standard of Lubrication

Oiling cars is dirty work and it is usually delegated to the cheapest and least intelligent laborers around the car-houses and shops. For the most part it is done at night, even on those roads which make a practice of daylight inspection, and frequently the oilers are subject to practically no supervision. For these reasons it is not a matter of surprise that few companies are getting more than a small part of the real value out of the oil which is used. Since the safe and continuous operation of the cars depends in no small degree upon the care and skill with which the motor and journal bearings are lubricated and inspected, too much emphasis cannot be laid on the necessity of establishing a high standard in this department of rolling stock maintenance. The company which is desirous of improving its lubrication practice should begin at the bottom and improve the standard of the men who apply the lubricants. No printed or verbal instructions, however complete they may be, will entirely supplant experience and the exercise of good judgment on the part of the oilers. They should be able to tell at a glance when the waste is thoroughly saturated and when it is charred and needs renewal. Some

NEW DELEGATES AT THE CONVENTION

incentive to prevent waste of oil without skimping the amount necessary for proper lubrication would go far to reduce excessive consumption. This might take the form of a bonus on the oil saved, with strict accounting for every hot bearing, or the limitation of the amount of oil supplied per month to each carhouse. Most of the steam railroads allow their enginemen fixed quantities of oils of various kinds for each 100 miles run and the tendency is constantly to decrease the allowances as the enginemen, who are the oilers, become more expert in the use of oil. The surest way of reducing the waste and improving the practice of lubrication, however, is to replace the ignorant and irresponsible oilers now employed with men who can be taught to do their work properly and can be trusted to do it the way they are taught. It may cost a little more in wages, but the advantages will make it worth while.

A New Theory on Rail Corrugation

We take pleasure in publishing this week a new and ingenious theory on the cause of rail corrugation, by Mr. Pellissier, although we are not prepared to accept it as the final explanation of this baffling phenomenon. Briefly, Mr. Pellissier attributes the comparative immunity of T-rail from corrugation to the rounded shape of the head of the rail. Because of this form he believes that the maximum intensity of the wheel pressure on a T-rail occurs near the center of the head of the rail, where it is distributed with fair uniformity throughout the cubical contents of the head, whereas in girder rail the stresses are concentrated in a much smaller area near the edge of the rail. There is no doubt that in railway practice even small wheel loads will impose at the point of contact a pressure far in excess of the elastic limit of the steel in the head of the rail. Thus, it has been shown that a load of 4500 lb. on a 33-in. cast-iron wheel resting on a T-rail will exert on the area of contact an average pressure of 50,000 lb. per square inch, and that a load of 12,000 lb. under the same conditions will exert a pressure of 126,000 lb. per square inch. But if corrugation was dependent entirely upon the size of the area of contact and its position on the head of the rail it would follow that all rails of the same section held on the same foundations by the same attachments and subjected to the same traffic would develop corrugation to an equal extent. This does not appear to be the case. Moreover, the theory presupposes that the load on T-rails or on those rails which do not develop corrugation is normally carried at the center of the head and that on girder rails which develop corrugation at the side of the head. But we believe that both new T-rail and girder-rail track will show their first signs of wear along the edge of the head next to the gage line, and that later in both types of track, on account of the wear of the wheels and the wearing away and cold flow of the metal in the rail, the area of the contact becomes broader and finally extends across or nearly across the rail head. It is quite possible that other objections to Mr. Pellissier's theory will occur to readers of this paper, but there are objections to every theory which has been proposed to explain the cause of rail corrugation. Probably one reason for the large number which have been proposed is that it is about as difficult to prove a theory to be wrong as to prove it to be right.

By Oct. 1 most railway companies that intend to be represented at the convention will have selected their delegates or will be about to do so. To those men who have been chosen for the first time a few words of suggestion might be offered. We hardly believe that their companies expect them to obtain so much information at Atlantic City that they will be able on their return to solve immediately all of the problems which exist on every property. On the other hand, they will be expected to derive at least enough knowledge of possible benefits to the companies with which they are associated to warrant the expense incurred in sending them there. Hence it would be well for each delegate who is being sent for the first time by a member company to the convention to give some thought to the matter before he starts and to learn if possible, from those who have attended previous conventions, how best to profit by the trip. He should then plan his time accordingly.

Each new delegate should also remember that his duty at the convention is twofold; one obligation is to the company which sends him, the other is to the association. The first we have already mentioned. He should derive as much benefit as he can from attendance at the meetings, from talking with other railway men and from the exhibits. The latter should be studied to see to what extent the apparatus shown may be applied with profit to conditions on his own line. His responsibilities to the association are equally important. If every delegate went to Atlantic City for the purpose of receiving information only, the meetings would result in failure. Each man who is to attend the convention this year for the first time should therefore resolve to contribute his share to the discussions, and should remember that an account of failures and the reasons therefor is usually as valuable in deciding upon the best course to follow as a statement purely of successes. There is nothing which a delegate can do which will encourage his company to send a larger representation each year than to care for the interests of his company and of the association in the manner described.

Finally, the companies themselves can contribute greatly to the success of the convention by having each department well represented by the best men in those departments. The opportunity of attending a national convention occurs only once a year, and it is useless to say that the heads and responsible men in the different departments can derive nearly as much good by a careful reading of the reports of the meetings as by actually being present. We believe that everyone who has read the report of a discussion on a subject in which he was particularly interested has felt that he could understand the situation better if he could have been present. This is partly because no printed report can fully convey the entire spirit of a meeting, even if it should contain everything which is said. But even if a man can gather from a report of a meeting all that he would gain from attendance, he would still lose all the other benefits of convention week, such as the exchange of views with other railway men and the opportunity of inspecting the exhibits. In the opinion of many men who have attended conventions, each of these matters is of equal value with attendance upon the meetings themselves.

THE PROBLEM OF OLD MOTORS

Almost every electric railway which has been in operation for ten years or more is daily confronted with the problem of what to do with the older types of motors under its cars. As compared with the more modern types, these old motors are expensive to maintain and lubricate, and the frequent repairs to which they have been subjected have not improved their originally low mechanical and electrical efficiency. They require a stock of extra parts to be kept on hand, and as the manufacturers of some of these types of motors have long since gone out of business, these parts have to be made up in the railway company's own shop or in some outside shop which charges fancy prices for such work. At the same time, these old motors with proper care are capable of propelling cars, and for this reason alone they are retained in use.

There has been almost as much improvement in railway motor design in the last ten years as has taken place in power-generating machinery. Simple engines and belted generators in the early days were rapidly displaced by compound direct-connected units, which in turn are giving way to turbo-generators. The machinery removed from power houses to make room for more modern machinery seldom has been completely worn out, but it has lost its place because it was less efficient than the new apparatus installed. If this is justifiable practice in the power house where the energy is produced, it is an equally justifiable practice when applied to the motors where the energy is expended. If the extra cost of maintenance and lubrication and the loss of revenue on cars pulled in for motor trouble were added to the electrical and mechanical losses as compared with modern motors, the annual cost of keeping these old motors in service would more than equal the saving made in the power house by reason of the substitution of the most efficient generating apparatus for moderately economical engines and generators.

The economical life of a railway motor is a variable period, and no rule can be laid down for determining when economical maintenance ceases and expensive and continuous rehabilitation begins. But it is safe to say that when the annual cost of maintenance of an old motor exceeds the cost of maintenance of a new motor plus the interest on the investment in the new motor, it is along the lines of true economy to make the change. Thus, if the average cost of maintenance of a modern 50-hp interpole motor for the first five years is 50 cents per 1000 motor miles and its first cost is \$700, the annual cost, assuming 25,000 miles per year and interest at 5 per cent, would be \$47.50. As compared with this figure, one company in the East is spending \$3.24 per 1000 motor miles for the maintenance of the few G.E.-1000 motors which it still has in service. On the basis of 25,000 motor miles these old motors are costing the company \$81 per year, or \$33 more than new motors would cost. The maintenance of old motors will never cost less as time goes on, and the improvements in modern types of motors should keep the future cost of maintaining these equipments at a moderately low figure for a long period of years. Those companies which have a large number of old motors in service would profit by analyzing the maintenance and lubricating

costs of each type of motor and eliminating as rapidly as possible all of the old equipment which is costing more than it is worth.

PARLOR CARS ON INTERURBAN ROADS

The more luxurious equipment of the through trains operated by steam railroads has been one of the chief reasons why the competing interurban roads have not been able to secure a larger share of the long-distance traffic. The American public likes comfort and is willing to pay for it, especially when traveling. The interurban roads for the most part provide fast and convenient schedules and good roadbeds, with no smoke and no dirt, but the largest and finest coaches which they operate are not to be compared from the standpoint of comfort with the parlor, dining and café cars of the steam railroads. An individual seat which can be reserved in advance at a moderate cost is a large consideration in the mind of a traveler in the selection of a route for his journey. It is not surprising, therefore, that many of the larger interurban systems in the Central West and the Far West are adding parlor cars to their equipment in an effort to build up through traffic on an equal competitive basis with the steam railroads. The results in most cases have been encouraging if not immediately productive of large increases in revenue.

The Illinois Traction System, which was the pioneer in operating interurban sleeping cars, only recently put into service two parlor-car trains in each direction daily on all divisions. The lengths of the runs vary from 100 miles to 227 miles. The large scale on which this service was inaugurated is an indication that the management was convinced that it would be profitable. Certainly the revenue obtained from the sleeping-car service of the Illinois Traction System, which is described elsewhere in this issue, has been large enough to warrant an effort to obtain an equal if not larger share of the through travel in the daylight hours. The new parlor cars of the Illinois Traction System are as complete and luxurious in their appointments as any similar cars operated by competing steam roads, and the rates of fare for seats average about the same as those charged in Pullman cars.

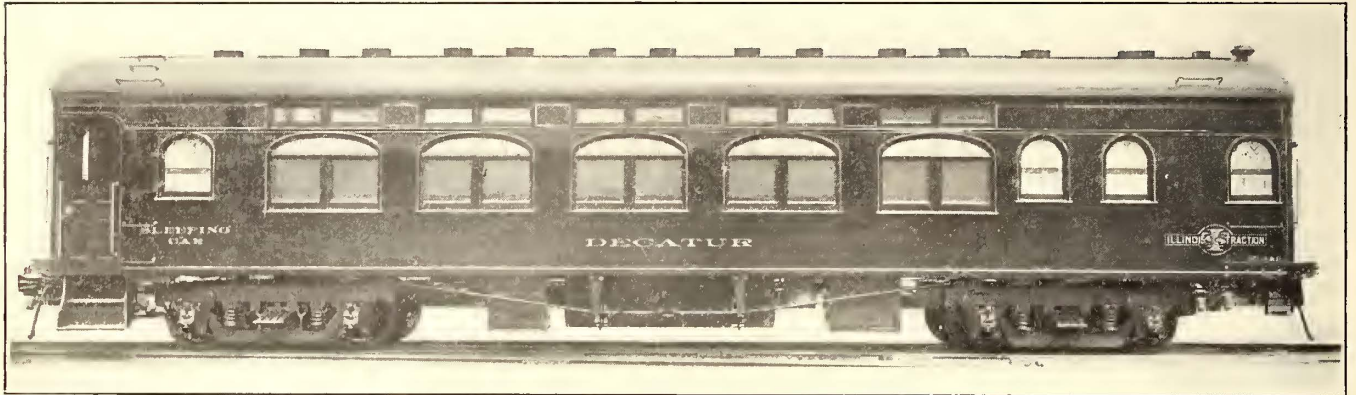
One of the principal operating objections to parlor cars is the limited seating capacity which they provide. The parlor cars of the Illinois Traction System, for example, have seats for only thirty-five passengers, whereas a coach of the same size will seat fifty-six passengers. When parlor cars are operated as trailers, however, and are hauled by a motor coach the cost of operating the two-car train is only slightly more than for a single car. A porter for the parlor car at \$50 a month represents the only additional labor expense. As regards power consumption, the tests made by the Illinois Traction System show that a two-car train consisting of a motor coach and trailer parlor car consumed only 650 kw-hours in a run of 175 miles, as compared with 504.5 kw-hours for a single motor coach. The total extra cost of operating a parlor car as a trailer works out then at less than 2 cents per mile for power and wages, whereas the total extra revenue from thirty-five passengers at 2½ cents would be \$7½ cents per mile. This should leave a large margin of profit.

Sleeping-Car and Parlor-Car Service on the Illinois Traction System

A Description of the Latest Types of Parlor and Sleeping Cars Is Given, Together with a Statement of the Operating Revenues and Expenses of the Sleeping-Car Service

During the past two years the Illinois Traction System has made many improvements in the character of its passenger service, particularly by the installation of sleeping and parlor car service. It is the only electric railway regularly operating sleeping cars, and is one of the few inter-urban roads operating parlor-observation cars on long

hinged berth frames with springs and mattresses 6 ft. 2 in. long, individual electric lights and wall safes in each berth, a system of automatic ventilation and an especially rugged design of car body with an arch roof. The constructional features of these cars were described in the *ELECTRIC RAILWAY JOURNAL* for March 19, 1910, page 476. The re-



Illinois Traction System—Exterior of New Sleeping Car

runs. The sleeping and parlor-car services are considered very profitable by the management of the road because they are good advertisements and encourage a class of travel which otherwise would use the competitive steam lines.

The first sleeping cars to be operated by the Illinois Traction System were built by the Holland Sleeping Car Company about six years ago. These cars were equipped with motors and were operated as single cars between Springfield and St. Louis, a distance of 100 miles. While these cars were inferior in their accommodations as compared with the later types of sleeping cars, they proved to the management that electric railway sleeping-car service was a possibility. Accordingly in the fall of 1909 an order

was placed with the Barney & Smith Car Company for two more sleeping cars of the same design. These cars were put in service on April 1, 1911, replacing the Holland sleeping cars, one of which will be refitted as a day coach.

LATEST TYPE OF SLEEPING CARS

The two cars built this year are similar in general design to those built in 1910. They are 3 ft. longer than the cars built last year, however, and this space has been added to the men's wash room. The new cars are 57 ft. 3 in. long over buffers, and 9 ft. 4 $\frac{3}{4}$ in. wide over the sills. The floor plan, a cross-section of the body and an elevation of the side finish in one section are reproduced. The designs for



Illinois Traction System—Two-Car Train with Sleeping Car

was placed with the American Car & Foundry Company for two sleeping cars of novel design. The plans for these cars were made by J. M. Bosenbury, superintendent motive power and equipment, under the supervision of H. E. Chubbuck, vice-president executive. The principal innovations in the new sleeping cars were the windows in the upper berths, permanent bulkheads between sections,

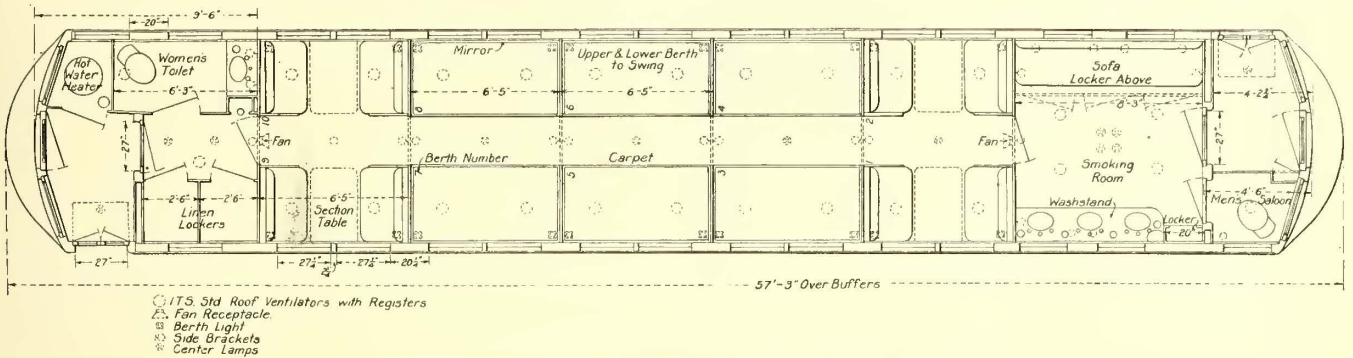
the body, berths, fittings and ventilating apparatus were prepared by the rolling stock engineering department of the Illinois Traction System.

All sleeping cars are runs as trailers and are mounted on M. C. B. steam coach trucks, which have steel frames and quadruple full-elliptic bolster springs. The Illinois Traction System cars are all equipped with M. C. B. type radial

couplers having an extended guard arm on one side, a receiving shoulder on the other side and a 14-in. knuckle. These couplers are mounted at standard M. C. B. height, and may be operated from the side of the car.

The bodies of these new sleeping cars are supported on composite wood and steel underframes of heavy design with six steel sills and a sub-floor to hold a 4-in. layer of

cludes a sofa seat 8 ft. long on one side and a washstand with three bowls on the other side, a dental bowl at one end, a water cooler and several large mirrors. The washstand and plumbing fittings are made of "Nickeline". Four exhaust ventilators are provided in the ceiling of the wash room and one above the toilet room. The wash room is illuminated by fourteen tantalum lamps. All the lamps



Illinois Traction System—Floor Plan of New Sleeping Car

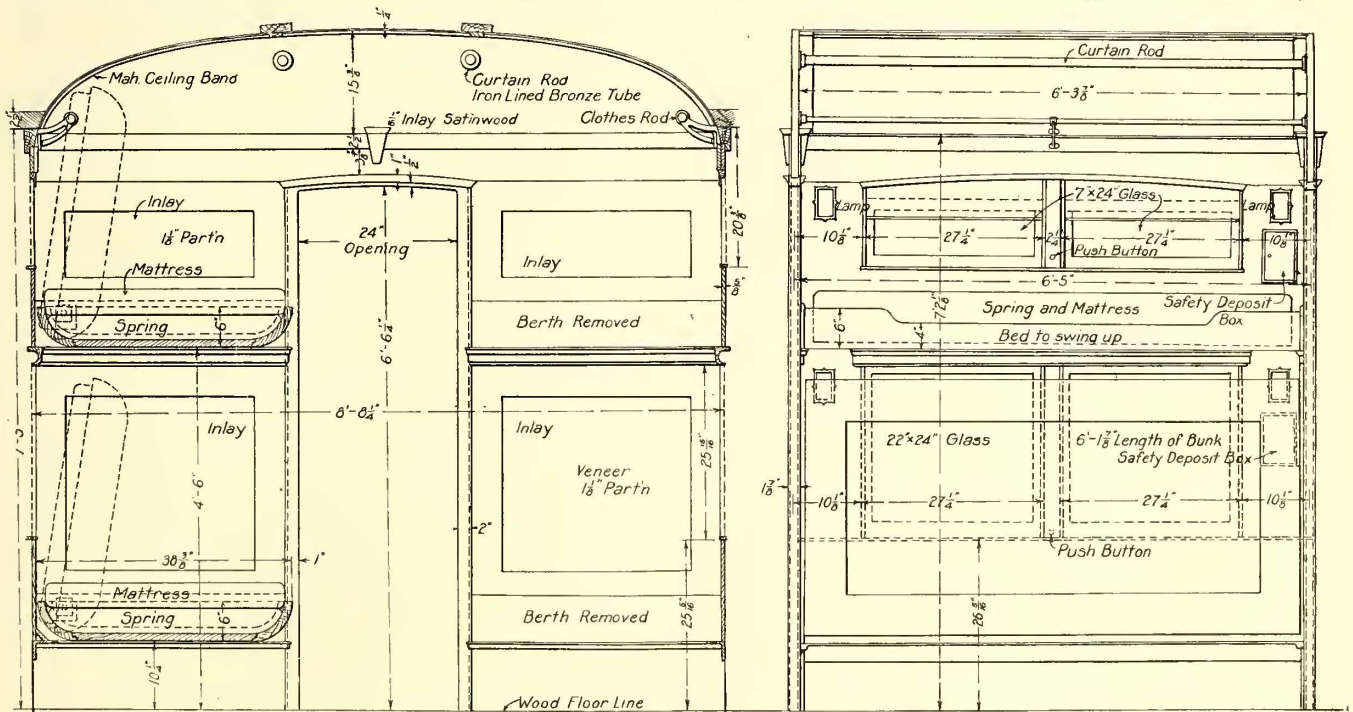
sound-deadening material. The roofs are of the arched type and the bodies are about 8 ft. high from the floor to the trolley plank. They are 8 ft. 8¼ in. wide between the interior finish, thus affording room for berths only 1 in. narrower than Pullman standard. The equipment of these cars includes Illinois Traction standard automatic ventilators, Westinghouse electro-pneumatic conductor's train signals, Westinghouse automatic air brakes, Hedley anti-climbers, Symington journal boxes, storage-battery electric lighting equipment and Peter Smith hot-water heating system.

Entrance steps are provided at diagonally opposite corners and end doors at both ends. The interiors of the cars are arranged as follows: The men's smoking and wash room is at one end of the car and occupies the full

in the car are inclosed in rectangular-shaped frosted glass shades, held in cast bronze fixtures supported by cast-bronze square tubing.

The women's saloon is at the opposite end of the car from the men's. It includes toilet fixtures similar to those in the men's room, and occupies a space of 6 ft. 3 in. long on one side of the center aisle. Across the aisle from it are two linen lockers, each 2 ft. 6 in. square in plan and reaching to the ceiling. A Peter Smith hot-water heater is installed in a steel-lined closed compartment on the platform space adjoining the women's saloon. This location for the heater avoids taking coal and ashes in and out of the car body.

The center of the car body is divided into five sections. The end sections contain Pullman type berths on each side



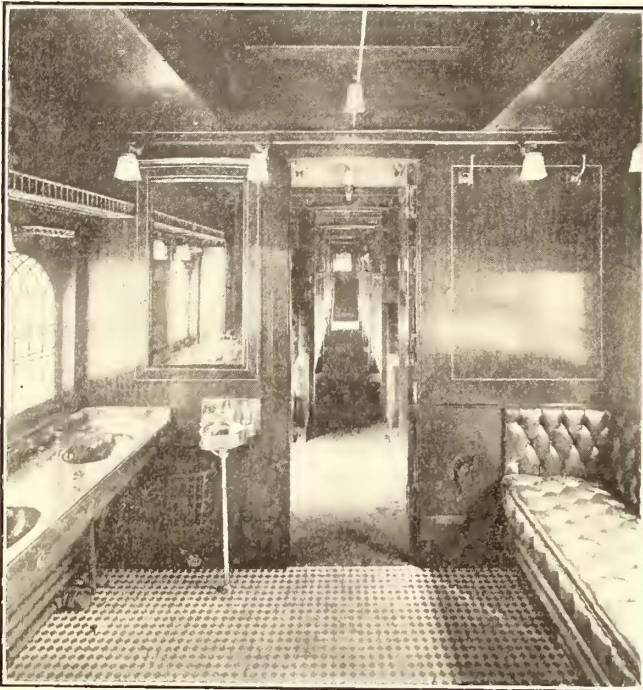
Illinois Traction System—Details of Berth Sections of Sleeping Car

width of the body for a length of 8 ft. 3 in. An interior view showing the generous space allotted to the wash room is shown. The men's toilet room, which contains a flush hopper, is set off from the vestibule space and is about 3 ft. 10 in. in length, opening into the smoking room. This toilet room occupies about one-third of the platform space. The equipment of the smoking and wash room in-

of the aisle. The three center sections have hinged berths fitted according to the designs of the Illinois Traction System. In these five sections of the car twenty berths are provided, each of which is 6 ft. 5 in. long and 38¾ in. wide. Seats for 16 people are provided in the two-end Pullman sections.

The arrangement of the hinged berths is shown in the

cross-section of the car. They are installed between rigid bulkheads, which extend from side to side of the car, and greatly increase the strength of the car body. Two win-



Illinois Traction System—Men's Saloon in Sleeping Car

dows and two ventilators are provided for each upper berth, and all berths have individual electric lamps, supplied with current from the storage battery lighting sys-

The interiors of these sleeping cars are finished in figured mahogany highly polished. The upholstery of the smoking room is Spanish leather. Interior trimmings are of statuary bronze. The floor covering in the main compartment is Wilton carpet and in the smoking room and toilet rooms the floor has an inlaid rubber surface. The cars are equipped with an annunciator system with push-buttons in all berths and other subdivisions of the cars. Double windows with full-size bronze wire screens are provided for both upper and lower berths.

The combination motor coaches which haul the sleeping car trains were described in the *ELECTRIC RAILWAY JOURNAL* for Feb. 2, 1911, page 275. These cars are 52 ft. 6 in. long, 9 ft. 5 $\frac{3}{8}$ in. wide and 12 ft. 10 in. high from the rail to the top of the roof. The bodies are of heavy design with arch roofs, and are mounted on Curtis trucks equipped with four GE-205 motors and type M control. The interiors of the bodies are subdivided into three compartments, one for milk, one for express and a passenger compartment seating sixteen. These combination motor cars, of which the company has four, were built by the McGuire-Cummings Manufacturing Company.

SLEEPING-CAR SERVICE

The sleeping-car service is operated daily in both directions between Peoria and Springfield and St. Louis. The run of 175 miles between Peoria and St. Louis is made from 11:30 at night to 7:05 in the morning. The southbound sleeping-car train arrives at Springfield at 2:15 a. m. and picks up a Springfield-St. Louis sleeping car. Similarly the sleeping-car train which leaves St. Louis at 11:45 p. m. and arrives in Peoria at 7:40 a. m. carries two sleeping cars, one of which is set off at Springfield at 5 a. m. The sleeping cars at all terminals are ready for occupancy at 9 p. m. and may be occupied until 7:30 a. m. The schedules of the sleeping-car trains are so arranged



Illinois Traction System—Sleeping Car Section with Lower Berths Down

tem. The center aisle of the car is illuminated by thirteen lamps. Steel safety deposit receptacles in which occupants of the berths may place their valuables are installed in the car sides at the head of each berth.



Illinois Traction System—Sleeping Car Section with Berths Up

that the southbound train out of Peoria at 11:30 at night makes connection at Mackinaw Junction at 12:18 a. m. with a local train from Bloomington. Thus the Peoria sleeping car serves both of the northern terminals of the road.

Similarly in the morning the northbound sleeping car from St. Louis makes connection at Mackinaw Junction at 6:55 a.m. with the local train for Bloomington. The average speed of the sleeping-car trains, which are made up of one combination motor coach and one or two sleeping cars, is about 24.5 m.p.h. including stops.

The reservations for berths on the sleeping cars are handled in a way similar to that followed in steam railway practice. All agents are prepared to sell berth tickets and make reservations, confirming them by telephone.

The publicity department of the Illinois Traction System devotes considerable space to advertising the sleeping-car service. The following statements regarding the service are included in the general timetable folder, together with illustrations of the cars:

"The Illinois Traction System when it offered to the traveling public its unique sleeping cars gained the distinction of being the only electric railroad in the world to operate sleeping cars. Two more of similar design have recently been delivered. These have more room in the smoking section and wash room and in several respects are improvements over the first ones built. Like the parlor cars, these cars are of the arch-roof design, giving them added strength and solidity.

"The berths are 6 in. longer than in the standard Pullman sleeping car, and there is more head room between the lower and upper berths. The berths do not make down

sleeping car is the window in the upper berth. These are easily opened, are supplied with screens and make the upper berths as comfortable as the lower berths. An abundance of fresh air is also supplied by the roof ventilators. Every berth is supplied with electric lights, current for which is furnished from storage batteries.

"In the wall of the car at the head of each berth is

DATE	FROM	TO	ILLINOIS TRACTION SYSTEM
22 12 1	Bloomington	Carlinville	Form 49
23 12 2	Carlinville	Champaign	Form 49
24 12 3	Champaign	Clinton	Form 49
25 12 4	Clinton	Danville	Form 49
26 12 5	Danville	Decatur	Form 49
27 12 6	Decatur	Granite City	Form 49
28 12 7	Granite City	Lincoln	Form 49
29 12 8	Lincoln	Mackinaw Jct.	Form 49
30 12 9	Mackinaw Jct.	Monticello	Form 49
31 12 10	Monticello	Peoria	Form 49
1 12 11	Peoria	St. Louis	Form 49
2 12 12	St. Louis	Springfield	Form 49
3 12 13	Springfield	Stanton	Form 49
4 12 14	Stanton	Urbana	Form 49
5 12 15	Urbana	Vir den	Form 49

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6 12 6	Decatur	Granite City	Form 49
7 12 7	Granite City	Lincoln	Form 49
8 12 8	Lincoln	Mackinaw Jct.	Form 49
9 12 9	Mackinaw Jct.	Monticello	Form 49
10 12 10	Monticello	Peoria	Form 49
11 12 11	Peoria	St. Louis	Form 49
12 12 12	St. Louis	Springfield	Form 49
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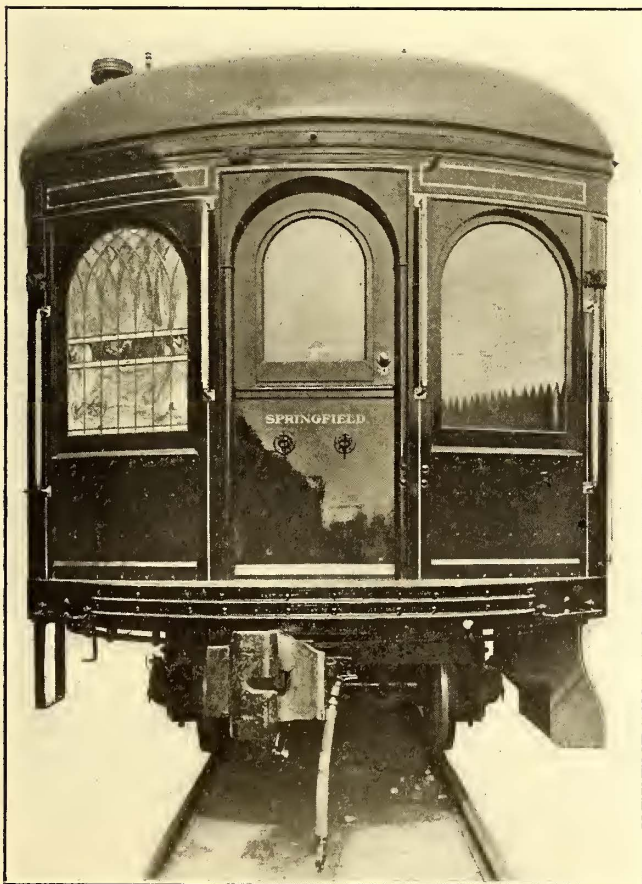
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30 12 9	Mackinaw Jct.	Monticello	Form 49
31 12 10	Monticello	Peoria	Form 49
1 12 11	Peoria	St. Louis	Form 49
2 12 12	St. Louis	Springfield	Form 49
3 12 13	Springfield	Stanton	Form 49
4 12 14	Stanton	Urbana	Form 49
5 12 15	Urbana	Vir den	Form 49

Illinois Traction System—Triplex Ticket for Sleeping and Parlor-Car Fares

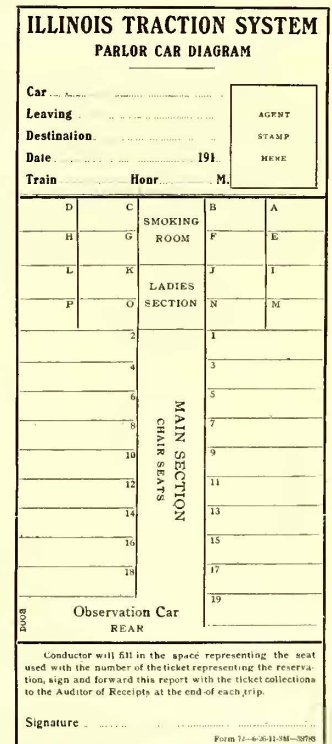
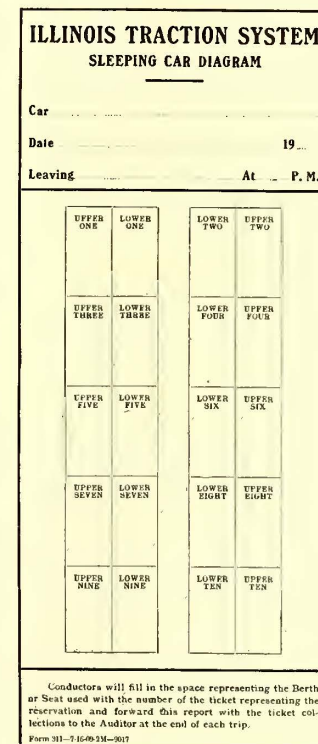
placed a plush-lined steel safety deposit box. The passenger is supplied with a key and one is kept by the porter. When locked, both keys are necessary to open the box.

"These cars have electric fans and every possible convenience. The porters are courteous and tips are not necessary to insure cheerful and prompt service. In the morning coffee and rolls are served without extra charge.

"These cars run between Peoria, Springfield and St.



Illinois Traction System—End View of Sleeping Car



Illinois Traction System—Sleeping and Parlor-Car Reservation Diagrams

in the seat, being built for sleeping purposes only. A 6-in. spring box mattress covered with one of felt placed on these long even berths makes a bed without a bump or break, which is more comfortable than is possible in a car of other design.

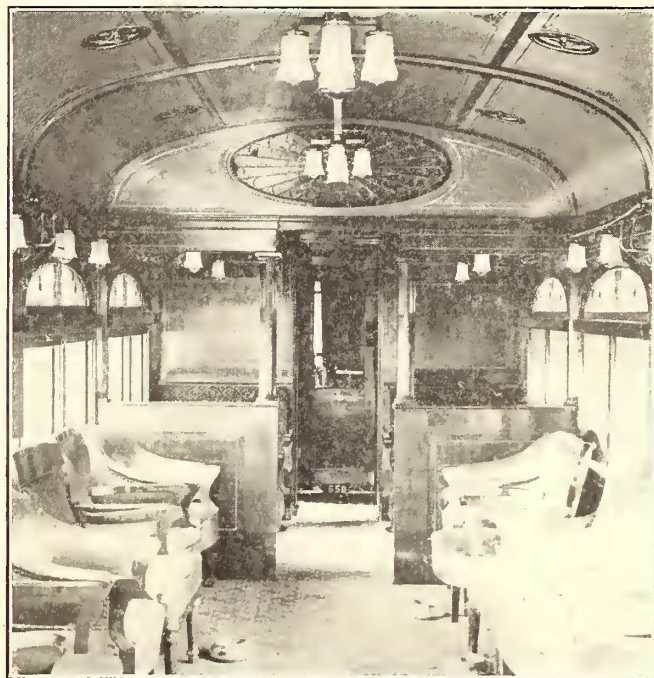
"An innovation in these cars never before seen in a

Louis, leaving each city after the theater and arriving early the next morning."

EARNINGS FROM SLEEPING-CAR TRAINS

A statement of the sleeping car earnings for August, 1910, was presented in the ELECTRIC RAILWAY JOURNAL for Oct. 8, 1910, page 620. During that month two of the new

type of sleeping-cars and one of the Holland type were in operation. These cars each made one trip a day and earned from passengers only a total of \$2,557.56, in addition to which the two motor cars hauling the two new-type sleeping cars earned \$1,009.97. The total earnings



Illinois Traction System—Interior of Parlor-Observation Car

from the three sleeping-car trains were \$3,667.53 for one month.

The accompanying table shows the revenue and expenses for the sleeping-car trains operated between Peoria, Springfield and St. Louis from February, 1911, to July, 1911, inclusive. It should be noted that the statement does not include the express, baggage and milk revenue earned

between Peoria and St. Louis are \$1.50 for a lower berth and \$1.25 for an upper berth, and between Springfield and St. Louis, \$1 for any berth. The column headed "Train Traffic Revenue" represents the tickets and cash fare collections for transportation of the sleeping-car and motor-coach passengers. It will be noted that the average earnings per month for the six months as shown were \$3,632.99; or, in other words, this average which includes the months of February, March and April, is only \$34.54 less

EARNINGS AND EXPENSES OF SLEEPING-CAR TRAINS—ILLINOIS TRACTION SYSTEM.

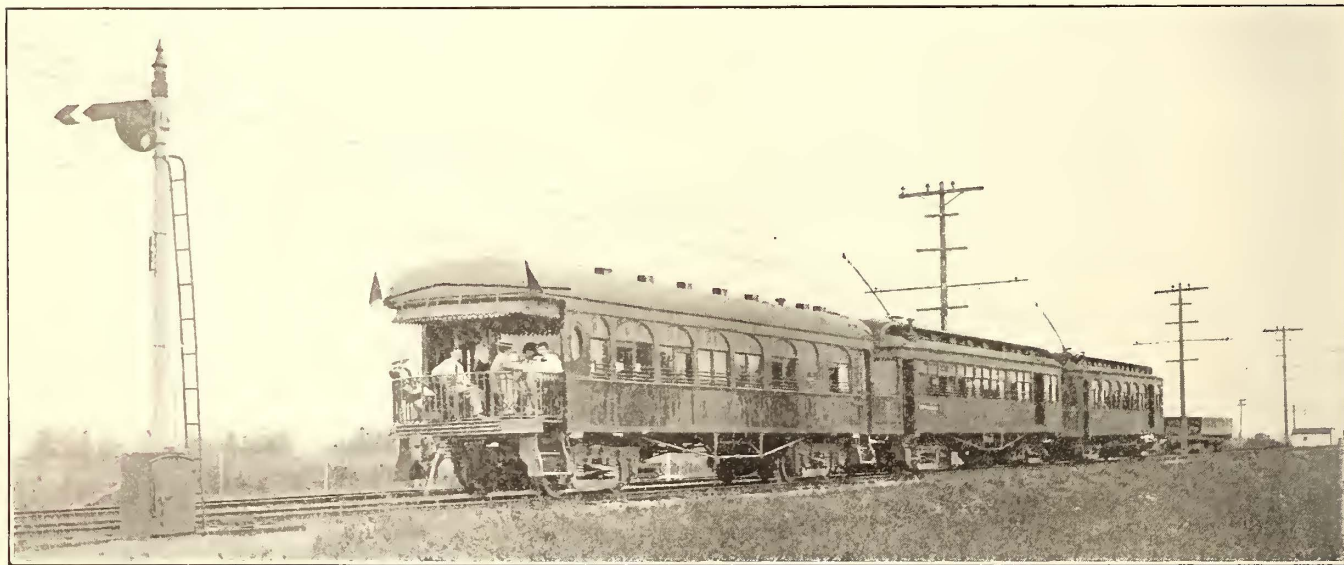
	Sleeping Car Revenue.	Train Traffic* Revenue.	Total Earnings.	Total Expenses.	Net Earnings.
July, 1911.....	\$895.25	\$2,941.30	\$3,836.55	\$2,776.04	\$1,060.51
June, 1911.....	974.25	2,987.28	3,961.53	2,366.13	1,595.40
May, 1911.....	1,064.25	3,036.21	4,100.46	2,645.63	1,454.83
April, 1911.....	910.75	2,580.33	3,491.08	2,558.28	932.80
March, 1911.....	876.00	2,562.44	3,438.44	2,802.60	635.84
Feb., 1911.....	793.25	2,176.63	2,969.88	2,287.68	682.20
Six months.....	\$5,513.75	\$16,284.19	\$21,797.94	\$15,436.36	\$6,361.58
Aver. per month..	918.96	2,714.03	3,632.99	2,572.73	1,060.26

*Does not include express, baggage or milk revenue.

than the earnings for the month of August of the previous year. The "Total Expenses" column covers all operating expenses, including power, crews, proportionate wear and tear of track, cost of coffee and rolls given passengers each morning, linen supplies, monthly salary of \$100 for the supervisor of sleeping cars, porters' wages, maintenance of equipment and overhead charges on the sleeping-car equipment. On this basis the net earnings for the two sleeping-car trains are \$1,060.26 per month. The average total expense of operation is approximately 71 per cent of the train revenue, not including the revenue from express, milk and baggage.

PARLOR-CAR SERVICE

The parlor-observation cars, which are of an attractive design, were put into service on all divisions of the Illinois Traction System on Aug. 1 of this year. The schedules provide one morning and one afternoon parlor-car train in each direction on each division of the road except between St. Louis and Springfield, on which division parlor-car trains leave the terminals in the morning, at noon and in the afternoon, three parlor-car trains being run in each direc-



Illinois Traction System—Three-Car Train with Parlor-Observation Car

by these trains. It does include, however, the traffic earnings from the passengers in the combination motor cars which haul the sleeping-car trains. The two trains which this financial statement covers operate in each direction daily between St. Louis, Springfield and Peoria.

Referring to the table, the sleeping-car revenue is made up of the rental of berths and seats. The rates for berths

tion daily. Parlor-car trains consist of a standard inter-urban motor car and one of the new observation trail cars. These trains weigh 81 tons complete. The two cars are connected by the Illinois Traction standard high-knuckle M. C. B. radial couplers and by a Westinghouse electro-pneumatic signal system. The crew of one of these two-car trains consists of a motorman, a conductor and a parlor-

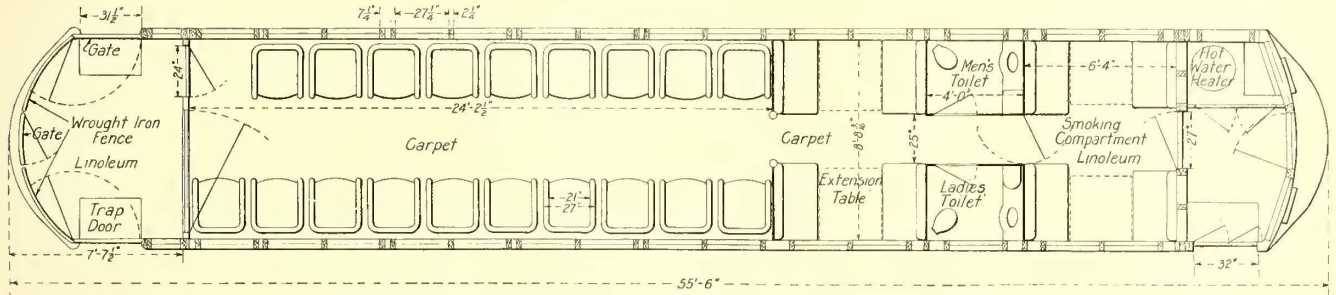
car porter, who is paid \$50 per month. The trains are operated only in limited service, and the average speed between terminals is 27 m.p.h. The lengths of the runs range from 100 miles to 227 miles.

PARLOR-CAR EQUIPMENT

An illustration is presented showing the interior of the five new parlor-observation cars, which were built by the Danville Car Company from the designs made by the engineering department of the Illinois Traction System. The new parlor-observation cars have the same type of underframe and body framing as the latest type of passenger coach for the McKinley System, which was described in detail in the *ELECTRIC RAILWAY JOURNAL* for July 8, 1911, page 76. The general dimensions of these cars are as follows: Length over buffer plates, 55 ft. 6 in.; width over sheathing, 9 ft. 6 in.; width between wainscotings, 8 ft.

In the rear observation compartment a 16-cp tantalum lamp is placed at each single and double window post, and there are four four-lamp chandeliers along the center line of the ceiling. The lamps are all held in heavy cast-bronze fixtures provided with substantial cast-bronze shade holders. Ventilation is afforded by fourteen exhaust ventilators located above the arch roof and connecting with the interior through adjustable registers. Camp chairs are provided for use on the observation platforms, and periodicals, including monthly magazines and daily newspapers, are carried on the cars for the free use of the passengers.

The arrangements for selling seats on the observation parlor cars are practically the same as those followed by steam roads in their chair-car service. The extra charge for a seat in a parlor car is 1/2c per mile. All agents sell seat tickets, and will make reservations for the seats in



Illinois Traction System—Floor Plan of Parlor-Observation Car

6 1/16 in.; height from top of rail to top of roof, 12 ft. 10 in.; truck-center distance, 32 ft. 3 in. The bodies are of substantial design and have arch roofs. The underframe consists of four I-beam center and intermediate sills and two deep plate side sills. All sills are reinforced by wooden stringers. The chief difference between the standard passenger coaches and the new parlor-observation cars is in the arrangement of the rear platform and the interior subdivisions.

The parlor-observation cars have an open-hooded rear platform at the rear of sufficient size to accommodate ten seated passengers comfortably. The platform is covered with interlocking rubber tile and the platform is surrounded by an ornamental rail made of iron and brass. The steps are covered by Edwards trap doors. The main interior compartment is finished and furnished in an especially attractive style. The arch roof with its mahogany ceiling bands is tinted a light green to harmonize with the African mahogany woodwork, which is inlaid with narrow lines of white wood. The floor is covered with a figured green Wilton carpet. Chairs of special design with mahogany frames and upholstered in green Spanish leather are provided for nineteen passengers. These chairs conform to the three special designs made by the engineers of the road.

At the forward end of the main compartment are four fixed double seats arranged so that card tables may be placed between them. These seats are set off from the main compartment by a pair of columns and a bulkhead which extends across the car above the window level. In the center of this bulkhead is an oval-shaped art-glass design, including the initials of the road.

The forward compartment of the observation car is set off from the main compartment by a mahogany bulkhead with a swinging door. This forward compartment, which is reserved for smokers, has four fixed double seats upholstered in leather and so arranged that card tables may be placed between them. Lavatories for men and women on opposite sides of the center aisle are located between the smoking compartment and the main compartment. A Peter Smith hot-water heater is installed on the left-hand side of the forward platform.

Excellent illumination has been provided in these cars.

these cars in the same manner as for berths in the sleeping cars. The parlor-car seat tickets consist of three sections, one of which is collected by the conductor, one by the porter and the third is retained by the passenger.

ENERGY CONSUMPTION OF LIMITED TRAINS

Complete observations recently were taken of the energy consumption of a parlor-car train consisting of a standard motor passenger car and one of the new parlor-observation cars operating in regular service on the 175-mile limited run between Peoria and St. Louis. The total weight of this train was 81 tons. The motor car was equipped with four GE-205 motors rated at 100 hp each and fitted with 21-tooth pinions and 53-tooth gears. The accompanying table shows the characteristics of the run and the energy consumption as compared with two similar runs made by a single motor car of the same type and same electrical equipment. These two single-car runs are designated as motor A and motor B, and an average of the two runs of motors A and B, both southbound, is shown. The ratios

Trains.	ENERGY CONSUMPTION OF ONE AND TWO CAR TRAINS.						
	Total Weight Tons.	Total Running Time.	Net Run-ning Time.	M.P.H. While Run-ning.	Total Run-ning Time.	Kw-hrs. per Mile.	Kw-hrs. per Ton Mile.
1. Motor A.....	45	6.35	5.50	31.9	511	2.92	64.88
2. Motor B.....	45	6.10	5.30	33.2	498	2.84	63.20
3. Average, A and B..	45	6.22½	5.40	32.4	504.5	2.88	64.06
4. Motor and trailer..	81	7.37	6.09	28.8	650	3.71	45.85
Ratio 3/4.....	1.8	1.198	1.085	0.89	1.29	1.29	0.716

between the results of operation with the motor and trailer and the average of the two single motor runs also are presented. Sixty-one stops were made by the two-car train on its run of 175 miles, and it was delayed en route by a broken trolley wire.

The Milwaukee Electric Railway & Light Company installs fuse-testing clips in the panel boxes at the ends of many of its cars. By the use of these clips the trainmen can determine whether or not a cartridge fuse is in good condition. The testing sets consist of four dry cells wired in series, one terminal being connected through a bell to one fuse clip and the other terminal being connected directly to a second fuse clip. By placing a fuse in the spring clips the circuit will be complete and the bell will ring if the fuse is in operating condition.

A New Theory of the Cause of Rail Corrugation

The Author Attributes Corrugation to the Form of the Rail Head and Suggests That Girder Rails Be Rolled with a Rounded Head

BY G. E. PELLISSIER, SUPERINTENDENT GOLDSCHMIDT THERMIT COMPANY

The writer first became interested in the subject of rail corrugation when acting in the capacity of engineer maintenance of way for an electric-railway company, and since that time he has had an opportunity to inspect a great deal of corrugated rail in many cities of the United States and Europe. His study of the question has been directed to an effort to find an explanation of this phenomenon which would not only fulfil the conditions of possibility but also those of probability.

In considering the various theories which have already been advanced as to the causes of corrugation one must necessarily be impressed with the fact that while all of the causes mentioned might be responsible for corrugations under certain particular conditions, they fail to fulfil the requirements of probability, because these causes, while continually operative, are assumed to produce corrugations only where they happen to appear, whether it is in the middle of a straight rail or on a curve, while on the remainder and greater portion of the track they have no effect. In some cases the rail not affected is less than 5 ft. distant from the one that is.

For instance, taking only one of the theories advanced, it hardly seems probable that dust or grit blown upon the track could be responsible for corrugations as found, since the chance of this dust being continually deposited on one rail and not on the other rail, only 5 ft. away, or in places in the track 50 ft. or 100 ft. apart, is very small.

The same argument might be applied to other theories which attribute all corrugations to chattering of the rolls when the rails are rolled, to vibration, hard spots in the rail, elongation of the fibers, due to the rolling action of the wheels, etc., as they in no way account for the fact that the corrugations appear only on widely distributed parts of a system of tracks, while the causes mentioned are operative over the entire system.

Approaching the question, therefore, from the point of probability the writer came to the conclusion that the corrugations themselves must be due to certain definite causes, which in turn might be the result of one or several conditions; that these conditions of necessity had to be operative where the corrugations occurred and not operative where they did not occur, and that there must be a reason for the change of conditions.

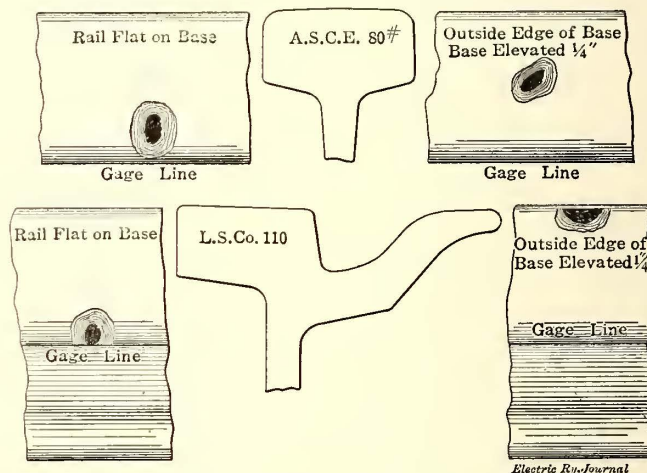
Proceeding on this assumption, the conditions under which corrugations appear were investigated and the following significant facts noted:

Corrugations rarely appear on steam roads, and rarely, if ever, on interurban track laid with T-rail, except at or near stations or under abnormal conditions; that T-rail in paved streets is not much affected; that high girder rail in paved streets is most susceptible to corrugation; that corrugations are often found on the outside rail of long radius curves, but rarely, if ever, on very short radius curves provided with a guard rail; that corrugations are more apt to appear where the rail is laid on a solid foundation with solid paving against the side of the rail; that rails which corrugate in one location sometimes wear smooth if taken out and laid elsewhere; that corrugations sometimes occur in parts of one rail and not in the remainder of the same rail.

In addition to the above facts, which it is believed are generally accepted, the writer has seen evidences of corrugations in less than forty-eight hours after track was laid under conditions which will be noted later.

Any explanation of the phenomena of corrugation which is advanced must necessarily account for the facts above mentioned in order to be satisfactory. The writer has evolved the following theory, which it is believed fulfils these conditions:

That corrugations are directly due to non-uniformity of pressure between the tread of the carwheel and the surface of the rail, and between the flange of the wheel and the side of the rail head, and they occur only when the pressure at the point of maximum intensity of pressure exceeds the elastic limit of steel at that point; that any condition or set of conditions which produce this non-uniformity of pressure will cause corrugations if the maximum intensity of pressure exceeds the elastic limit of the rail material; that comparatively few combinations of circumstances cause the maximum intensity of pressure to exceed the cubical elastic limit of steel; that any conditions which cause the position of a point of maximum intensity of pressure to move away from the approximate center of the rail head to the edge where any particles are not restrained, but free to move in one or more directions, reduce the elastic limit to



Figs. 1 and 2—Contact Areas on Girder and T-Rail

its linear value, which is not more than one-third of its cubical value, according to good authorities; that the shape of the rail head, wheel tread and wheel flange, and the position of the one relative to the other under traffic, has great influence on the position of the point of maximum intensity of pressure, and thus is responsible for most of the corrugations; that by so designing the rail head, wheel tread and wheel flange and so laying the rails that the maximum intensity of pressure will occur near the center of the tread surface of the rail and as far as possible from the corner or edge of the side of rail, most of the corrugations can be eliminated; that corrugations produced by pressures exceeding the cubical elastic limit of steel (such as might occur with quick braking of heavy, fast trains) can be eliminated only by raising the elastic limit of the steel, increasing the area of contact between the wheel and rail, or by making the acceleration (positive or negative) so uniform that a uniform cold flowing of the metal will follow.

In support of this theory a few facts regarding the intensity of pressure and its point of application may be of interest. Considering the surface of the rail a horizontal plane and the wheel a right cylinder, the contact between the two would take place along a straight line, neglecting

for the moment elasticity. If, however, the surface of the rail is a plane and the wheel is conical, the contact between the two occurs at a point, unless the wheel or the rail are free to move until an element of the cone coincides with an element of the plane. Since, however, in the case of rails laid in pavement it is not possible to obtain this adjustment of wheel and rail, and because we not only have coned wheels, but rails whose heads are not plane surfaces, we obtain contacts between the two varying from a point to a line, modified by the elasticity of the metal to a spot and an irregular area across the head of the rail.

Actual measurements of the area of contact made on various types of rails by placing a pair of standard 20-in. wheels fixed on an axle and then applying a pressure of 5 tons to each wheel showed the area of contact to vary from less than 0.25 sq. in. to about 0.75 sq. in., depending on the type of rail and its position relative to the wheel.

The accompanying sketches, Figs. 1 and 2, show roughly the relative size and location of a contact area. These, of course, are only representative and would be modified when the car was in motion and when the load and diameter of wheels were varied.

As the wheel load of 5 tons is not excessive, since in practice 6 tons or 7 tons are not uncommon, the areas found by experiment may be used to calculate the unit pressure on the rail. Assuming the intensity of pressure to be uniform

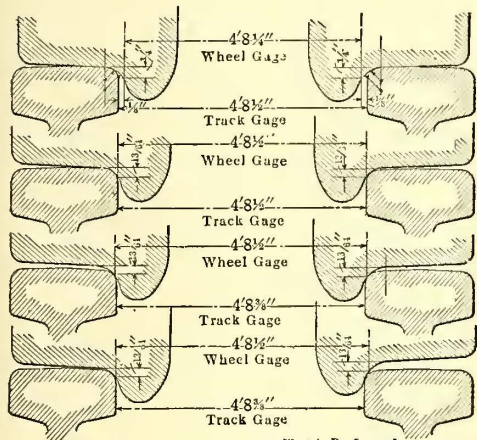
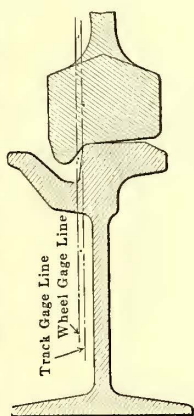


Fig. 3—Relation of Variable Wheel and Track Gages



Figs. 4 and 5—Flat Head and Proposed Rounded Head Girder Rail

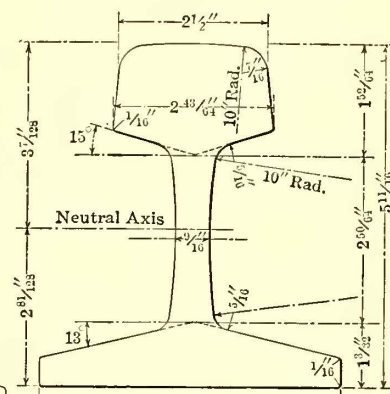
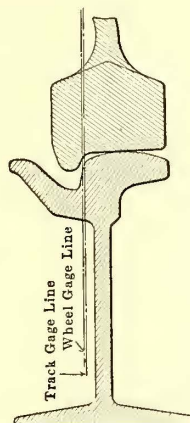


Fig. 6—Pennsylvania Railroad Standard 100-lb. T-Rail

over the entire area of contact, where the area of contact was 0.25 sq. in. the intensity of pressure would be 40,000 lb. per square inch, which is certainly close to, if it does not exceed, the linear elastic limit of ordinary rail steel.

When we consider, however, that the intensity of pressure is not uniform, but varies from nothing at the edge of the contact area to the maximum at the center, and that these figures are materially increased by loading, impact, breaking, etc., it is readily seen that the linear elastic limit of steel must often be exceeded. It must not be forgotten also that in producing these contact areas new wheels and rails were used, that care was taken to place them so that the maximum area of contact would be developed, and that the rails were merely laid on a cast-iron bed plate, so that they were free to adjust themselves under pressure.

With rails as laid in track and subjected to traffic we find quite a different set of conditions. The rails are held together by tie rods or supported by rail braces and are embedded in pavement so that they are not entirely free to adjust themselves under pressure. The position of the point of maximum intensity of pressure, therefore, is determined largely by the shape of the wheel and rail. Secondly, the track is rarely laid so that the wheels will make contact with the rail at corresponding points along its entire length. Thirdly, on account of defective gage of track and wheels the contact cannot always take place between the tread of the wheel and the surface of the rail, but somewhere along

the gage line. Fourthly, flanges sometimes ride either on the bottom of the groove or on the inside of the groove. Fifthly, centrifugal forces tend to make the wheels climb outside the rail when going around curves. Other differences could be noted, but the above are the most important.

It will readily be seen from the sketches shown in Fig. 3 that in all the cases illustrated the area of contact must be materially reduced. If the rails were free to adjust themselves under pressure all the other conditions mentioned would be of small moment, as the point of maximum intensity would tend automatically to keep away from the edge of the rail, both on the tread and side of head. When, however, the rail is not free to adjust itself the rail head and wheel tread must be so shaped that under traffic conditions the point of maximum intensity of pressure will not fall at the edge of the rail. This, of course, can be accomplished in many ways, but the simplest way which naturally presents itself is to make the tread of the rail approach the arc of a circle instead of a plane, as most girder rails are rolled. The radius of the curves at the gage lines should also be such as to bring the flange pressure under traffic conditions well below the edge of the rail, as illustrated in Fig. 5.

Analyzing the occurrence and non-occurrence of corrugation on the basis of this theory, it is not difficult to see why corrugation rarely occurs on steam roads, as not only is the

rail free to adjust itself so that the point of maximum intensity of pressure falls near the center of the head, but the shape of the head is such as to obtain this result even though the rail was not free to move. Fig. 6 shows rounded-head rails used by the Pennsylvania Railroad. In exceptional cases where slight evidences of corrugation have been found in steam roads, in yards or near stations, the cubical elastic limit of the steel of the rail undoubtedly has been exceeded, due to the combination of wheel loads and tractive forces exerted in starting and stopping trains, and as the positive or negative acceleration is not uniform the result is a non-uniformity of pressure. On some curves where there is no doubt that the cubical elastic limit of steel has been passed, but where there is no necessity for stopping and starting, a uniform cold flowing of the metal of the steel of the rail will be found. The same argument holds, of course, for interurban track.

With nearly all T-rails laid in paved streets the shape of the rail head tends to keep the point of maximum intensity of pressure near the center, but as the rail is not free to move all the cases illustrated in Fig. 3, except the top one, can produce corrugation. In the case of outside rails on long radius curves the wheel flange presses against the side of the rail with a pressure varying with the speed. When the rail is not properly shaped the tendency is for the wheel to climb the rail, lifting the tread of the wheel from the rail surface and bringing the maximum intensity of pressure

at the very edge of the rail. As soon as this pressure exceeds the linear elastic limit deformations occur and the wheel drops until the area of contact is sufficient to reduce the pressure below the elastic limit, when the wheel again starts to climb. As the time required for the wheel to drop a certain distance is constant and the speed of the cars varies, it will readily be seen that the length of the corrugations thus produced will be a function of the speed of the cars.

Quite a different effect is obtained on short radius curves. The speed is not sufficient to cause climbing due to flange pressure, and as the inside of the flange makes contact with the guard the area of contact is certain to keep the maximum intensity of pressure below the elastic limit, even if the point of maximum intensity falls near the edge, which it does not, as shown by the wear on the guard rail.

This theory further explains why in some cases grinding removes corrugations and why in other cases it does not. If the grinding simply removes the inequalities of the rail surface without changing the relation of wheel tread and rail surface, corrugations will again appear, while if the grinding does change this relation, taking the center of pressure away from the edge of the rail, corrugations will not occur. The occurrence of corrugation under various other conditions could be explained by this theory, but the above will be sufficient, it is believed, to demonstrate its soundness.

It is the intention of the writer to make some experiments with a view of determining the actual intensity of pressure between wheel and rail with various types of wheels and rails under different conditions as soon as opportunity offers.

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TRAILER CARS OF BEN HUR ROUTE

The Indianapolis, Crawfordsville & Western Traction Company, known throughout Indiana as the "Ben Hur Route," has a high-speed 45-mile road connecting Crawfordsville with Indianapolis. C. E. Morgan, general manager of the Ben Hur Route, recently placed in service four trailer cars which in general design conform to the standards of the company's motor cars, although they are not so long. These trailers were built by the Danville Car Com-

The principal members of the underframe are two 12.25-lb., 6-in. I-beam center sills and two side and two intermediate sills of 6-in. x 3/8-in. x 9-in. angles. All the sills are reinforced with timber and the side sills are further reinforced by 1/4-in. x 18-in. plates. These stiffening plates are reinforced at the top by angle irons. The cross members are spaced 32 1/4 in. apart and consist of 3-in. x 6 1/8-in.



Interior of Ben Hur Route Trailer Car

timbers reinforced with plates and angles. The center and intermediate sills extend from bumper to bumper. Both buffer blocks carry Hedley anti-climbers and are sheathed with 5/8-in. x 8-in. steel. Tomlinson M.C.B. radial couplers are fitted to both ends of the new cars and are standard for all equipment of this road. The bodies are carried on Baldwin 72-22 A.T. M.C.B. trucks with 36-in. rolled-steel wheels and cast-steel bolsters. The truck-center distance is 24 ft. 6 in.

The bodies seat forty-six passengers in Brill walkover seats having arm rests. These seats are upholstered in green plush. Additional fittings and equipment of these new trailers include: Westinghouse schedule AMT air brakes, Peacock hand brakes, Dayton Manufacturing Company's brass trimmings, Peter Smith hot-water heaters,



Train of Motor Car and Two Trailers Operated by the Ben Hur Route

pany and were designed to have an especially strong bottom frame. The bodies and running gear are so built that electrical equipment can be added if desired.

The accompanying engravings show interior and exterior views of the cars. In ordinary service the motor cars haul one trailer. The general dimensions of the new trailers are as follows:

Length of body.....	35 ft.
Length over vestibules.....	44 ft. 2 1/8 in.
Width over sills.....	9 ft. 1/4 in.
Width over belt rails.....	9 ft. 3/8 in.
Height, bottom of sill to top of roof.....	9 ft. 9 in.
Height, top of rail to bottom of sills.....	3 ft. 6 1/2 in.

Symington journal boxes, Pantasote curtains with Curtain Supply Company's No. 88 ring fixtures, Ohmer registers, Edwards sash fixtures and Mason safety treads.

The bodies are painted according to the Murphy A.B.C. system and weigh 26,000 lb. The interior finish of the bodies is mahogany.

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 A horse car that had been in retirement for seventeen years was used recently for an outing by the employees of the Rhode Island Company who have been longest in the company's service.

Inclosed Arc Lamps for Street Car Headlights

This Article Gives a Description of the Different Types of Arc Headlights and Hints as to Their Maintenance

BY A. T. BALDWIN, RESEARCH LABORATORY OF THE NATIONAL CARBON COMPANY

Inclosed arc headlights for street car service may be divided into two classes, depending on the position of the carbons with respect to the vertex of the reflector. In both types the carbons are aligned with each other. In one type they are mounted at an angle to the vertex of the reflector. This is known as the inclined type. In the other class the carbons are held perpendicular to the base of the lamp, and are so placed that the arc is maintained directly in front of the vertex of the reflector. This is called the vertical type. The lamps may also be classified as automatic or hand feed, depending on whether the clutch which controls the upper carbon is operated by means of an electromagnet or by means of suitable hand-operated springs and releases. All inclosed arc headlights have stationary lower carbons and are therefore non-focusing except in so far as the lower carbon is moved by a hand-controlled device in order to maintain the arc in focus with the vertex of the reflector.

CONSTRUCTION OF D.C. HEADLIGHTS

Since d.c. lamps with automatic feed control are most commonly used, we shall confine our attention to them. To illustrate the method of operation of these lamps reference is made to the accompanying generalized sketch of an inclined type lamp.

The sketch shows all the essential parts except the case, which is usually made of japanned sheet iron properly punched and pressed into shape so as both to protect and to ventilate the lamp proper. The essential parts of the lamp are the base plate and frame *W*, which may be made of one or more iron castings, the magnet *C*, the clutch control levers *E*, *E'* and *E''*, the clutch *S*, the upper and lower carbons *M* and *N*, the lower carbon holder *T* and knurled feed wheel *K*, the inclosing globe *H*, the gas cap *Z* held in place by the spring *L*, and the spun aluminum or silver-plated parabolic reflector *R*.

From the resistance in series with the lamp the current flows to the binding post *A*, which is completely insulated from the frame *W*. From here the current passes to the magnet *C*, through the lead *B*, then by the lead *B*, through the cap *P*, to the upper carbon *M*. The lower carbon *N*, not being insulated from the frame *W*, allows *W* to serve, so to speak, as the negative terminal of the lamp. The lamp frame is either grounded to the trucks through the dash or to the grounds in the controller box.

Arc headlights are of the constant arc length or constant potential type. The current passing through the magnet energizes it and the lever *E* is drawn toward the core *D*, in this way lifting the clutch and striking an arc. Increased arc length decreases the current flowing until the

magnet is no longer able to hold the lever *E*, which falls, releases the clutch and allows the carbons to feed together, and then re-establishes a normal arc. The arc length and voltage are determined by the thumb screw *Y*, which limits the movement of *E*. The lower carbon is fed up into position from time to time by means of the knurled feed wheel *K*.

The vertical lamps are also of the constant potential type and operate similarly to the inclined type. In some vertical lamps the upper carbon passes through the center of the magnet and its feed is controlled by a clutch operated by this magnet. Other vertical type lamps have the upper carbon holder outside the magnet and controlled by the usual clutch. In this type of lamp the clutch is operated by one long lever, generally directly attached since the magnet has an upward pull. It might be mentioned here that hand-feed lamps are of the vertical type, where the clutch is controlled by releasing or compressing a suitably placed spring.

Since these lamps are built to operate at from 2 amp to 5 amp, with 75 to 80 volts at the arc, an external resistance must be used between them and the trolley circuit. Some users put the headlights in series with the heaters, the car lights or the head and tail lanterns. This policy is not recommended, because it is safer, in order to secure constant operation, to have the headlight on a separate circuit. This is accomplished by means of a lead coming directly from the trolley to a resistance box supplied by each manufacturer as part of the lamp equipment. These resistances are usually of the porcelain spool or coiled wire type. They are caged and have marked terminals to indicate the connections from the trolley and to the lamp. It is usually customary to place these resistances under the car platform or to hang them from the platform roof, carefully avoiding grounds and protecting them from the weather. A lead from the resistance is run to one or both bumpers and fastened in a plug socket, which is so placed that driving rain will not ground it.

In the vertical-type lamps, where carbons of the same diameter ($\frac{3}{8}$ in. or over) are used, the upper carbon is usually 1.5 times the length of the lower. In this way ample life, compatible with sufficiently frequent inspection, is secured, and at the same time there is a stub of suitable length for future use as a lower carbon. In the inclined type of lamp the same size carbons may be used as upper and lower, but better practice calls for a $\frac{5}{16}$ -in. upper carbon with a $\frac{3}{8}$ -in. lower carbon. Here the upper carbon is twice as long as the lower in order to secure the maximum life from the lower with minimum stub length, since under such conditions both stubs are useless. All carbons are solid and the life of twenty to thirty hours claimed by various manufacturers for their headlights is not exaggerated if the lamps are operating normally.

Both types of lamps are subject to practically the same troubles, and it is doubtful if one type has any great advantage over the other. There are reasons, however, why the inclined type gives a better light distribution. In both types the upper carbon is positive, and from its crater issues about 85 per cent of all the light given by the lamp, the remaining 15 per cent being distributed about equally between the arc itself and the crater of the negative (lower) carbon.

In the inclined type the carbons are held at an angle of 45 deg. with the focal axis. Consequently practically all the light from the positive crater falls on or near the vertex of the reflector *V*, from which it is reflected in parallel

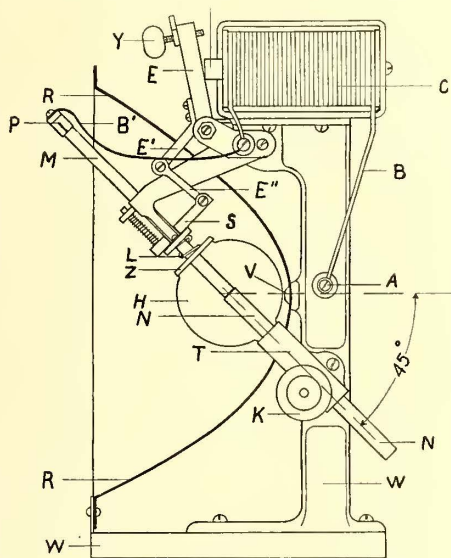


Diagram Showing Construction of Arc Headlight

lines, when the arc is at the focal center of the parabolic reflector. This results in a more intense and far-reaching beam of light. The use of a smaller upper, positive carbon is of further advantage, since, for the same amperage, it affords a higher current density at the crater. This increases the candle-power and gives a whiter light for the same quantity of current consumed. In the vertical type, the crater being at an angle of 90 deg. with the focal axis, a smaller percentage of the light falls on the vertex of the reflector, and, consequently, the reflected beam of light is not so intense as it would be were the reflected rays issuing mostly from the vertex of the reflector back of the arc.

It is very important that the position of the arc be so regulated by the trimmer and operator that it casts the incident rays as near the vertex of the reflector as possible. Many manufacturers draw attention to some fixed mark upon the reflector to which the carbons should be trimmed. If a gage is not provided to regulate the distance of the lower carbon from the globe top, each trimmer and motorman should provide himself with one. Attention is drawn to this because motormen frequently complain of a black spot in the center of the area lighted by the headlight. This spot is not caused by the arc wandering, but because the positive crater is out of focus. Properly trimmed carbons will burn in focus for at least half an hour and quite often for an hour, after which the motorman should raise the low carbon to its proper height, when the black spot will not appear on restarting the arc.

HEADLIGHT TROUBLES AND THEIR REMEDIES

Short life, dim or bluish light and globe melting are among the more common troubles experienced in headlight operation. In general, these are quite to be expected as part of the necessary limitations of the lamp. At best, railway service is a severe test on an inclosed arc lamp and one can hardly expect to avoid troubles that would not be tolerated in lamps on circuits maintained for them alone. Headlights are subjected to continual rapid jarring, which makes it difficult to maintain a constant arc length. Uniform inclosure in the case of headlights must not be secured by clamping the globes so rigidly that the constant jarring will cause excessive breakage.

Carhouse conditions are such that it seems impracticable to use the same headlight on the same car each night, yet such a practice would certainly work toward efficiency. The reason for this is because much of the trouble starts with the resistances. Although these are undoubtedly carefully made and tested, the service demanded of them is such that within even a year they are sometimes no longer reliable. Observations at various carhouses have shown it to be a difficult matter to find two resistances that would operate the same lamp properly at 3.5 amps with 75 volts at the arc. The amperage often varies from three to seven, while the voltage reading sometimes differs by 50 volts. That such conditions were due to the resistance was clearly demonstrated by using the test lamps with resistances just received from the factory. These always operated satisfactorily.

When the resistance is such as to allow the lamp to operate at high amperage a shortening of the trim life immediately results. Although it is not a hard and fast rule, it is generally true that if the amperage is doubled the life of a trim will be but one-third to one-half normal. With high amperage low voltage results, and if the arc voltage drops below 65, proper operation of the lamp is all but impossible. In this case the carbons are close together, since the voltage will not maintain the proper arc length and the lower carbon tip obscures the light from the positive crater. The greatest trouble resulting from low voltage is graphitization and mushrooming of the points, accompanied by dim light. The globes are often blackened, and if this condition lasts long enough the carbons unite

and the only light is a dull glow at the point where the carbons touch. This extreme condition is seldom realized, the usual condition being the formation of a cup-shaped crater of graphite on the upper carbon, which fits down over a point built up on the lower. With the high amperage to aid it, the arc soon moves to the rim of the crater and burns the carbon behind it, giving rise to an unsteady, constantly breaking arc. This is commonly known as "chasing."

When the conditions are reversed, i. e., the voltage is high and the amperage is low, the light does not have the proper volume or penetrability and is highly tinged with the violet light that is characteristic of high voltage in inclosed arcs. With arc voltages as high as 85 and 95 volts ten minutes generally is sufficient time for the high-voltage flame to crack or melt the globe. With the open arc and conditions so obtained, it is doubtful if a new trim would last for a single night's service. To avoid the excessive blue or violet light and the globe melting the arc voltage should be kept below 80. Quite frequently fresh trims will flame during the first few minutes' burning, but this can be minimized if the lower carbon point has already been burned. This applies to lamps where the stub of the upper is used as the lower on a succeeding trim, when it is recommended that the already burned point be again put in the arc. To prevent the flaming and globe melting which results from jarring and jamming of the parts, it is customary for some manufacturers to recommend that the motormen snap the lights off and on at least once an hour during burning. In the vertical type of lamps the jarring not infrequently drops the upper carbon down on to the lower, resulting in graphitization of the points and globe blackening.

The life of a trim is determined by the amperage at which the arc burns, the degree of inclosure and the uniformity of the carbon. If the amperage is normal and constant and the inclosure is complete and constant it would require an excessive lack of uniformity in the carbons to give poor operating results. If for any reason the globe becomes so broken that open arc conditions prevail, it is doubtful if a trim will last throughout a single night's service. If a very small chip is taken out of the bottom of a globe it will shorten the life more than an equal-sized opening at the top of the globe. In all types of lamps where the gas cap is held in place by a spring, it will be well to recognize the fact that the heat within the reflector soon weakens this spring to such an extent that the inclosure made by the gas cap is not constant and that often a jar will readily shake the globe free from the gas cap. The results of this condition are open arc conditions within the globe and probable interference with the proper feed of the upper carbon. Not infrequently globes have been found which were held so loosely that they could be easily spun around.

When operated under normal conditions inclosed arc headlights are efficient and reliable. They are, however, subject to some limitations, and it has been the object of this paper impartially to lay the proper emphasis on some of them. It is hoped that the facts noted will impress upon users the importance of having their entire headlight equipments in proper operating condition in order to secure efficient service.

Among the prominent English electrical engineers who attended the convention of the Association of the Edison Illuminating Companies at Spring Lake, N. J., Sept. 19-21, were S. Z. de Ferranti, of Sheffield; Charles H. Merz and Arthur Wright, of London, and H. A. Couves, of Newcastle. On the evening of Sept. 29 Samuel Insull, president Commonwealth Edison Company, Chicago, Ill., gave a large dinner in New York at which the English visitors were the guests of honor.

Meeting of the Central Electric Accounting Conference

At This Meeting the Principal Subjects Discussed Were the Report of the Standing Committee on Freight Accounts and Affiliation with the C. E. R. A.

The eighteenth regular meeting of the Central Electric Accounting Conference was held at the Claypool Hotel, Indianapolis, Ind., on Saturday, Sept. 23. The meeting was called to order at 10 a. m. by the president, A. F. Elkins, auditor Columbus, Delaware & Marion Railway.

The report of the committee on freight accounts was the first subject on the program. This report follows:

REPORT OF STANDING COMMITTEE ON FREIGHT ACCOUNTS

"The committee had held two meetings and the subject of interline billing was discussed fully.

"Whereas, The necessity of extending interline billing arrangements in this territory is fully apparent, and in order to make such extension it is deemed necessary to adopt a more uniform way of handling the accounts, therefore be it

"Resolved, That this conference recommend the following:

"FIRST: Forms.

"That conference standard freight forms be adopted and numbered as follows:

"Form 1. Interline waybills, $1\frac{1}{3} = 5\frac{2}{3}$ in. x 14 in.; $\frac{1}{2} = 8\frac{1}{2}$ in. x 14 in.; whole = 17 in. x 14 in.

"Form 2. Passing records, $8\frac{1}{2}$ in. x 14 in.

"Form 3. Waybill correction, $8\frac{1}{2}$ in. x 11 in.

"Form 4. Abstract of interline waybills received, $8\frac{1}{2}$ in. x 14 in.

"Form 5. Division sheet, 14 in. x $8\frac{1}{2}$ in.

"Form 6. Statement of differences, 14 in. x $8\frac{1}{2}$ in.

"Form 7. Correction account, 14 in. x $8\frac{1}{2}$ in.

"Form 8. Summary, $8\frac{1}{2}$ in. x 14 in.

"SECOND: Arrangement for Interline Billing with Audit Office Settlements.

"Interline waybills should be used only between such stations and over such lines as have been agreed upon by auditors of the interested carriers.

"Agents at junction stations should be instructed to be careful to ascertain whether audit office settlement has been adopted by all roads interested in interline waybills before passing them. In case unauthorized interline waybills are received junction agents will issue correction, changing destination of waybill to last junction point to which interline billing is in effect, and junction settlement will be made at such corrected waybill destination, connecting line to re-bill to the final destination.

"THIRD: Waybills.—Form of Waybill and Method of Distribution of Copies.

"Form F-1 to be a blanket waybill printed on light-weight manila paper from which five carbons can be made easily at one writing.

"Original waybill to accompany shipment to destination, originating agent to make sufficient copies so that auditor of each road over which shipment moves will receive a copy; such copies to be sent daily through the auditor's office to the originating carrier.

SPECIAL CONDITIONS NOTED ON WAYBILLS

"Separate waybills on regular form to be used for order—notify shipments; making agent should write in full 'order—notify' and, if practicable, use a rubber stamp, instructing destination agent as follows:

"The surrender of the original order bill of lading, properly indorsed, shall be required before the delivery of the property."

"It is recommended that the bills of lading fully accomplished should be forwarded daily to the accounting de-

partment with waybill reference plainly indorsed thereon.

"Agents issuing waybills for order shipments should render a report of such waybills daily or weekly to accounting department. A record of order shipments moved on waybills issued by other carriers may be prepared in the accounting department or a separate report thereof may be required of the junction agents.

"These reports of order waybills should be checked by the auditor against accomplished bills of lading sent in to him by the agents.

"FOURTH: Waybill Corrections.

"When errors in billing are found by originating carrier correction on Form 3 shall be issued and copies furnished, through the auditor's office, to auditors of each road over which the shipment was moved, as well as a copy for the destination agent.

"The destination carrier shall be held responsible for the collection of the proper revenue and shall issue waybill corrections, furnishing copies through the auditor's office to the auditors of each road over which the shipment was moved, as well as one copy for the originating agent.

"As foreign roads' tariffs are not on file at small agencies, it is recommended that junction agents of destination carrier be supplied with joint tariffs and be held responsible for proper rates on shipments to stations on the line of their company. When an error is found by such junction agent a change shall be made on the waybill in red ink and the notation 'Corrected at _____ station, _____, 1911, _____ authority of _____,' made on the face of the waybill and signed by the agent making such change. The destination agent will issue correction.

"Agents at important stations will be furnished with such tariffs when possible and when so supplied will be expected also to verify rates on waybills received, both local and interline, covering shipments originating on other lines.

"FIFTH: Abstracts and Division Statements.

"A report on Form 4 of all interline waybills received shall be rendered by the receiving line on or before the fifteenth day of the succeeding month and shall include all waybills received during the month for which the report is rendered; the original report, accompanied by a division statement on Form 5, showing the apportionment of earnings between all lines interested, shall be mailed to the forwarding line and legible copies of such reports and division statements shall be mailed to all intermediate lines interested. The report and division statement as rendered by the receiving line shall be accepted as a basis for settlement and all errors or omissions shall be taken up with the receiving line and adjustment made in the next month's report.

"SIXTH: Statement of Difference and Correction Account.

"Discrepancies discovered by forwarding or intermediate carrier in the abstract or division statements, as rendered, shall be taken up with the receiving carrier in a statement of differences, Form 6.

"The items in the statement, if approved by the receiving carrier, shall be embodied in a correction account, Form 7, which shall also include discrepancies found in the abstracts of division statements, although attention may not have been called thereto by any other carrier.

"Discrepancies in correction accounts shall be handled in the same manner as these in the original statement.

"When the receiving carrier has reported waybills to one

intermediate carrier that should have been reported to another the original settlement thereof shall be made void by correction account and such waybill shall be reported via the proper route in the current abstract.

"SEVENTH: Summary and Statement.

"A summary (Form 8) of division sheet and correction account should be made by the receiving road to all roads interested. The net balance as shown by summaries should be settled by draft on or after the twenty-fifth day of the following month.

"EIGHTH: Tracing Unreported Waybills.

"Waybills not reported by the receiving carrier in the current or succeeding month's account should be immediately traced for by the billing carrier, who should attach copies of such waybills, noting thereon the junction passing report reference."

After full discussion it was decided to authorize the committee to have the various blanks printed and distributed to the members in connection with the usual report of the meeting. Final action on the adoption of a uniform system of interline freight billing with uniform blanks was deferred, however, until the next regular meeting of the conference.

As the report of the committee had been successful in promoting discussion on the subject of interline billing, the president was directed to appoint a similar committee on passenger accounts. Both of these committees are to be standing committees. Any member of the conference who wishes to ask questions relating to either passenger or freight accounting will write to the secretary, who will refer the matter to the chairman of the committee concerned for report and action at the ensuing meeting of the conference.

At the conclusion of the morning session those who attended the meeting were entertained at lunch at the Claypool Hotel by the officials of the Terre Haute, Indianapolis & Eastern Traction Company.

Owing to the absence of W. H. Forse, Jr., chairman of the committee on constitution and by-laws, no action was taken on the subject assigned to the committee. The report will be received at the next meeting in December.

OTHER BUSINESS

H. J. Davies, secretary Cleveland Railway, was unable to be present, but forwarded his paper on the subject "Legislation Affecting Electric Railway Accountants." This supplements a paper presented by Mr. Davies on this subject at the meeting of the conference held at Springfield, Ill., on June 24, and published in the *ELECTRIC RAILWAY JOURNAL* of July 1, 1911, page 26. It is probable that the conference will have the complete paper published for the use of the members and others interested.

The work of the committee on uniform comparative statistics was discussed and it developed that it would be impossible for the committee to arrive at a definite plan that would promote the adoption of uniform blanks for general statistics. Each company requires forms especially adapted to its purposes. The committee therefore felt that it should be relieved by the conference of further study of this subject. The committee was discontinued.

Walter Schroyer, chairman of the membership committee, reported that, pending the action of the conference on the proposed affiliation with the Central Electric Railway Association, the committee did not feel justified in soliciting new members. As the subject of affiliation was to be settled at this meeting, the committee was requested to begin an active campaign for membership, soliciting every company in the Central Electric Railway Association. In the past the membership fee has been \$5 per year. Under the arrangement for affiliation the representatives of the accounting departments of lines which are members of the Central Electric Railway Association will pay no dues other than those to the railway association. No more representatives of lines that are not members of the rail-

way association will be taken into the Accounting Conference, but those that are already represented in the conference will be continued as members with the same dues as heretofore.

AFFILIATION WITH THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The final subject on the program was the report of the joint special committee of the association and the conference dealing with the subject of affiliation. This committee consists of H. A. Nicholl, R. A. Crume and M. J. Insull, representing the association, and the following representing the conference: E. L. Kasemeier, L. T. Hixson and J. D. Maynes. This report was adopted and is as follows:

"First—The Central Electric Accounting Conference to be taken in as a whole and become an auxiliary of the Central Electric Railway Association.

"Second—The present members of the conference representing lines not members of the Central Electric Railway Association to pay the present dues. The proportion of expense of the non-member lines above \$5 per year to be prorated per member.

"Third—Lines members of the Central Electric Railway Association to pay no additional dues to the Central Electric Railway Association.

"Fourth—No more representatives of non-member lines to be taken into the Accounting Conference.

"Fifth—The Accounting Conference to elect its own officers except the treasurer. The treasurer of the Central Electric Railway Association shall be the treasurer of the Accounting Conference.

"Sixth—The president of the Accounting Conference, or other designated officer thereof, shall represent the conference as a member of the executive committee of the Central Electric Railway Association, provided such officer shall represent a member company of the Central Electric Railway Association."

If the proposed plan of merger is approved by the Central Electric Railway Association, the Accounting Conference, which was organized in 1907 at Dayton, Ohio, will become an auxiliary of the general organization.

The annual meeting of the conference will be held in Toledo, Ohio, on Dec. 16.

ELECTRIC RAILWAY EXHIBIT AT GLASGOW

An unusual feature of the conference of the Municipal Tramways Association, which was to have been held in Glasgow Sept. 27 to Sept. 29, was an exhibition of electric railway appliances for which space was provided in one of the carhouses of the Glasgow Corporation Tramways. James Dalrymple, general manager of the tramways, is also president of the association. Among the exhibits announced are the Ackley no-staff brake, the C-H amp-hour meter, the Titanium Alloy Manufacturing Company's products, Warner non-parallel axle motor truck, Atlas bearing metals, a trackless trolley brake, steel-back brake shoes, various forms of track and overhead line fittings, electric mechanical brakes, etc.

THE ATLANTA CONVENTION SPECIAL

Arrangements have been made for a special train to the coming Atlantic City convention from Atlanta, Ga., and neighboring cities. Special cars have been provided on train No. 38 Southern Railway, leaving Atlanta Oct. 7, 11:00 a. m., and arriving at Atlantic City Sunday noon, Oct. 8. Reservations may be made through P. S. Arkwright, president Georgia Railway & Electric Company, or F. L. Markham, 623 Forsyth Building, Atlanta, Ga. Delegates along the road may join the special train, but it is necessary to apply for reservations as noted.

Questions Involved in New Jersey Regulation

Discussion by Thomas N. McCarter, President of the Public Service Corporation, on Issues Before Board of Public Utility Commissioners Involving Gas and Electric Rates

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, made an address before the New Jersey Board of Public Utility Commissioners at Newark on Sept. 27 in reference to an investigation which the board is making into gas and electric rates. Mr. McCarter took up the questions of recognition of outstanding securities in any plan of rate-making, valuation, depreciation and other subjects of like importance. He said in part:

"While, of course in a small way, the electric industry was pushing its way forward in the decade between 1880 and 1890, the great development of that industry for purposes of light, power and traction took place in the decade from 1890 to 1900. The latter half of that decade was a period of unexampled prosperity the country over in all kinds of business, and the people, flushed with commercial and economic success and inspired by the wonders of the new inventions, entered upon an era of development and of exploitation which, however much it may have been accompanied by evils, has on the whole added greatly to the comfort of living and the convenience of the public.

"This was the picture as it looked at the close of the decade ending with 1900. But another century was dawning and in the early years of its first decade it soon became apparent that all that glittered was not gold; that the laying down of steel rails under legislative authority upon public highways was not of necessity immediately followed by fabulous wealth to the owners of those rails; in short, that the inexorable laws of trade applied to the new business in very much the same way as they did to any other commercial pursuit.

"About 1903 the larger of the street railway systems of the State had become financially embarrassed, and some plan of reorganization was absolutely imperative. The electric properties of the State were in a fair financial condition. Some were sound and some were not. The gas properties were sound but had very largely exhausted their capacity for new capital. As the enormous expenditures for the development of the business, to which I have before referred, had practically exhausted their bond issues, a very serious question was presented as to their future financing. At this juncture Public Service was formed with \$10,000,000 of full paid cash capital, without a drop of water in it, to take over and acquire these various properties, by lease or otherwise, to resuscitate the dilapidated railroads, to build up the electric properties and to provide the necessary additional capital for the gas companies. To-day the cash capital of Public Service is \$25,000,000 and it has sold \$30,000,000 of its bonds, making a total financial investment of \$55,000,000, and from the date of its inception to the present date there has not been a drop of water in the entire enterprise.

"The policy of Public Service has been to lower its rates in all branches of its business as rapidly as was possible, and in addition thereto, so far as its gas and electric business is concerned, to establish an absolute uniformity of rate for its commercial business, and this is now so as to both branches of its business throughout the broad territory served, except that in two of the divisions the gas rate is \$1 flat, whereas in the other four the rate is \$1.10 with 10 cents a thousand discount for payment within a certain number of days. After years of consideration of the matter I am satisfied that this plan of uniformity is of great advantage to the people of the State. Technically it may be open to some objection, but it has been of great assistance in the development of the smaller suburban

places whose prosperity is so interwoven with that of the larger cities.

"Furthermore, the problem of Public Service is unique. Most other companies of a similar character furnish one particular municipality, and perhaps its immediate environs, with one or more utility. We furnish 193 municipalities—large and small—with one or more classes of public utility service and most of them with all three.

CAPITAL INVESTMENT

"The capital invested in the business carried on by the Public Service Gas Company as of Dec. 31, 1911, will be approximately \$74,000,000. The capital invested in the business carried on by the Public Service Electric Company, as of Dec. 31, 1911, will be approximately \$67,250,000. These figures are arrived at respectively by taking the amount of underlying securities upon which each company pays a fixed charge and adding thereto the amount of cash capital of the Public Service Gas Company or electric company, as the case may be, as it will exist at the end of this fiscal year. Where there has been a combination or merger of gas or electric properties into one corporation the proportion of capitalization is generally arrived at by dividing the same in proportion to the gross receipts of that underlying company received from the gas and electric business respectively. This does not vary greatly from two-thirds gas and one-third electricity. As the capital of the gas company as of Dec. 31 next will be \$7,950,000 and of the electric company \$10,250,000, the underlying capitalization of the gas company is approximately \$66,000,000 and of the electric company \$57,000,000. The fixed charges of the gas company amount to \$3,929,718, thus demonstrating that this underlying capitalization has been obtained at an annual cost of less than 6 per cent. The fixed charges of the electric company are \$2,696,146. In this case the underlying capital has been obtained at 4.73 per cent—a most fortunate and reasonable circumstance in each case.

"The next question which presents itself is whether the actual capitalization is the capitalization that the board must recognize in this proceeding. I insist that it is. All these underlying companies, both gas and electric, upon which obligations of rental or otherwise have been assumed by the gas or electric company, as the case may be, were, with only one substantial exception, results of mergers or consolidations expressly authorized by and made in compliance with the so-called merger or consolidation act of New Jersey. The stocks of the old constituent companies were thus by direct authority converted into stocks and bonds of the new consolidated company, the practice generally followed being to provide sufficient bonds in the new consolidated company to take up the underlying bonds at maturity or before of the constituent companies, as well as to provide a quota of bonds for the future financial needs of the consolidated company. These values, thus long ago fixed, are in point of law at this late day immune from attack by the rate-making power or otherwise, and said values thus fixed must now be taken to have been the value of the properties, physical and franchise, tangible and intangible, entering into the respective agreements of merger and consolidation, and thus the State is now estopped from attacking this capitalization. This legal proposition is based on the decision of the Supreme Court of the United States in the New York Consolidated Gas case.

"The stocks of these underlying companies have been issued from twelve to twenty years. They have become scattered far and wide and, as in New York, have been

traded in freely and widely on the faith of their legality. The State through its rate-making power cannot be now heard to attack it. I regard this matter as settled for all time by the decision in the leading case which I have just quoted.

"If the conclusion that as a matter of law the validity of these securities cannot now be questioned is not controlling, then I insist with equal vigor that they should not be questioned by the board in the exercise of its discretion. I can conceive of no greater financial calamity that could happen to the people of this State than drastic action by this board, resulting in the destruction of the temple of Public Service over our heads. The securities to which I have referred are held broadcast over this State. They have passed from the hands of the promoter into the possession of the public. The blow would fall, in the first instance, upon those who have since put in large sums of money, and all—including radicals—agree that the investment of money in these enterprises should be encouraged, and those who make it should receive a fair return on their investment. Secondly, the blow would fall upon those who over a long period of years have invested in good faith in these various underlying stocks; but the end would not be here. I make bold to say that there is not a bank or trust company chartered by this State—except savings banks—that would not be seriously affected by any such unfortunate situation. In short, a state of financial panic would ensue.

VALUATION

"I now direct the attention of the board to the impracticability of making a complete physical valuation of the gas and electric properties connected with Public Service with-

EFFECT OF LOWER GAS AND ELECTRIC RATES

"In behalf of the interests which I represent I make the following proposition:

"That a schedule of rates be fixed by the board, effective for five years from Jan. 1, 1912, on a basis that will recognize the obligations of the gas and electric companies as to their respective underlying securities, and which will enable the gas and electric companies to pay annually a dividend of 8 per cent on their actual capital as it will exist from year to year, over the five-year period, after deducting proper reserves for maintenance, as hereinafter referred to, and after further providing a moderate fund for that portion of capital expenditure which business prudence demands should not be capitalized, and which must be made out of earnings to induce new capital to come forward for the balance of the large sum required annually for extensions to meet the growth of territory.

"I have caused to be made, subject to verification by the board, a careful estimate, based on the experience of the past, of the prospective business of both the gas and electric companies for the next five years, and have applied to this statement the foregoing proposition. It contemplates, in the case of the gas company, the putting into operation of a uniform flat rate of \$1 as of Jan. 1, 1912, for the whole territory served by the gas company, and on Jan. 1, 1914, the reduction of this base rate to 95 cents and on Jan. 1, 1916, the further reduction of this base rate to 90 cents. On this basis an inspection of the table submitted will show that during this period there will have been accumulated by the gas company over and above dividends of 8 per cent and reserves a surplus of approximately \$1,100,000, or an aver-

PUBLIC SERVICE RAILWAY AND SUBSIDIARY COMPANIES' ESTIMATE OF OPERATIONS, YEARS 1912-1916 INCLUSIVE

Year	Total, Including Miscellaneous		Oper. Exp. and Taxes, 62 p.c.	Net Earnings	Bond Int., Rentals, etc.	Int. on Capital			Res. under Bankers' Agreement	Balance	†Dividend	
	Earnings from Operation	Earnings of \$25,000 Annually				Joint Facility Rent.	Adv. by Pub. Ser. Corp., 6 p.c.	Total				Balance
1912. . . .	\$15,150,623	\$15,175,623	\$9,408,886	\$5,766,737	\$4,547,331	\$94,313	\$346,500	\$4,988,144	\$778,593	\$200,000	\$578,593	\$566,820
1913. . . .	*15,908,154	15,933,154	9,878,555	6,054,599	4,551,931	124,313	441,550	5,117,794	936,805	266,667	670,138	661,290
1914. . . .	*16,703,562	16,728,562	10,371,708	6,356,854	4,548,531	154,313	541,000	5,243,844	1,113,010	333,334	779,676	755,760
1915. . . .	*17,538,740	17,563,740	10,889,519	6,674,221	4,541,393	184,313	645,518	5,371,518	1,302,997	387,739	915,258	850,230
1916. . . .	*18,415,677	18,440,677	11,433,220	7,007,457	4,534,343	214,313	753,736	5,502,392	1,505,065	500,000	1,005,064	1,039,170

*Annual increase, 5 per cent. †Rate of dividend: In 1912, 1½ per cent; in 1913, 1¾ per cent; in 1914, 2 per cent; in 1915, 2¼ per cent; in 1916, 2½ per cent.

in any reasonable time; to the uselessness of any such appraisal when completed, and therefore to the advisability of arriving at some equitable solution of this problem quickly. I am frank to confess that I do not know what the physical value of these various properties is.

"The complications that would exist in valuing gas and electric properties located in some 193 municipalities, large and small, must be apparent. Assuming that the value as ascertained is less than the capitalized value, the knowledge thus acquired would be purely academic unless made the basis of action that would lead to financial ruin.

FAIR RATE OF RETURNS

"Then there is another aspect of the matter which must not be lost sight of. Having arrived at such a fair valuation of the property, gas and electric, devoted to the public use as would stand the test of review by the courts, the next duty of the board would be to determine the fair rate of return to be allowed thereon. My contention is, and I believe this board will go along with me in the proposition, that not less than 8 per cent on such valuation is just and reasonable. That was the deliberate judgment of the Wisconsin commission in the Madison case, and that, after years of reflection, is my judgment as to the minimum amount to be allowed on a well-established property, if it is to meet the requirements for betterments and extensions that will be put upon it by an increased public demand. If the rate of return is to be limited to a prevailing interest rate, sensible capital will not embark upon such enterprises, but will prefer a bond and mortgage, or a deposit in the savings bank.

age of \$220,000 a year. This sum is a less amount than should be accumulated for the purposes referred to above, as well as for protection against a business depression which seems only too imminent.

"In the case of the electric company it contemplates as of Jan. 1, 1912, the adoption of the same schedule of discounts from the base rate lately put into effect in New York by the Edison Company—which embraces a more liberal schedule of discounts than now in force in this territory. The present Public Service rate steps down 1 cent for every 500 kw-hours of monthly consumption for the first five steps; the New York rate steps down 1 cent for every 250 kw-hours of monthly consumption for the first four steps. In the fourth year of the period, or on Jan. 1, 1915, the base rate is further reduced from 10 cents to 9 cents, thus combining the first two steps of the theretofore existing schedule.

"There will be at the end of five years, if the prognostications as to business are reasonably accurate, a surplus over the 8 per cent dividend and reserves in the electric company of approximately \$1,650,000, or an average of \$330,000 a year—a sum quite inadequate.

"The subject of a proper reserve for purposes of depreciation, permanent renewals, obsolescence, unforeseen catastrophes and what-not is one that has been forcing itself to the front and engaging the attention of all thoughtful men conversant with public utilities. The fact is it has become a practical necessity for companies to consider the subject. All intelligent bankers now require it as a prerequisite to the purchase of securities. We have for years

given this subject a most thorough consideration, and at the time of the first large sale of our general mortgage bonds to bankers the subject was thoroughly considered by the bankers, their experts, Stone & Webster, and by ourselves, and an agreement was reached providing for the gradual accumulation of such a reserve, starting in a small way, but with as large an amount as the company at that time was able to bear and still do its duty to the public and to its stockholders, but increasing annually at certain specific rates, until it reached a maximum of \$1,500,000 a year. For the year 1912 the sum we are required to place in the reserve is \$600,000, for 1913 it is \$800,000, for 1914 it is \$1,000,000, and it increases from there on, proportionately with the earnings, up to \$1,500,000. In addition to this, commencing in 1913, the corporation is obliged to establish a sinking fund, amounting to \$209,500 annually, for the retirement of its general mortgage bonds. This is simply additional reserve in another form.

"We should also feel justified in appealing to the board for protection by way of raise of rates against any action by any other arm of the State government, the effect of which was to make impossible the results herein outlined, such as, for example, any new form of taxation largely in excess of that now in force.

"The rates of the railway company are not here under discussion, but as the railway company is the third constituent member of the corporation family I have thought it wise to insert a prospective statement of the railway company's earnings and expenses for the next five years.

"The corporation is now paying dividends at the rate of 6 per cent per annum. It has been the frank hope of the management that the earnings for 1912 would justify placing the corporation upon a 7 per cent basis, and in 1913 upon an 8 per cent basis, there to remain at least for the early future. Using the results shown in the detailed tables of the three operating companies as a basis, it is apparent that if this plan be adopted these expectations will not be realized, and all that the corporation can hope to do is to continue its 6 per cent dividend in 1912 and the first half of 1913, and thereafter during the period probably pay a 7 per cent dividend, accumulating, in addition thereto, a surplus that in the later years might justify an 8 per cent dividend."

Mr. McCarter then presented a statement showing the prospective financial status of the corporation in the next five years. He added:

"The tables are founded upon the best predictions for the future that we can make, assuming that the country is normal. Financial panics which cause a cessation of increases, such as took place in 1907, are not provided against, nor are strikes nor untoward catastrophes such as in recent years have overtaken Galveston and San Francisco. Those conditions, should they arise, the company would have to meet as best it could, bearing its share of the burden of distress.

NEW CAPITAL REQUIRED

"A great opportunity is here presented for a just and honorable settlement of what otherwise might turn out to be the most dangerous and perplexing problem that has been injected into the public affairs of New Jersey since the days of the civil war. The Public Service Corporation has still left available for improvement some \$20,000,000 of bonds. Its supply of bonds will then be exhausted. Future funds for the development of these great properties can come only from three sources—the expenditure of the reserve for construction purposes, the investment of further surplus earnings and additional issues of stock. As the municipalities served by the companies grow larger and larger the amount of money annually needed for improvements will increase. It has already averaged over \$6,000,000 a year since the formation of the corporation. If these properties are to extend properly and do their share in the work of state development it must be practicable for

the corporation to obtain its necessary funds. To make this reasonably secure, to insure a further investment of cash capital commensurate with the needs of the corporation, which must take the risk of its dividend behind all this mass of capitalization, we must be in the position to offer at least 8 per cent dividends, and in so doing we are only paying the minimum of what money is worth when devoted to these purposes under the circumstances which surround the case.

"This corporation is taking advanced ground upon all the great questions affecting public utilities. From having been unjustly regarded at its inception as a stock-jobbing operation, designed to enrich the few at the expense of many, it has taken its place, I am proud to say, as one of the foremost corporations of its character in the country. By successive raises in wages to the host of its employees it enjoys most cordial relations with its 10,000 workers. Allowing five persons to a family on the average—the usual average in such matters—one person out of every fifty of the total population of this State is dependent upon this corporation for his or her daily sustenance.

"But the corporation has gone further. It has jumped into the front rank of those companies which have inaugurated a system of welfare among their employees.

"The claim is made that we are active in politics. We have been to the extent of self-preservation. Just as long as approximately 10 per cent of the bills introduced into the Legislature at Trenton directly affect the business of this corporation, just so long will the corporation not only be justified but required to defend itself from such attacks by any legitimate means within its power. Two-thirds of the bills to which I have referred have no excuse for their existence other than an attempt on the part of the introducer to pamper to popular clamor or to blackmail the corporation. This board could perform no better work than helping to take the corporation out of politics, and in no way could that work be better started than by a permanent adjustment of the matters here under discussion. If such Utopian condition can be brought about no one will rejoice more than I. The few need to be protected from the clamorous many, as well as the many from the avaricious few."

PRELIMINARY CENSUS REPORT ON POLES PURCHASED IN 1910

The preliminary comparative report on poles purchased during 1910, as issued by the Census Bureau in co-operation with the Forest Service of the Department of Agriculture, shows that of the 3,870,694 poles purchased during 1910, 2,831,810, or 73.2 per cent, were reported by telephone and telegraph companies; 733,092, or 18.9 per cent, by electric railroad, light and power companies; and 305,792, or 7.9 per cent, by steam-railroad companies.

The total number of poles purchased in 1910 by all users of these materials, while greater than the number in 1909 by only 3.5 per cent, exceeded that of 1908 by 19.1 per cent, and of 1907 by 17.9 per cent. The electric railway, light and power companies increased their purchases by 105,678. In 1910, as in each of the three preceding years, more poles were cut from cedar than from all other woods combined. The proportion contributed by this species, however, has been steadily growing smaller, the percentage of cedar poles in the total of 1910 being 62.8, as against 65.3 in 1909, 67.7 in 1908 and 64.2 in 1907. While twenty-eight different woods were reported as drawn upon for pole material during 1910, four species—cedar, chestnut, oak and pine, ranking in the order given—contributed more than 90 per cent of the total during each of the four years covered by the report.

An interesting fact disclosed by the figures is the rapid growth of the practice of treating poles in order to prolong

their period of use. In 1910 824,673 poles, or more than 21 per cent of the total reported purchases for that year, were given some preservative treatment. This number was an increase of 248,042 poles, or 43 per cent over that of 1909; 480,285, or 139.5 per cent over that of 1908; and 428,474, or 108.1 per cent over that of 1907. In 1910 the class of pole users which applied preservatives most extensively was the electric railway, light and power companies.

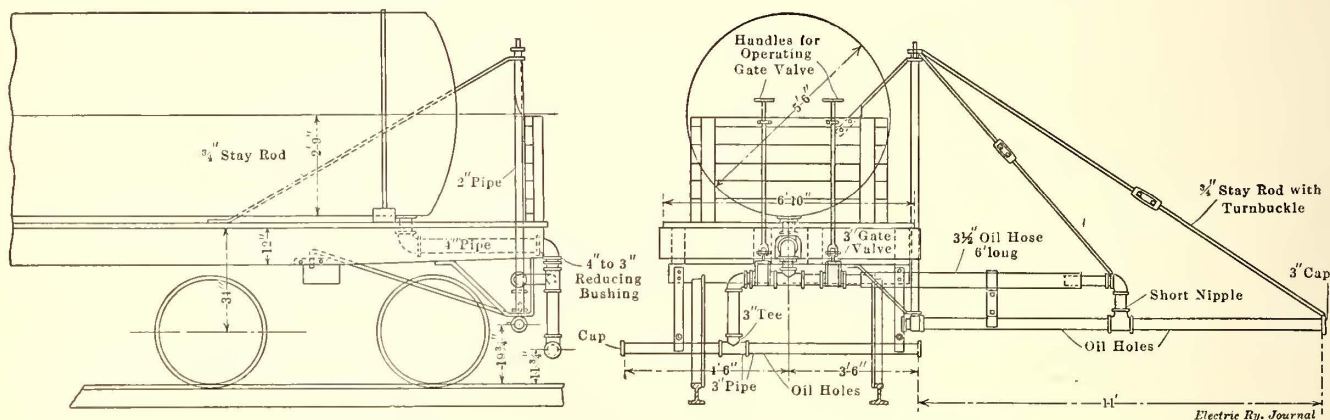
CAR FOR OILING STREETS

The interurban lines of the Milwaukee Electric Railway & Light Company pass through the streets of a number of small towns and the company has inaugurated the plan of oiling the streets once or twice a year in preference to sprinkling them with water. To do this work a road-oiling car has been designed and built by the maintenance of way

curb line and the other shows them as arranged for oiling only the track space.

The crew of the oil car consists of a motorman, a trolley man and a valve man. The latter watches the speed of the car and the condition of the highway and regulates the supply valves according to the need of the street surface and speed of the car. Ordinarily the oil is spread with the car moving at about 3 m.p.h. A little over 1/2 gal. of road oil, at 3 cents a gallon, is used per square yard of street.

The distributing pipes permit the oil to escape through a series of small holes on the under side. These oil holes are graduated in size and spacing, according to the distance from the infeed, so that as the pressure is reduced near the end of the pipe the holes are larger and closer together. Thus an even distribution of oil is secured. The holes in the distributing pipes directly over the track rails are wound with tape. The long pipe supported at the side of the car is hung from a mast arm and is connected with

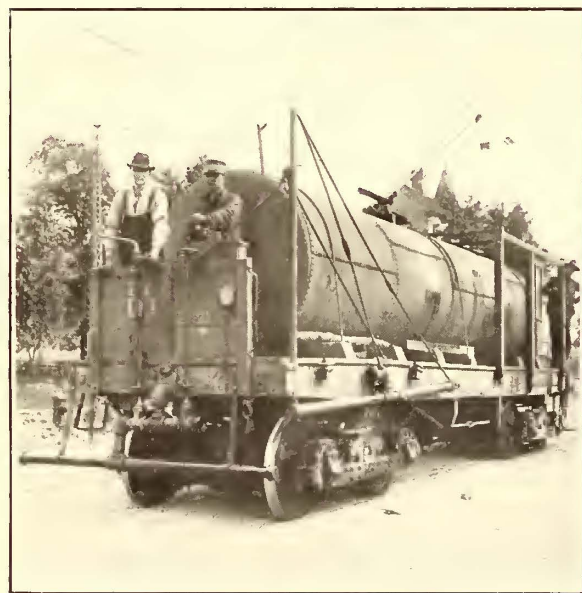


Side and End Elevations of Milwaukee Oil Tank Car

department of the company. This car, which is illustrated herewith, carries a 4000-gal. tank for holding road oil. It is equipped with oil-distributing pipes and regulating valves, and is designed so that it will spread the oil a width of 36 ft.

the oil supply through a piece of hose. This pipe is so supported that it can be swung alongside of the car and raised above the truck level to permit operation around sharp curves.

F. G. Simmons, superintendent of construction and



Tank Car with Boom Close to Car and Extended

Oil is taken from the bottom of the large tank through a tee-connection and two valves, one leading to a horizontal distributing pipe directly over the tracks and the other to a distributing pipe supported as a boom and designed to oil the roadway outside of the track space. One engraving shows the distributing pipes as arranged for oiling to the

maintenance of way, states that no trouble has resulted from slippery rails following the oiling of the streets. As soon as the oil car has covered its streets a sand car follows and both rails are sanded. The line drawing shows the dimensions and piping arrangement at one end of the car.

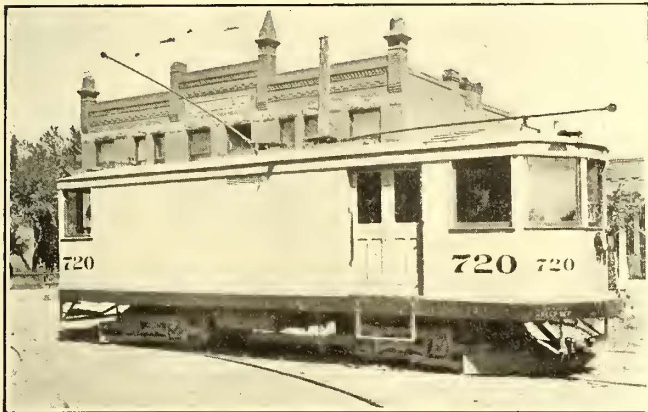
NEW UTILITY CARS OF THE DENVER CITY TRAMWAY COMPANY

To facilitate the handling of trailers in its different division headquarters and carhouses the Denver City Tramway Company has recently completed the construction of five general utility cars, each of which is equipped with four motors and straight air brakes. The cars were built under the direction of W. H. McAloney, superintendent of rolling stock, and are designed for a maximum speed of about 17 m.p.h. on a level track. Each car is 34 ft. long over all, and the maximum width is 8 ft. 3 in. The underframing is of girder rails reinforced by Oregon pine. The superstructure is also of pine. Each car is provided with two Brill 27-G trucks with steel wheels to secure the maximum tractive effort. The wheel diameter is 30 in. and the axles are 4 1/4 in. in diameter. The distance between

EG compressors are used. The main power wiring is installed in conduit with conduit fittings. All the electrical switches with the exception of the circuit breakers and platform controllers are located at one side of the car, and are carried on the wall upon suitable insulating bases. All switches are carefully labeled, and the main switch, which is of 400 amp capacity, air compressor, governor, auxiliary contactor, an aluminum cell lightning arrester, lighting and heating circuit breakers are mounted on the interior of the car.

No vestibule bulkheads are provided, but each end of the utility car is equipped with platform controllers and air-brake valves for double-ended operation. Two US-13 trolley bases and poles are installed on the roof. The height of the trolley base from the rail is 10 ft. 9 1/2 in., and the car floor is carried 40 in. above the rail. Steps 20 in. above the rail are provided on each side. The trolley wheels are 4 5/8 in. in diameter, the standard dimension of the company for this service. Each end of the utility equipment is provided with two nose plows and attachments, permitting the use of fenders in case they become necessary. The car is fitted with sand boxes, electric heaters, two roof gongs and an air whistle. The weight of each car complete is 40,000 lb.

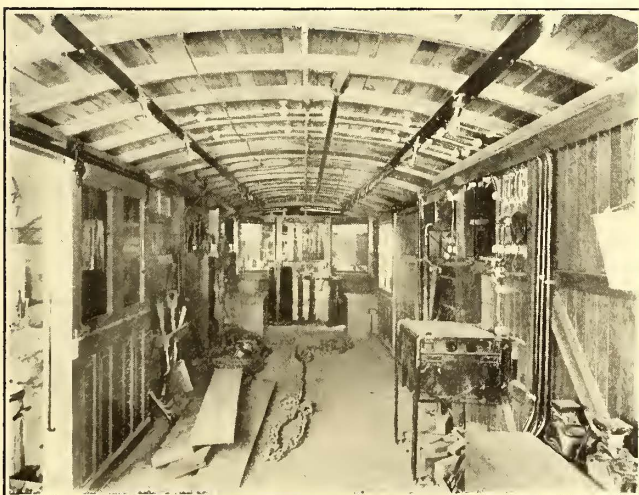
The interior equipment includes in each car a supply of jacks, rope, block and tackle, frogs, wedges, track tools, lanterns, torches, brooms, flags and dry-powder extinguishers. Racks are provided for smaller apparatus and supplies, and a locked cabinet is installed for the minor hand tools used. At opposite ends of the car near the vestibules are two side doors of the sliding type, 3 ft. 10 in. wide, and an extra trolley pole is carried below the roof in iron straps. Gay trolley catchers are in service. Ten trailers weighing 13,500 lb. each can easily be handled by each utility car.



Denver Utility Car

truck centers is 16 ft. The cars were made as short as was feasible for double-truck service on the Denver track gage, which is 3 ft. 6 in.

Each car is driven by four GE-58 motors, rated at 37 1/2 hp and with gear ratio of 15 to 69. The control of four of the cars is of the General Electric K-6 type, with auxiliary contactor break in the main circuit, the fifth car being equipped with Westinghouse H L control. Plug connections are provided to enable any number of trailers to be supplied with light from each utility car. Each of the



Interior of Denver Utility Car

latter is provided with sixteen 16-cp incandescent lamps installed eight on each side of the interior in a row underneath the deck sill, the headlights being furnished with a 32-cp lamp in each case in series with the interior circuits. Westinghouse straight air-brake equipment with type D-1

TECHNICAL LIBRARIES

At the annual meeting of the Special Libraries Association, held in New York on Sept. 27 and 28, two papers relating to technical libraries were presented.

UNITED GAS IMPROVEMENT COMPANY'S LIBRARY

One, by F. N. Morton, was entitled "Technical Literature Abstracts and Information Bureau Work in the Library of the United Gas Improvement Company." Mr. Morton, before describing his work as librarian of this company, stated that some years ago the company, appreciating that the mass of information contained in the library was buried beyond hope of usefulness, employed an engineer to index the books and particularly the technical periodicals. At the same time a clerk was delegated to index the current periodicals as received.

This arrangement was continued until about eight and a half years ago, when Mr. Morton was transferred from the plant of which he was then superintendent to his present position. He is a graduate of a technical college and has spent seventeen years in serving in all departments of the gas and electric business, both technical and commercial. At first the principal work, it was supposed, would consist in keeping the various officials and heads of departments informed regarding current progress and development in the subjects in which the company is interested. This is done by a system of abstracts. Forty periodicals are read and abstracts are made of all articles of interest or value. The abstracts are mimeographed and are issued at intervals of about ten days. The work of indexing books and periodicals then came logically under the charge of the librarian. A good knowledge of applied science is an essential requirement for proper answers to some of the questions asked. The librarian is always on the lookout for new information, and makes a point of investigating any source that looks at all promising.

LIBRARY OF THE BUREAU OF RAILWAY ECONOMICS

Richard H. Johnston, librarian of the Bureau of Railway Economics, Washington, D. C., read a paper describing this library. The bureau was established by a committee of presidents of steam railways, and represents all the steam railways of the country. It expects to serve as a clearing house of information upon matters of economic interest to the railways. As an adjunct to this work the bureau proposes to build up a complete railroad library, which is to be free of access to the general student of transportation. The necessity for such a library is demonstrated by an inspection of the various collections existing now. The library first obtained information as to the material available in the larger libraries in the United States. The check list now comprises about 20,000 entries, not including articles in periodicals or analytical references to the railway contents of works written primarily on other subjects.

The library keeps on file sets of the principal manuals and complete or partial sets of the most important economic journals. It is also interested in the reports of the various chambers of commerce and boards of trade, whose committees on transportation furnish valuable material relating to railways. The library also has works of general reference and many governmental documents relating to the subject. The bureau has a number of histories of individual railways and a fair collection of annual reports.

steel framework of the station presented in the half-tone illustration. This station is located at Delafield, on the 1200-volt Watertown interurban division. It consists of three unit sections, each 6 ft. x 10 ft. in floor area and 7 ft. 2 in. high to the eaves. The structural steel work is carried on a substantial concrete foundation with a platform having

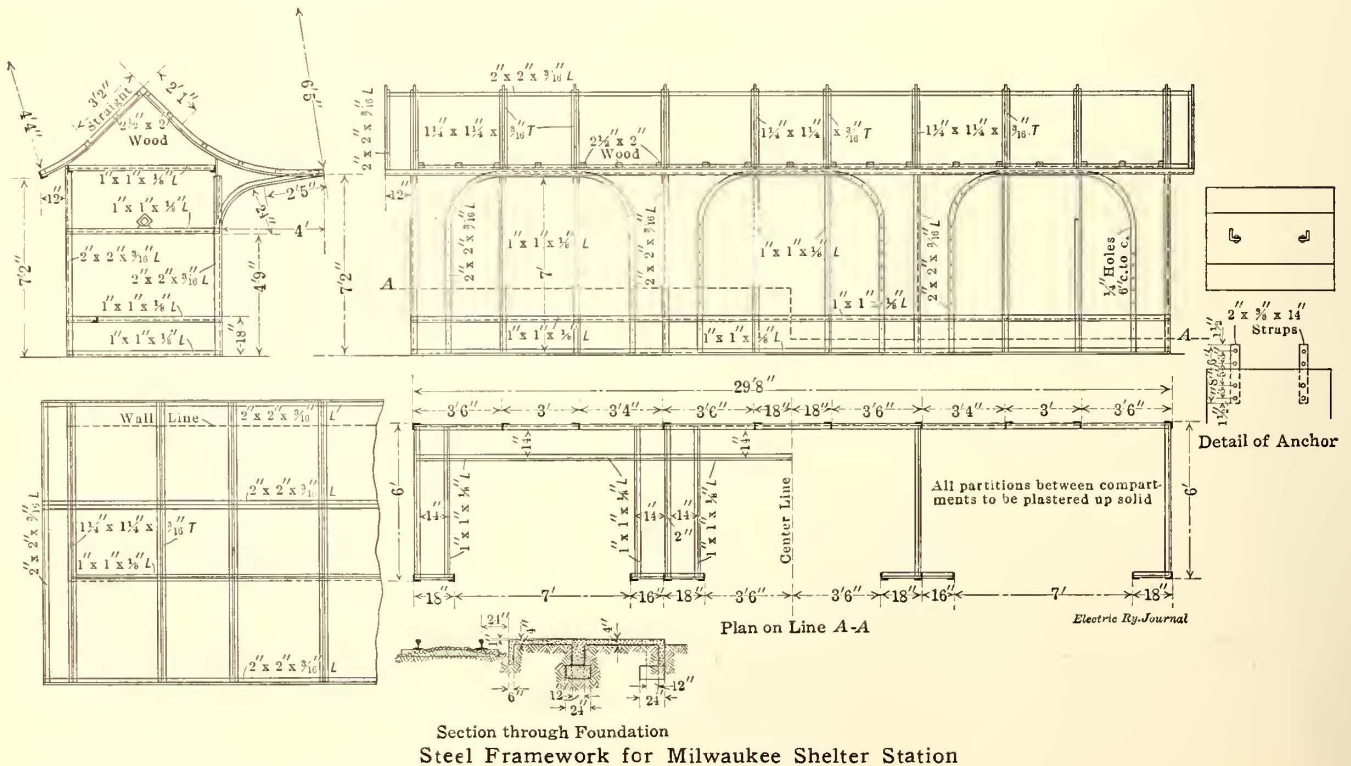


Milwaukee Shelter Station

MILWAUKEE SHELTER STATIONS

The way department of the Milwaukee Electric Railway & Light Company, which is under the supervision of Fred G. Simmons, superintendent of construction and maintenance of way, has built along the interurban lines of the company a large number of substantial shelter stations of the design shown in the accompanying illustrations. The stations are made of fireproof materials, having a framework of steel covered with concrete placed on expanded

a smooth finish. All the steel work is covered with concrete except for a height of about 1 ft. around the outside, where the concrete wall has a protecting covering of sheet steel riveted to the structure. The building is painted drab with white trim. The seats along three sides of the interior of each of the three inclosures are 14 in. wide and these consist of concrete supported on expanded metal lath securely anchored to angle-iron framework. Mr. Simmons states



metal lath. Such a station as the one shown in the half-tone engraving costs about \$425. Stations of this type are used at points of considerable travel. At the various country road stops on the interurban line a square shelter with "X" walls in the center is erected.

The accompanying line engraving shows the structural-

that when a large number of these stations are built at one time the unit cost given above can be considerably reduced. This type of station, using only fireproof materials, even though it costs more than a frame structure, is thought to be warranted because it requires practically no maintenance and is not easily defaced.

SIGNALING WITH TRACK TRIP CONTROL

BY W. H. ARKENBURGH

There has been some discussion recently of the desirability and advisability of using track trips in place of track circuits for signaling on interurban electric roads. Opposition to the scheme has come almost entirely from steam road men, as was to be expected. On steam roads there can be no doubt of the necessity for the track circuit. Theory and experience prove that there is no adequate substitute. The reasons for this are not far to seek. The track circuit protects every inch of the track. Any break in the circuit or any obstruction that will produce a slunt between the rails will be detected. Thus, if a train break in two, the portion remaining in the block will cause the signal at the entrance to that block to indicate stop. A broken rail will do the same thing in most cases, unless the break occur between the bond wires at a joint.

Now, a track circuit fed by primary battery is not a very expensive device. An alternating-current track circuit, on the other hand, especially if it includes impedance bonds for carrying the propulsion current around the insulated joints, is extremely expensive. Most steam road track circuits are of the primary battery type. It is true that some roads are using alternating current, but this is done on electrified lines or where foreign current interferes with the proper operation of direct-current circuits. With electric interurban roads the case is different. There is no escape from the alternating-current circuit with impedance bonds. The result is a very serious question of justifiable expense. On such roads, also, trains rarely consist of many cars and there is little danger of a break-in-two going undiscovered by the motorman unless he should be disabled, in which case no amount of signal protection, except automatic stops, would be of use. Aside from "break-in-two" protection the track circuit performs only one function better than a trip actuated by the wheels of a train can be made to do—that is, to warn against broken rails. Even here the track circuit is not infallible.

As already intimated, many cases of broken rails go undetected because either the break occurs at a joint and is bridged by the bond wires, or the ends of the rails make a contact sufficiently good to carry current to the relay. A track trip should be actuated by the wheels of a car and should follow closely the design of the standard instrument that has been on the market for many years; that was, in fact, the predecessor of the track circuit for the control of automatic block signals on steam roads. The most common form consists of a lever, pivoted in a frame which is fastened to one or more ties. The lever is so arranged that one end nearly touches one of the rails of the track, the upper edge being just high enough above the top of the rail to receive a smart blow from the wheels of a passing train. The other end of the lever projects within the frame and actuates a plunger which in turn moves contacts in an electrical circuit. Circuits can be so arranged that, as with track circuits, they will be normally closed. Thus any derangement of circuits will cause a stop signal to be displayed. One trip is placed at the entrance to the block and one an average train length beyond the end of the same block. The instrument at the entrance sets the signal at stop and the other restores the apparatus to normal. Other instruments may be placed at the fouling points of sidings and at other places demanding special protection. The only modification in design needed would be a provision for the display of a stop signal in case of breakage of any part of the instrument. There is no doubt that a trip might become inoperative through failure of the actuating mechanism or from being struck and knocked off its support. A reasonable amount of inspection should, however, detect anything of the kind in time to avert disaster. It should be possible so to design a trip that displacement or failure of any of its

parts would cause a stop signal to be displayed. For example, the circuit being normally closed, its integrity might depend on the presence of mercury in a cup which would be overturned in case of damage to the instrument. Therefore, if the managers of interurban roads feel that they can afford to dispense with broken rail protection there is ready at hand a simple and cheap means of controlling automatic block signals. I do not wish to be understood as advocating trips actuated by trolley contacts; it is too easy to beat them.

PUBLIC UTILITIES DISCUSSED AT MUNICIPAL CONGRESS

On Sept. 25 the International Municipal Congress, which has been holding a two weeks' convention and exposition in the Coliseum, Chicago, devoted its afternoon session to the discussion of public utilities. Bion J. Arnold, of Chicago, acted as chairman.

Mr. Arnold opened the meeting with a brief review of the conditions leading up to the establishment of the public utilities commissions now found in many States. The last thirty years, he said, had been a period of rapid advance during which inventors and engineers produced many new ideas which the capitalists had financed and promoted. As a result, franchises had been granted easily and on liberal terms, often having been awarded to competing projects. Later these competing corporations, compelled to combine and absorb by economic conditions, had become monopolies, the privileges of which, as well as the financial management, were sometimes abused. Allowances had not been made for depreciation, and in some cases even maintenance had not been provided for, so that, as the original franchises lapsed, the corporations had found themselves without the means of rehabilitating their badly run-down plants and so heavily capitalized as to preclude their raising additional funds. At about this time public service commissions had been developed, and the problems of regulation have since been undergoing solution in many cities and States. In conclusion Mr. Arnold declared his belief that where a company has been judiciously managed the differences between property value and invested capital, represented by promoter's profit, fees, etc., should also be allowed to earn a fair rate of return for the investors, all over such a fair rate being turned back into an amortization fund to retire the burden of their early costs, so that finally the physical value shall equal the capitalized value of the plant.

E. L. Elliott, editor of the *Illuminating Engineer*, discussed "Public Lighting." A paper by H. M. Byllesby, Chicago, was next read. After reviewing the events of the last quarter century, the accomplishments of engineers and inventors and the undertakings of promoters and capitalists in carrying out these developments, Mr. Byllesby called attention to the decrease in price which the commodities made and sold by public utility corporations had undergone in late years. In many cases, he said, the companies had even extended their services into unproductive fields at a loss. The public and the corporations are fast approaching a common meeting ground and the day of fair dealing between corporations and the public and corporations and the government was at hand. In the public utility commissions the demand of the companies was only for able, experienced men, familiar with utility management and themselves men of some accomplishment. The public would then better realize that the utility corporations should be encouraged rather than strangled and their beneficent monopoly would be protected.

Mr. Arnold then called upon W. D. Norton, formerly assistant secretary for the New York Public Service Commission of the First District. Refuting the claim that commission regulation is expensive, Mr. Norton explained that the body under which he served and which has jurisdiction within the limits of New York City had, beside its other numerous duties, succeeded to the functions of the

former Rapid Transit Commission, an organization with an \$800,000 yearly budget and employing an engineering staff of 500. The present budget of the Public Service Commission, little more than \$1,000,000, was even less than the expected rate of growth of that of the old transit commission alone. Mr. Norton also spoke of the advantages of uniform accounts and reports.

W. H. Buist, Dundee, Scotland, said that in Great Britain it was a notable fact that the municipal plants were the best managed and most stable and furnish the best service. The Edinburgh railways, he said, under private management, with municipal division of profits, had given much trouble, while the municipally owned Glasgow roads were in a flourishing condition and last year earned \$500,000 net profit. Municipally owned utilities in Great Britain, said Mr. Buist, were by their charter required to pay off their capital debts in a limited time.

Mr. Arnold said that thus far in America it was believed that better results could be obtained with private management under regulation. The talent required for efficient management, he said, required something more than merely the usual rate of interest or salary return.

HEARING ON ELEVATED RAILWAY IMPROVEMENTS IN NEW YORK

A hearing was held before Commissioner Eustis, of the Public Service Commission of the First District of New York, Sept. 27, 1911, on the question of improvements in the service of the Interborough Rapid Transit Company in respect to the operation of eight-car trains during the rush hours on the elevated lines of the Manhattan Railway.

H. H. Whitman, counsel for the commission, offered in evidence the order of the commission directing the hearing, with proof of service on the company. James L. Quackenbush, counsel for the company, said that he had no objection to the proceeding, but that he felt obliged to ask for an adjournment of the hearing. The Interborough Rapid Transit Company had been engaged in collecting data upon which to form a conclusion ever since the order had been served, and he had been advised that a conclusion had not been reached. It required time to determine how much work would have to be done in changing the structure and stations to accommodate the longer trains and to ascertain what financial plans would have to be made, as the expenditure of a considerable amount of money was involved.

E. G. Comette, transportation engineer of the commission, testified in regard to observations made on the various elevated lines of the company and to the probable increase in carrying capacity with eight-car trains. He qualified this, however, by stating that the company was running all the trains it could reasonably get over the road. Eight-car trains would not help with the same number of trains in operation, but the same number of cars divided into trains of eight car units would result in better service. To accommodate the longer trains changes would have to be made at terminals and the station platforms would have to be lengthened.

Mr. Quackenbush suggested that he defer asking the witness any questions until he had had an opportunity to look over the minutes. He said that at least a month would be required. Commissioner Eustis said that he would set the hearing for continuation on Sept. 29, 1911, and present the suggestion of an adjournment for a month to the commission. He said further: "This proceeding was brought for the purpose of arriving at a conclusion, and when we bring proceedings of this kind they are brought to carry them to as quick a conclusion as possible. It was time for you to prepare yourselves when you got this order."

Mr. Quackenbush in replying said: "This is not a thing which can be disposed of in the light way that you may think. It requires grave consideration and considerable

study, and I had just as soon put all of these things in the form of an affidavit. I did not think that I would be required to do that."

The hearing was adjourned until Friday, Sept. 29, 1911, at 2:30 p. m.

PROGRAM OF THE AMERICAN ASSOCIATION

Secretary Donecker, of the American Electric Railway Association, has issued the following program for the Atlantic City Convention. All sessions will be held at the Greek Temple on the Convention Pier.

Tuesday, Oct. 10, 2 p. m. to 5 p. m. (Open session.)

Convention called to order.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Announcements.

New business.

Reports of committees: (a) Subjects, (b) active membership, (c) associate membership, (d) public relations, (e) education.

Address—"The Hudson and Manhattan Tunnels," by William G. McAdoo, president Hudson & Manhattan Railroad, New York, N. Y.

Address—"The Effect of Electric Railway Operation on Taxable City Property," by Gen. George H. Harries, second vice-president Washington Railway & Electric Company, Washington, D. C.

Wednesday, Oct. 11, 2 p. m. to 5 p. m. (Executive session.)

Appointment of nominating committee.

Reports of committees: (a) Brill prize, (b) special committees, (c) insurance, (d) welfare of employees.

Address—"Measures for the Welfare of Employees," by D. T. Pierce, New York, N. Y.

Address—"Electric Railway Securities," by James G. Cannon, president Fourth National Bank, New York, N. Y.

Address—"The Interurban," by C. L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

Address—"The Toledo Street Railway Situation," by Albion E. Lang, president Toledo Railways & Light Company, Toledo, Ohio.

Thursday, Oct. 12, 2 p. m. to 5 p. m. (Executive session.)

Reports of committees: (a) McGraw Dictionary, (b) compensation for carrying United States mail, (c) taxation matters, (d) federal relations.

Address—"Physical Valuations," by O. T. Crosby, president Wilmington & Philadelphia Traction Company, Wilmington, Del.

Report of the committee on determining the proper basis for rates and fares.

Report of committee on nominations.

Election of officers.

Installation of officers.

Resolutions.

Unfinished business.

Adjournment.

THE INTERNATIONAL ELECTRICAL CONGRESS AT TURIN

The International Electrical Congress recently convened at Turin and completed its sessions Sept. 17. The program for the fifth section of the congress—that is, for the department of railways and electrical propulsion—contained eight papers as follows: "Single-Phase and Three-Phase Traction on Lines of Great Traffic," by Giorgio Calzolari; "Single-Phase Traction vs. High-Tension Direct-Current Traction for Interurban Lines," by F. J. Sprague; "Contract Systems for Electric Railways," by Gustave L'Hoest; "The Application of Electricity to Submarine Boats," by

Agostino Bezzi; "The Electrification of Steam Railroads," by Pietro Lanino; "Interurban Electric Railways with Special Reference to the Use of High-Tension Direct Current," by Guillaume Gyaros; "Distribution Systems for Single-Phase Trunk Lines," by Dr. W. Kummer, and "Electrification of Railways," by C. O. Mailloux. Mr. Mailloux was president of this section.

At one of the early meetings this section approved unanimously the proposition of Mr. Mailloux concerning the measure of the rate of acceleration of trains. The resolution reads as follows :

"WHEREAS, It is the universal practice on railways to express the speed of trains in kilometers per hour (or in miles or versts per hour); and,

"WHEREAS, It is logical to use this measure of speed in expressing the acceleration per second; and,

"WHEREAS, This definition of acceleration of trains is the one employed in America and its use is spreading in other countries; and,

"WHEREAS, This proposition has already received favorable action at the International Congress of Electricity held at Marseilles in 1908; now, therefore, be it

"Resolved, (1) That the acceleration of trains ought to be expressed in kilometers per hour per second (or in miles or in versts per hour per second); and,

"Resolved, (2) That a copy of this resolution be transmitted to the International Electrotechnical Commission."

TESTS WITH HAND AND AIR BRAKES IN NEW YORK CITY

At the request of the Public Service Commission, First District, New York, the Third Avenue Railroad, New York, made some interesting tests to determine the relative value of hand and air brakes under certain conditions. The experiments were made on Sept. 19 over a piece of practically level track on Bailey Avenue near 216th Street. Two cars were used, one weighing 28,000 lb. and equipped with hand brakes only, the other weighing 38,000 lb. and equipped with air brakes and Peacock hand brakes. Both the air-brake and the hand-brake applications on the second car were made by the same motorman. The results of the tests are shown in the accompanying table.

BRAKING TESTS ON P. A. Y. E. CARS.

Test No.	Speed—M.P.H.	Distance Traveled After Applying Brakes.
<i>Car No. 610—Weight 28,000 Lb.—Hand Brakes.</i>		
1	17.2	137.8 ft.
2	16.9	123.8 ft.
3	15.5	122.6 ft.
4	17.2	114.5 ft.
Average	16.95	124.7
<i>Car No. 876—Weight 38,000 Lb.—Air Brakes.</i>		
1 A	16.6	128.7 ft.
2 A	16.5	*117.4 ft.
3 A	16.4	*105.3 ft.
4 A	17.3	105.2 ft.
Average	16.7	114.2
<i>Car No. 876—Weight 38,000 Lb.—Hand Brakes.</i>		
1 B	17.0	144.1 ft.
2 B	17.6	134.3 ft.
3 B	17.0	128.3 ft.
4 B	17.6	159.8 ft.
Average	17.3	141.6

* Wheels skidded.

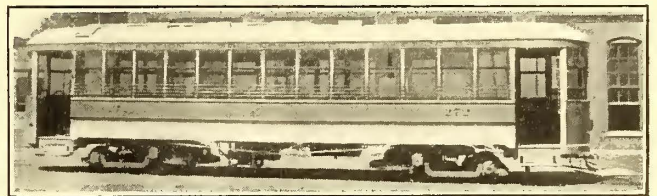
It will be noted in the case of the second car that with the hand brakes it was found possible to stop inside of 128.3 ft. when the initial speed was 17 miles per hour. With the use of the air brake the same car was stopped in 105.2 ft. from an initial speed of 17.3 miles per hour. In all cases the distances given in the table were measured from the point reached by the car at the instant that the stop signal was sounded.

Some comments on this test were made by E. G. Connette, transportation engineer of the commission, at a hearing held

on Sept. 20 and reported on page 503 of the ELECTRIC RAILWAY JOURNAL for Sept. 23. Mr. Connette said that it was his belief that accidents with cars weighing as much as 38,000 lb. and not equipped with air brakes would be diminished materially if such cars were furnished with a hand brake as efficient as the one used by the Third Avenue Railroad. These braking experiments were conducted for representatives of the commission under the direction of Thomas F. Mullaney, chief engineer, and J. S. McWhirter, superintendent car equipment, Third Avenue Railroad.

SINGLE-END PAY-WITHIN CARS FOR CITY RAILWAY COMPANY, DAYTON

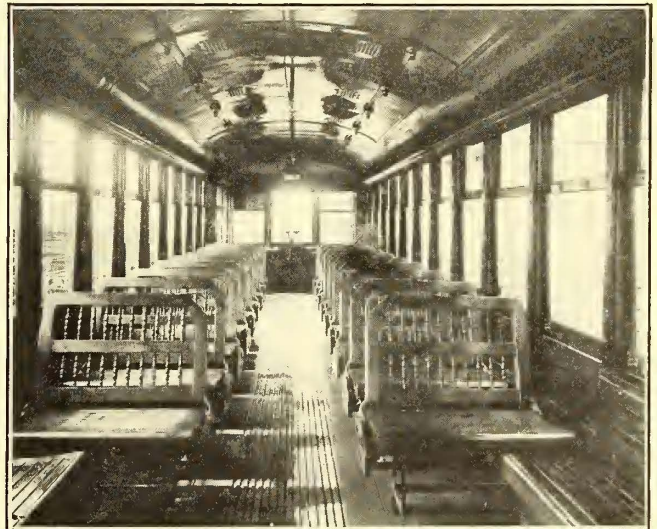
The City Railway Company, Dayton, Ohio, has recently placed in service ten double-truck, single-end, pay-within cars of the design shown in the accompanying exterior and interior views. The cars were built by the Cincinnati Car Company. Their principal dimensions are as follows: Length over the corner posts, 32 ft. 1/4 in.; length over the



Arch-Roof Car for Dayton, Ohio

bumpers, 43 ft. 3 in.; length of the platforms, inside of vestibule, 5 ft.; width over the posts, 8 ft.; height from bottom of sill to top of roof, 8 ft. 6 in.; height from rail to underside of sill, 2 ft. 7 7/8 in.; truck centers, 23 ft. 6 1/4 in.; wheel base of trucks, 4 ft. 9 in.; diameter of driver wheels, 34 in. and of pony wheels, 24 in.

The thirteen windows in each side of the car body are divided into two parts. The upper part is stationary and the lower part is arranged to rise straight up 25 1/2 in. be-



Interior of Dayton Car Looking Toward Rear Platform

hind the letter panel. The lower sashes are equipped with Dayton Manufacturing Company's raise sash locks, racks and compression rollers. The sides of the car below the windows are of the concave and convex panel type of construction, with 1/2-in. yellow poplar panels steam bent to shape. The interior finish is of cherry throughout, with Agosote headlinings 3-16 in. thick.

The roof is of the arch pattern. Each car is ventilated by means of ten ventilators mounted on the roof. The

inside ventilation openings are equipped with Hart & Cooley pressed metal registers measuring 5 in. x 10 in., one under each ventilator. The vestibules at each end of the car are inclosed with three drop sashes in the end and one in the devil-strip side. The opposite side has a pneumatically operated sliding door and folding step of the pay-within type. This door slides into a side pocket. There are no bulkheads at either end of the car.

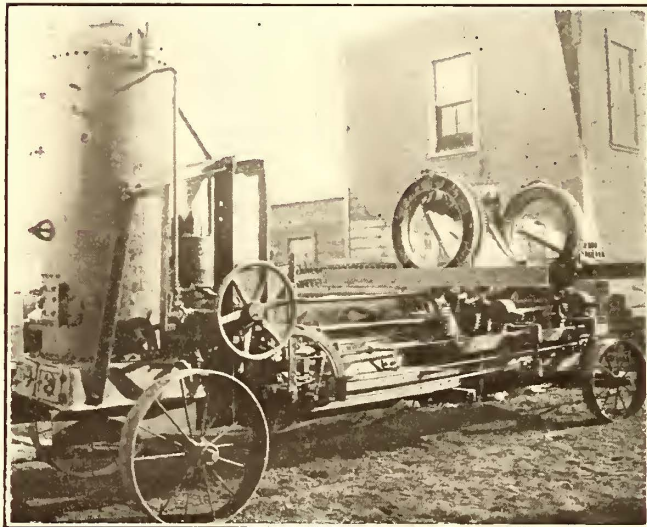
Each car has eighteen cross seats, nine on each side of the car, together with one longitudinal seat in each corner of the car which occupies the space of the two side windows. All seats are of cherry slat construction. The reversible seats are of Haywood Brothers & Wakefield manufacture.

The cars are mounted on two Standard No. O-45 maximum-traction-type trucks each equipped with a Westinghouse No. 306 motor wired for double-end control. The National Brake & Electric Company's straight air brakes are also installed. The weight of the car body, exclusive of body electric and air brake apparatus, is 12,360 lb., and complete, ready to run, 34,500 lb. The special equipment includes Consolidated buzzers, Ohio Brass Company's air sanders, Peacock hand brakes, Cincinnati Car Company's drawbars, National Lock Washer Company's curtains and illustrated herewith.

A POLE-PRESERVING MACHINE

Among the methods which have been tried for pole preservation are the effective but costly pressure treatment of the entire pole and the cheap but less efficient brush or non-pressure treatments. Since poles decay almost exclusively at the ground line, the problem of their preservation is confined practically to finding an inexpensive yet satisfactory method of treating that portion of the pole which is near the ground line. Working on this basis, George P. Benton and I. B. Eberhardt, of Chicago, have invented the "B. & E." pole-preserving machine, which is described herewith.

A demonstration of this machine was made on Sept. 20 in the pole yard of one of the largest public utility cor-



Pole-Preserving Machine

porations of Chicago. About a dozen representatives were present from the United States Forest Service and from several of the leading electric utility companies of Chicago and other cities. Three 35-ft. Michigan cedar poles cut last winter were treated seven, ten and fifteen minutes, respectively with heated creosote oil which was injected by an air pressure of about 5 lb. per square inch into a 3-ft. band corresponding to the ground belt of the pole.

With the ten-minute treatment an initial penetration of $3/16$ in. was obtained and this extended in a few days to a depth of over $1/2$ in. In the ten-minute treatment the pole absorbed a full gallon of oil in the 3-ft. band that was subjected to the treatment.

The accompanying illustrations of the machine are from photographs taken during the tests. The machine is about 19 ft. long and 6 ft. wide. It is mounted on wheels so



Pole-Preserving Machine in Service

that it may be easily hauled about to various positions in the pole yard or taken from yard to yard. The main parts are as follows: Steam boiler, air compressor and storage tank, closed oil tank containing steam coils for heating the preserving oil, 3-ft. wide air-tight canvas band, which incases the pole at the zone to be treated, together with the necessary gearing and mechanism to pass this band about the pole and tighten it. If a large number of poles are to be treated, a platform is built on either side of the machine or the latter is placed in a trench so as to have the iron skids level with the ground; a simpler plan is to place inclined skids on each side of the machine and roll the poles up on them.

The operation of the machine is quite simple. The pole is rolled onto the iron skids. The two segmental rings called track rings are closed about the pole by turning a hand-wheel. The spool carrying the canvas band is then revolved about the pole by an opposite movement of the handle. A clamping bar is wedged against the band so that the latter forms a closed bag or cylinder around the pole. Air pressure is applied to the edges of the band to tighten it and the compressed air is allowed to enter above the oil in the tank, thus forcing the heated oil through a pipe connection into the bag and entirely around the pole for any desired length of time. Any oil which oozes out of the bag, as for instance through checks in the pole, drops into a basin on top of the tank, into which it is later drained by opening a drip valve. Thus no oil is wasted by spilling on the ground nor by treating more than that part of the pole that is subject to decay while in service. By means of the reverse operations the pole is released and then rolled off the other side of the machine. The entire operation takes only a few minutes beyond that required for actually subjecting the pole to the oil.

Any kind of coal-tar oil favored by the user may be employed for a preservative. The capacity of the machine is about fifty poles a day for poles from 7 in. to 24 in. in diameter. The cost of treatment, which includes labor, oil, fuel and fixed charges on the apparatus, is only a fraction of a dollar for a 7-in. top, 35-ft. pole. The machine is manufactured by the B. & E. Pole-Preserving Machine Company, Chicago. This company can also furnish treated poles from Chicago.

News of Electric Railways

Judge Grosscup Not to Resign

Judge Peter S. Grosscup, of the United States Circuit Court of Appeals at Chicago, announced on Sept. 21, 1911, that he would not send his resignation to President Taft early in October as he had planned. Judge Grosscup issued this statement:

"If any responsible magazine comes forward and says it has an article about me intended for publication, if any responsible government official comes forward and says that a government investigation of me is pending, or if any responsible man comes forward and says that he knows of anything that is pending, I will not resign. Full opportunity will be given any of these to come forward and present the matter so that I can meet it as a circuit court judge and not as an individual. I still am a circuit court judge and may hold on to the office. If any attempt is made to make the community believe that I am resigning under pressure or for any other reasons than the ones I have stated, I will not resign."

Judge Grosscup is also reported to have said:

"I shall ask that a committee, composed of reputable men, be appointed to make a thorough investigation of my career and business transactions. I want this committee particularly to investigate my connection with the Union Traction Company, Chicago, and the Chicago & Milwaukee Electric Railroad."

Laurence Ritchie, who is reported to have been engaged for more than a year in inquiring into the act of Judge Grosscup to obtain material for a magazine article, is quoted as follows:

"I wish to say that at no time while I was investigating Judge Grosscup was I connected with the United States government in any capacity, or with any federal department. I took up this work for an Eastern magazine and represented it throughout the investigation. What information and data I gathered are now the property of that publication. I resigned from the United States secret service about Aug. 22, 1909, when I became connected with that publication. My resignation was sent to the Secretary of the Treasury and no doubt can be found in the records of that department. I have at all times during my investigation of Judge Grosscup taken a neutral stand. I am in no way interested in his resignation and can take no part in the present controversy. My work on this matter was an open investigation; I made no secret of it."

New York Central Railroad to Put Its New York Waterfront Tracks Underground

The New York Central & Hudson River Railroad laid before the Board of Estimate in New York on Sept. 28, 1911, a comprehensive plan for its freight tracks along Riverside Drive and Eleventh and Tenth Avenues, New York. It provided for placing the tracks under ground from Spuyten Duyvil to its yards at the end of Riverside Drive, and their elevation from Sixtieth Street to Cortlandt Street and their operation by electricity. In addition development was suggested of its yards between Thirty-first and Thirty-seventh Streets and at St. John's Park. The entire cost of this improvement, it is reckoned by the company, would be \$65,000,000, of which \$43,000,000 would be spent at once. The company is asking in return for its outlay a perpetual franchise to such extensions and tracks as it does not now possess, a six instead of two or four-track line along Riverside Drive and a four-track line down the marginal way as far as Cortlandt Street instead of its present two-track surface road to St. John's Park, which can be operated only with great difficulty. The section of the New York Central's tracks involved begins at Spuyten Duyvil. There they cross the Harlem River at the present time on a two-track drawbridge. This is now quite sufficient for the needs of the traffic, but the new plans provide for the construction of a tunnel under the Harlem at some future time, if that should be found advantageous on account of the increase of the traffic.

Tax Value of Ohio Railways Fixed

The Ohio State Tax Commission completed its work of appraising the interurban and suburban railways on Sept. 19, 1911. On account of a request for further hearings the valuation of the property of the Toledo Railways & Light Company was omitted. The aggregate value of these properties, as fixed by the commission, is \$115,482,227, as compared with \$30,382,927 for 1910, an increase of \$95,099,300. The commission has adopted a factor of computation to be used in the valuation of all properties under which the value of each road is fixed on the basis of its earning capacity. The commission argues that under this plan the results are in proportion to the total value of the properties. Many railway officials hold that the factor adopted is too high. The following table shows the valuations for 1910 and for 1911 of the principal companies in the State:

	1910	1911
Ashtabula Rapid Transit Company.....	\$45,230	\$225,208
Chillicothe Railroad, Light & Power Company...	36,915	132,020
Cincinnati, Lawrenceburg & Aurora Street Railroad.....	121,930	379,050
Cincinnati, Newport & Covington.....	150,300	360,000
Cincinnati Traction Company.....	2,883,000	18,123,416
Cincinnati, Milford & Loveland Traction Company	162,509	404,060
Cincinnati & Columbus Traction Company.....	224,730	505,847
City Railway, Dayton.....	222,550	2,342,918
Cleveland, Painesville & Eastern.....	267,174	1,478,525
Cleveland & Eastern.....	263,090	577,573
Cleveland, Painesville & Ashtabula.....	137,853	469,635
Cleveland, Southwestern & Columbus.....	975,026	3,432,536
Cleveland Railway.....	7,964,800	18,465,140
Cleveland, Youngstown & Eastern.....	147,514	368,859
Columbus, Delaware & Marion.....	321,465	1,255,027
Columbus, Marion & Bucyrus.....	45,012	154,800
Columbus, New Albany & Johnstown Traction Company.....	74,896	113,729
Columbus Railway & Light Company.....	2,671,540	7,921,979
Dayton, Covington & Piqua Traction Company...	128,759	418,310
Dayton & Troy Electric Railway Company.....	217,178	900,463
Dayton, Springfield & Xenia Southern Railway..	121,032	375,000
Dayton Street Railway.....	97,890	329,830
Detroit, Monroe & Toledo Short Line.....	30,531	82,219
East Liverpool Traction & Light Company.....	209,110	1,585,679
Interurban Railway & Terminal Company.....	340,338	828,205
Lake Erie, Bowling Green & Napoleon.....	59,026	185,000
Lake Shore Electric Railway.....	972,504	3,890,867
Lorain Street Railroad.....	117,295	688,784
Mahoning Valley Railway.....	464,955	2,663,682
Mansfield Railway, Light & Power Company...	105,768	787,227
Maumee Valley Railway & Light Company.....	74,375	308,080
Northern Ohio Traction & Light.....	1,496,782	9,617,701
Oakwood Street Railway.....	97,680	500,000
Ohio Electric Railway.....	2,899,375	12,570,022
Ohio Traction Company (operating Cincinnati-Hamilton Traction Company).....	241,986	699,927
Ohio Valley Electric Railway.....	88,078	196,700
Parkersburg, Marietta & Interurban Railway....	136,572	447,502
Pennsylvania & Ohio Railway.....	79,245	364,509
People's Railway Company, Dayton, Ohio.....	343,820	1,534,599
Portsmouth Street Railway & Light Company...	262,746	841,683
Scioto Valley Traction Company.....	478,300	1,569,062
Springfield Railway.....	300,000	913,853
Stark Electric Railroad.....	232,053	1,142,356
Steuenville & East Liverpool Railroad & Light Company.....	206,000	1,126,589
Steuenville & Wheeling Traction Company.....	81,050	403,293
Springfield, Troy & Piqua Railway.....	115,770	328,260
Toledo, Fostoria & Findlay Railway.....	162,176	754,960
Toledo & Indiana Railway.....	304,575	876,609
Toledo, Port Clinton & Lakeside Railway.....	248,199	728,790
Toledo & Western Railroad.....	313,528	921,547
Toledo, Bowling Green & Southern.....	352,510	1,415,046
Western Ohio Railroad.....	59,663	2,219,144
Youngstown & Sharon Street Railway.....	90,933	574,853
Youngstown & Ohio River Railway, including Salem Street Railway.....	166,511	819,451
Youngstown & Southern Railway.....	113,300	625,856
Grand total.....	\$30,382,927	\$115,482,227

Chicago Subway Commission

At the first fall meeting of the Chicago City Council on Sept. 25, 1911, Mayor Harrison sent to the Council a proposed ordinance formally establishing the subway commission and defining its duties. The ordinance was referred to the committee on local transportation. The members of the present commission are City Engineer John Ericson, E. C. Shankland and James J. Reynolds. Mayor Harrison is expected to reappoint the present commissioners to the permanent body. The commission was appointed to make a preliminary study of the subway problem and to prepare plans for a system for Chicago. The members have just returned to Chicago from an inspection of subways in Eastern cities. The proposed ordinance provides:

Establishment of a subway commission of three members, one of whom is to be the city engineer.

Commission to have complete charge and control of designing, constructing and maintaining a subway system, subject only to supervision of the Mayor.

City Council to select routes.

No construction work to be undertaken until the routes have been prescribed.

Commission to have complete control of the location of water mains, gas mains, tunnels, conduits and all other underground work, which must be moved to make way for the subway.

The commission to maintain an office, employ engineers, architects, draftsmen and other assistants and buy such supplies and materials as are needed.

New Boston Power Plant Inspected.—By invitation of the Stone & Webster Engineering Corporation a party composed largely of Boston bankers inspected the new power house of the Boston Elevated Railway recently. At this station current will be generated at 13,200 volts, to be transmitted to a number of substations. The work is being done by the Stone & Webster Engineering Corporation.

Electrification at Montreal.—At the meeting of the Board of Control of Montreal, Que., recently. City Attorney Archambault submitted a statement that Chief Engineer Janin was studying plans to replace steam locomotives with electric locomotives on trains entering and leaving the city. As soon as the report of Mr. Janin is received the matter will be taken up with the Railroad Commission with a view to obtaining the opinion of that body.

Opportunity for American Manufacturers.—The representative of a foreign government, who is now in the United States, writes to the Bureau of Manufactures that a municipality in his home country, having with its suburbs a population of about 100,000, has decided to build electric tramways and to establish an electric lighting system. Further particulars can be obtained by interested American manufacturers by addressing the municipal officers and referring to the Daily Consular Reports, No. 7303, page 1104.

Opinion Divided over Municipal Ownership in Winnipeg.—Wide difference of opinion exists in the Council of Winnipeg, Man., over the terms of purchase of the property of the Winnipeg Electric Railway by the city for \$24,000,000. At a meeting of the Council on Sept. 25, 1911, a motion to employ experts to go into earnings and valuations of the properties involved was adopted by the deciding vote of the Mayor. Two members of the special committee, appointed previously to conduct the negotiations, have resigned.

Petition of Groton & Stonington Street Railway Approved.—The Public Utility Commission of Connecticut has approved the petition of the Groton & Stonington Street Railroad, Mystic, Conn., in regard to methods of construction in Mystic. The commission says in its opinion: "We also order and direct that all trolley wires be suspended not less than 18 ft. above the surface of the highways, and that all double-truck cars used in transportation of passengers be equipped with some effective system of power brakes."

Joint Board to Consider Plans of Boston & Eastern Railroad.—The organization of the joint board to consider the plans of the Boston & Eastern Railroad for a tunnel between East Boston and its proposed terminal near Post Office Square in Boston has been perfected, with George G. Crocker as chairman and James B. Noyes as secretary. Both Mr. Crocker and Mr. Noyes are members of the Boston Transit Commission, which, together with the Railroad Commission and members of a board established in 1910 to investigate the whole subject of tunnels under Atlantic Avenue and the harbor, constitutes the joint board.

Terms of Detroit Settlement.—Under the new agreement between the Detroit (Mich.) United Railway and its employees the men will receive 23 cents an hour for the first six months, 27½ cents for the next twelve months and 29½ cents after eighteen months' service. The old scale provided for 23 cents an hour for the first six months, 26 cents for the next twelve months and 28 cents after eighteen months' service. The original request of the men was for 24 cents, 28 cents and 30 cents an hour respectively for the

periods mentioned. For four months the men will be subject to call during thirteen hours for nine hours of work. At the end of the four months it will be decided whether the time can be reduced to twelve and one-half hours and maintain the schedule.

Proposal for Joint Use of Seattle, Renton & Southern Railway.—In the *ELECTRIC RAILWAY JOURNAL* of Sept. 23, 1911, page 508, mention was made of the ordinance introduced in the City Council of Seattle, Wash., which provides for the purchase under condemnation by the city of the property of the Seattle, Renton & Southern Railway in the city proper. Following the introduction of this measure W. H. Crawford, president and general manager of the company, submitted a proposition to the city for the joint use of the line by the city, ownership to remain in the company. The city has voted to issue bonds for the construction of a municipal railway from Renton to Salmon Bay, and it is proposed to make the Seattle, Renton & Southern Railway a part of the city's line.

Personnel of Pacific Electric Railway.—Under the consolidation of the Pacific Electric Railway, Los Angeles Inter-Urban Railway, Los Angeles Pacific Company, Los Angeles & Redondo Railway, San Bernardino Valley Traction Company, Redlands Central Railway, San Bernardino Inter-Urban Railway and Riverside & Arlington Railway, effective on Sept. 1, 1911, the operating organization of the new company, the Pacific Electric Railway, is as follows: Southern Division—W. T. Maddex, superintendent; O. P. Davis, assistant superintendent. Northern Division—J. C. McPherson, superintendent; F. L. Annabe, assistant superintendent. Western Division—W. C. White, superintendent; H. E. Rodenhouse, assistant superintendent. San Bernardino Division—A. B. Merrihew, superintendent; W. E. Erwin, assistant superintendent. Riverside Division—M. P. Groftholdt, superintendent. Other officers of the operating department of the former Pacific Electric Railway continue with like jurisdiction in like positions under the new company.

The Steinway Tunnel.—W. R. Willcox, chairman of the Public Service Commission of the First District of New York, at the meeting of the commission on Sept. 22, 1911, in replying to an inquiry by J. Sergeant Cram, of the commission, in regard to the Steinway tunnel to Long Island City stated that the board had always been in favor of the opening of the tunnel but that the Board of Estimate had not accepted the original terms arranged between the commission and the Interborough Rapid Transit Company. Mr. Willcox went on to explain that negotiations, which have been restarted, were progressing satisfactorily and that there was every prospect that at further conferences some agreement would be reached. Heretofore the Interborough Rapid Transit Company has refused to operate the tunnel except on the condition that the city buy it at its actual cost of construction, somewhere around \$7,500,000. The commission was willing to agree to this proposition but the Board of Estimate refused to give its sanction.

Responsibility for Bridge Maintenance Defined.—The Board of Public Utility Commissioners has settled differences between the Trenton & Mercer County Traction Corporation and the Trenton Water Power Company regarding the maintenance of a bridge at Market Street, by deciding that the responsibility rests in a measure upon each corporation. It holds that the Trenton Water Power Company is obliged to maintain a safe structure and that the electric railway company must keep in good repair the space between its tracks and a distance of 3 ft. on either side of them. The attention of the board being called to the unsafe condition of the bridge, an investigation was made, as a result of which several recommendations were submitted to the Trenton & Mercer County Traction Corporation. One of these recommendations which was agreed to was that no car operated over the bridge should exceed a loaded weight of 20 tons. In respect to the other recommendation, the Trenton & Mercer County Traction Corporation alleged that it was the duty of the Trenton Water Power Company to maintain the bridge. The water power company denied the jurisdiction of the board upon the ground that it was not a public utility within the meaning of the act. The board decided otherwise and assumed jurisdiction.

Financial and Corporate

New York Stock and Money Markets

September 27.

Trading in Wall Street throughout the week was led by activity in the Steel shares. Strong rumors of either government suit against the Steel Corporation or its voluntary dissolution were followed by declines of both preferred and common shares to the lowest prices for the year. Trading on Tuesday was marked by general losses throughout the list. Total sales on Monday, Tuesday and Wednesday passed the million mark, the record for to-day being 1,683,729 shares. Rates in the money market are unchanged. Quotations to-day were: Call, 2½@2½ per cent; ninety days, 3½@3¾ per cent.

Other Markets

Boston issues opened at slight advances to-day, but declined early in the trading. Steel and Amalgamated Copper were the features of interest.

The Philadelphia market has been rather dull, and prices have not followed the trend of the New York market as closely as have those in other cities.

Chicago prices have dropped in the widespread decline, but a better tone was in evidence to-day and most of the active issues closed at higher prices than on Tuesday.

Quietness prevails on the Baltimore Exchange, and while a demand for investment securities is apparent, there is only very little business being done.

Quotations of traction and manufacturing securities as compared with last week follow:

	Sept. 20.	Sept. 26.
American Light & Traction Company (common).....	a298	a290
American Light & Traction Company (preferred).....	a107	a106
American Railways Company.....	a44	a44
Aurora, Elgin & Chicago Railroad (common).....	a43½	a42½
Aurora, Elgin & Chicago Railroad (preferred).....	a87	a87
Boston Elevated Railway.....	a127¼	a125
Boston Suburban Electric Companies (common).....	a14	a14
Boston Suburban Electric Companies (preferred).....	a75	a75
Boston & Worcester Electric Companies (common).....	a12	a12
Boston & Worcester Electric Companies (preferred).....	a51	a51
Brooklyn Rapid Transit Company.....	73¼	a72½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s.....	84	83
Capital Traction Company, Washington.....	a130	a130
Chicago City Railway.....	a190	a180
Chicago & Oak Park Elevated Railroad (common).....	a3	a3
Chicago & Oak Park Elevated Railroad (preferred).....	a6	a6
Chicago Railways, pteptg., ctf. 1.....	a95	a95
Chicago Railways, pteptg., ctf. 2.....	a30	a27
Chicago Railways, pteptg., ctf. 3.....	a10½	a10
Chicago Railways, pteptg., ctf. 4.....	a6	a6½
Cincinnati Street Railway.....	a132	*132
Cleveland Railway.....	a100	a99½
Columbus Railway (common).....	a83	*83
Consolidated Traction of New Jersey.....	a75	a75
Consolidated Traction of N. J., 5 per cent bonds.....	a104	a104
Dayton Street Railway (common).....	a25	a25
Dayton Street Railway (preferred).....	a101	a101
Detroit United Railway.....	a70	a70
General Electric Company.....	149	146
Georgia Railway & Electric Company (common).....	a158	a158
Georgia Railway & Electric Company (preferred).....	a93½	a93
Interborough Metropolitan Company (common).....	13¾	13½
Interborough Metropolitan Company (preferred).....	41¾	40¾
Interborough Metropolitan Company (4½s).....	78½	77½
Kansas City Railway & Light Company (common).....	a18	a19
Kansas City Railway & Light Company (preferred).....	42	a42
Manhattan Railway.....	137	132
Massachusetts Electric Companies (common).....	a17	a17
Massachusetts Electric Companies (preferred).....	a88¼	a87¼
Metropolitan West Side, Chicago (common).....	*27	*27
Metropolitan West Side, Chicago (preferred).....	*75	*75
Metropolitan Street Railway, New York.....	15	*15
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	65½	65
Northern Ohio Light & Traction Company.....	a57	*57
Northwestern Elevated Railroad (common).....	*30	*30
Northwestern Elevated Railroad (preferred).....	*70	*70
Philadelphia Company, Pittsburgh (common).....	a50	49
Philadelphia Company, Pittsburgh (preferred).....	42½	42
Philadelphia Rapid Transit Company.....	a21¾	21
Philadelphia Traction Company.....	82	83
Public Service Corporation, 5% col. notes (1913).....	*94	*94
Public Service Corporation, ctf. 5.....	a104	a103
Seattle Electric Company (common).....	a110	a110
Seattle Electric Company (preferred).....	a101	a100
South Side Elevated Railroad (Chicago).....	*95¼	a95¼
Third Avenue Railroad, New York.....	8½	7½
Toledo Railways & Light Company.....	6½	6½
Twin City Rapid Transit, Minneapolis (common).....	a106¾	*106¾
Union Traction Company, Philadelphia.....	a49½	*48¾
United Ry. & Electric Company (Baltimore).....	17¾	*17¾
United Rys. Inv. Co. (common).....	29	29
United Rys. Inv. Co. (preferred).....	56	53½
Washington Ry. & Electric Company (common).....	a43½	a41
Washington Ry. & Electric Company (preferred).....	a89	a89
West End Street Railway, Boston (common).....	a87	a85½
West End Street Railway, Boston (preferred).....	a101½	a100½
Westinghouse Elec. & Mfg. Co.....	60½	60¾
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a118	a118

aAsked. *Last sale.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—Judge W. E. Hadley, of the United States Circuit Court at Edwardsville, Ill., has appointed Frank L. Butler, Alton, Ill., receiver of the Alton, Jacksonville & Peoria Railway on the application of E. M. Davis and A. J. Davis, majority stockholders.

Berkshire Street Railway, Pittsfield, Mass.—The Berkshire Street Railway has petitioned the Railroad Commission of Massachusetts for authority to issue 49,000 shares of additional capital stock of the par value of \$100 per share. The proceeds of the issue will be used to retire the company's floating indebtedness and for further additions and improvements to the company's property.

Boston (Mass.) Elevated Railway.—A meeting of the stockholders of the Boston Elevated Railway has been called for Sept. 29, 1911, to vote to authorize an issue of negotiable bonds not to exceed \$5,000,000, the proceeds to be used for construction and equipment and to purchase such property as may be necessary and to pay any debts of the corporation.

Columbus Railway & Light Company, Columbus, Ohio.—The committee which is investigating the relations between the Columbus Railway & Light Company and the Columbus Railway did not have its report ready on Sept. 25, 1911, the date fixed for the adjourned meeting, and was expected to ask for thirty days more to finish its work. This investigation covers eight years and includes an examination of the physical property made by experts. The Columbus Railway owes the Columbus Railway & Light Company \$115,000 for improvements, and it is to finance this debt and make other improvements that additional capital is asked.

Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia.—Judge Smith McPherson, of the District Court of the United States for the Southern District of Iowa, has authorized the receivers of the Ft. Dodge, Des Moines & Southern Railroad to issue \$720,000 of receivers' certificates. Of this amount \$500,000 will be used to take up receivers' certificates issued on March 20, 1911, and the remaining \$220,000 is to be spent for improvements.

Interborough Rapid Transit Company, New York, N. Y.—A hearing was held on Sept. 25, 1911, before the Public Service Commission of the First District of New York on the application of the Interborough Rapid Transit Company to issue bonds to the value of \$11,400,000 under the mortgage of the company, dated Nov. 1, 1907, for \$55,000,000. The company submitted evidence to show that it is desired to use the proceeds of \$10,000,000 of the bonds to liquidate notes and \$1,400,000 to install side doors on local trains, purchase additional machinery for the main power station and make other improvements. The hearing was adjourned until Oct. 4, 1911.

Montgomery County Rapid Transit Company, Norristown, Pa.—The property of the Montgomery County Rapid Transit Company was sold under foreclosure at Norristown on Sept. 21, 1911, for \$75,000 to a representative of the committee of bondholders.

Montreal (Que.) Street Railway.—The Canadian Railway Commission is to be asked to recommend the Governor in Council to sanction an agreement for the sale of the entire property of the Montreal Park & Island Railway to the Montreal Street Railway.

Pacific Electric Railway, Los Angeles, Cal.—A meeting of the stockholders of the Pacific Electric Railway has been called for Nov. 16, 1911, to vote to authorize an issue of \$100,000,000 of bonds to retire outstanding issues and provide funds to carry out the important extensions and developments which the company has in contemplation.

Porto Rico Railways, Ltd., San Juan, P. R.—The Porto Rico Railways, Ltd., has declared an initial quarterly dividend of 1 per cent on its common stock; also the regular quarterly dividend of 1¼ per cent on its preferred stock.

Portland & Brunswick Street Railway, Freeport, Me.—The property of the Portland & Brunswick Street Railway was sold under foreclosure on Sept. 25, 1911, for \$225,000 to Harry B. Ivers, general manager of the Lewiston, Augusta & Waterville Street Railway, representing others.

Third Avenue Railroad, New York, N. Y.—The Court of Appeals at Albany has set Oct. 16, 1911, for hearing the appeal by the Public Service Commission from the decision of the Appellate Division of the Supreme Court in the reorganization case of the Third Avenue Railroad. The first plan of reorganization of the Third Avenue Railroad was disapproved by the Public Service Commission of the First District in 1909. The bondholders then devised a new plan, which was in turn disapproved by the commission. The company then applied for a rehearing before the commission. The rehearing was denied by the commission and appeal was taken by the company to the Appellate Division which decided against the commission.

Trenton (N. J.) Street Railway.—C. E. Mitchell & Company, New York, N. Y., are offering at 101 and interest the unsold portion of the present issue of \$300,000 of 6 per cent general mortgage gold bonds of the Trenton Street Railway, dated June 1, 1911, and due June 1, 1941, but callable at 105 and interest on any interest date. The total authorized issue is \$500,000. The trustee of the mortgage securing the bonds is the Bankers' Trust Company, New York, N. Y.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—Julius M. Mayer, counsel for Joseph B. Meyer, receiver for the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad Company, outlined the terms for the reorganization of the company, which have been submitted to the Public Service Commission of the First District of New York, at a hearing on Sept. 22, 1911, before Commissioner Maltbie. The company is now operated under an arrangement with Frederick W. Whitridge, receiver of the Third Avenue Railroad, as explained in the ELECTRIC RAILWAY JOURNAL of Sept. 16, 1911, page 468. The plan of reorganization provides for turning over the control of the company to the Third Avenue Railroad, which would purchase securities to the amount of about \$1,500,000 at 30 cents on the dollar. Mr. Mayer admitted that until the reorganization of the Third Avenue Railroad is effected his clients could not make their proposition definite. Mr. Maltbie said that the commission was willing to keep the proceedings alive, and if the company would submit data as to any property which it has, the commission may informally indicate the capitalization which it would be willing to consent to under the reorganization. The hearing was adjourned until Sept. 29, 1911.

Washington & Rockville Railway, Washington, D. C.—A hearing was held before the Public Service Commission of Maryland on Sept. 16, 1911, on the application of the Washington & Rockville Railway for permission to issue a mortgage to cover an issue of \$100,000 of bonds and to increase the capital stock of the company from \$50,000 to \$300,000. The hearing will be continued on Oct. 5, 1911.

Waterville & Fairfield Railway & Light Company, Waterville, Maine.—Control of the Waterville & Fairfield Railway and the Union Gas & Electric Company has passed to the Central Maine Power Company, of which Harvey D. Eaton, Waterville, is president.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland as receiver of the Yonkers Railroad to issue \$65,000 of receiver's certificates to refund a like amount which came due on Sept. 10, 1911. The proceeds of the original issue were used to improve the company's property in Yonkers.

Dividends Declared

Aurora, Elgin & Chicago Railway, Chicago, Ill., quarterly, 1½ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¾ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, 2½ per cent.

Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Columbus, Newark & Zanesville Electric Railway, Newark, Ohio, quarterly, 1¼ per cent, preferred.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1¼ per cent, common.

Illinois Traction System, Champaign, Ill., quarterly, 1½ per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1 per cent, common.

Oklahoma Railway, Oklahoma City, Okla., quarterly, 1¼ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common; extra, ½ of 1 per cent, common.

Porto Rico Railways, Ltd., San Juan, P. R., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Public Service Corporation, Newark, N. J., quarterly, 1½ per cent.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred; quarterly, 1¼ per cent, preferred.

Stark Electric Railway, Alliance, Ohio, quarterly, ¾ of 1 per cent.

Washington-Virginia Railway, Washington, D. C., 1½ per cent, preferred; 1½ per cent, common.

Winnipeg Electric Railway, Winnipeg, Man., quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

CAPE BRETON ELECTRIC COMPANY.						
Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	July,	'11..... \$31,215	\$15,836	\$15,379	\$6,201	\$9,178
1 "	"	'10..... 28,876	14,407	14,469	6,182	8,287
12 "	"	'11..... 332,935	171,736	161,199	73,759	87,440
12 "	"	'10..... 310,680	169,178	141,502	74,048	67,454
CLEVELAND SOUTHWESTERN & COLUMBUS RAILWAY.						
1 m.,	Aug.	'11..... \$110,855	\$58,850	\$52,203	\$29,921	\$22,283
1 "	"	'10..... 107,755	56,605	51,150	29,794	21,356
8 "	"	'11..... 744,375	418,832	325,543	240,436	85,107
8 "	"	'10..... 688,272	401,535	286,737	238,351	48,386
DALLAS ELECTRIC CORPORATION.						
1 m.,	July,	'11..... \$125,037	\$81,610	\$43,427	\$25,992	\$17,434
1 "	"	'10..... 117,270	85,473	31,797	26,842	4,955
12 "	"	'11..... 1,559,557	975,863	583,694	314,310	269,384
12 "	"	'10..... 1,403,744	923,843	484,901	322,218	162,683
EL PASO ELECTRIC COMPANY.						
1 m.,	Aug.	'11 \$51,834	\$30,776	\$21,057	\$8,319	\$12,739
1 "	"	'10 49,351	29,557	19,794	8,215	11,579
12 m.,	"	'11 667,937	387,394	280,544	98,389	182,154
"	"	'10 629,620	361,626	267,994	101,300	166,694
GRAND RAPIDS RAILWAY.						
1 m.,	Aug.	'11 \$105,274	*\$58,300	\$46,974	\$15,008	\$31,966
1 "	"	'10 111,814	*54,424	57,390	15,278	42,112
8 m.,	"	'11 765,706	*437,288	328,418	120,353	208,065
"	"	'10 755,642	*401,228	354,414	121,543	232,871
GALVESTON ELECTRIC COMPANY.						
1 m.,	July,	'11..... \$44,763	\$20,371	\$24,392	\$8,718	\$15,674
1 "	"	'10..... 38,405	19,036	19,369	8,026	11,342
12 "	"	'11..... 414,212	221,791	192,420	100,197	92,224
12 "	"	'10..... 361,003	230,847	130,156	80,100	50,055
GALVESTON-HOUSTON ELECTRIC COMPANY.						
1 m.,	July,	'11..... \$136,113	\$76,069	\$60,044	\$25,105	\$34,939
1 "	"	'10..... 122,097	65,989	56,108	26,608	29,499
12 "	"	'11..... 1,430,165	837,870	592,295	303,099	289,196
12 "	"	'10..... 1,255,297	766,376	488,921	273,858	215,063
HOUGHTON COUNTY TRACTION COMPANY.						
1 m.,	July,	'11..... \$31,220	\$13,639	\$17,581	\$7,773	\$9,808
1 "	"	'10..... 30,036	14,380	15,656	6,640	9,017
12 "	"	'11..... 306,131	160,038	146,093	79,867	66,226
12 "	"	'10..... 320,231	169,837	150,393	76,556	73,837
JACKSONVILLE TRACTION COMPANY.						
1 m.,	July,	'11..... \$43,920	\$24,578	\$19,342	\$12,364	\$6,979
1 "	"	'10..... 46,906	25,207	20,699	9,489	11,210
12 "	"	'11..... 578,831	320,563	258,263	123,449	134,819
12 "	"	'10..... 543,723	284,920	258,802	112,499	146,304
MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.						
1 m.,	Aug.	'11..... \$424,701	\$229,642	\$195,059	\$132,343	\$62,716
1 "	"	'10..... 412,339	213,079	199,259	188,739	80,521
8 "	"	'11..... 3,297,882	1,755,726	1,542,155	991,165	550,990
8 "	"	'10..... 3,096,477	1,658,360	1,438,117	901,818	536,299
MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.						
1 m.,	Aug.	'11..... \$166,607	\$46,886	\$119,721	\$77,510	\$42,211
1 "	"	'10..... 159,894	45,616	114,278	75,299	38,979
8 "	"	'11..... 1,143,955	325,447	818,508	577,579	240,929
8 "	"	'10..... 1,073,719	307,916	765,803	563,848	201,955
NORTHERN OHIO TRACTION & LIGHT COMPANY.						
1 m.,	Aug.	'11..... \$272,624	\$143,666	\$128,958	\$44,321	\$84,638
1 "	"	'10..... 263,149	135,833	127,316	43,496	83,821
6 "	"	'11..... 1,773,731	981,692	792,039	354,749	437,290
6 "	"	'10..... 1,612,504	892,001	720,504	346,769	373,734

Traffic and Transportation

Test of Fenders and Wheel Guards in Massachusetts

The Railroad Commission of Massachusetts has issued the following notice in regard to the test of fenders and wheel guards which it proposes to conduct on the Middlesex & Boston Street Railway, commencing Oct. 10, 1911:

"Resolves of 1911, Chapter 74. Resolve to authorize the Board of Railroad Commissioners to investigate the matter of equipping street railway cars with fenders and wheel guards.

"Resolved, That the Board of Railroad Commissioners is hereby directed to investigate the matter of the compulsory equipping of the cars of street railways with fenders and wheel guards; to investigate the operation of such fenders and wheel guards in this commonwealth and elsewhere; to examine the comparative merits of different fenders and wheel guards, and to report to the General Court, not later than Jan. 15, 1912, the result of its investigation of the matters aforesaid and of any other matters relating to fenders and wheel guards for street railway cars, or to other means which the board may consider efficient and practicable for the prevention of accidents in the operation of the said cars. The board may expend for the purposes of this resolve a sum not exceeding \$1,500. (Approved May 13, 1911.)

"In accordance with the above resolve the board will, commencing at 10 a. m. on Tuesday, Oct. 10, 1911, conduct a test of such fenders and wheel guards as persons interested may attach to cars provided for the purpose. The tests will take place at the Homer Street carhouse of the Middlesex & Boston Street Railway, near the junction of Commonwealth Avenue and Walnut Street, in Newton, where similar tests were held in 1906. Dummies and cars will be provided by the board.

"Persons having fenders or wheel guards to be tested at that time are requested to confer with the board at an early date, when the necessary details may be arranged."

Decision of Supreme Court of Washington in Seattle-Tacoma Fare Case

The Supreme Court of Washington has sustained and affirmed the order of the State Railroad Commission directing the Puget Sound Electric Railway operating between Seattle and Tacoma to reduce its passenger fares. The commission's order permitted the company to continue its advanced rates for through business and to points where patrons of the line could have steam railroad connection, but it refused to allow increases to the suburban towns in the Duwamish Valley.

The opinion recites that the road went into operation in 1902 and established rates under which many little towns grew up. In October, 1909, the company increased its rates to towns outside of Seattle. Similar advances were made to suburban towns near Tacoma. The commission ordered the company to restore the old round-trip rate between Seattle and Renton Junction and from Tacoma north to Algona and between Tacoma and points on the Puyallup line. The round-trip rate, Seattle to Renton, was reduced from 54 cents to 35 cents; from Seattle to Earlington from 50 cents to 30 cents. These are the rates that the company is required to restore by the decision of the Supreme Court.

In its decision the court says in part:

"The rate established is one the patrons can pay. It is one which we believe will give the company a profit over the cost of the particular service, and, when added to the charges remaining, will produce a revenue of 7 per cent, which, considering the character of the service and the rights of the public, we cannot say is either unreasonable or unjust. Our affirmance of the commission's order is based upon the broad ground that the company's new rate is unreasonable, that it is more than the service is worth to the patrons, that the old rate ordered by the commission is one which the patrons can afford to pay and is all that the service is reasonably worth to them, that it is one which the company can give and perform the service at a profit over the cost of the haul, and hence is a reasonable rate.

Neither is the rate ordered by the commission in violation of the constitutional provision against discrimination between persons or places.

"Great consideration should be given the findings of that body to whom the State has primarily given the right and authority to determine questions of this character. Such findings should not be disturbed unless they bear evidence of having been arbitrarily reached and without a full and due consideration of all the controlling facts. Their determination calls for the exercise of economic as well as legal principles. Courts may well review the questions submitted in so far as they suggest the application of legal principles, but in so far as they suggest the enunciation of economic rules they must defer largely to those who by study, experience and calling are in better situation to determine what is and what is not a proper method of determination."

On the final question raised by the defense, that these rates are lower than the State permits the steam roads to charge, the decision says:

"It does not appear that these railroads are competing lines for passenger traffic nor that they have station facilities at any of the points affected by the order of the commission in the suburban zones except at Puyallup, Renton and Earlington. There being no discrimination, it is needless to determine the law upon a question which has no foundation in fact. It is therefore apparent that with the general increase in rates allowed by the commission, and with the patronage from through business approximately the same at the increased round-trip rate from \$1 to \$1.25, the company will have no difficulty in earning the 7 per cent fixed by the commission, in whose judgment as to a proper and sufficient rate we join."

Accident in Atlanta.—More than twenty persons are reported to have been injured on Sept. 24, 1911, by the overturning of a car of the Georgia Railway & Electric Company in Atlanta, Ga.

New Baggage Rules in Dayton.—The officers of the City Railway, Dayton Street Railway, Oakwood Street Railway and the People's Railway, Dayton, Ohio, have agreed to submit to the Public Service Commission of Ohio a new set of rules to govern the carrying of baggage on the cars of the companies. At the suggestion of the commission, the companies have agreed to keep the doors of their prepayment cars open at railroad crossings.

Safety Gates Reduce Accidents in Louisville.—The Louisville (Ky.) Railway has found, by a comparison of records of platform accidents, that a reduction of more than 50 per cent has been made following the use of safety gates on the cars of the Portland Avenue line. Thirty new cars for the Louisville Railway now under construction by the Cincinnati Car Company are to be equipped with gates for the entrances. The exits of these cars will be protected by sliding doors.

Owl Service Between Duluth and Superior Not Warranted.—Herbert Warren, general manager of the Duluth-Superior Traction Company, Duluth, Minn., is quoted as follows in regard to the subject of establishing an owl service between Duluth and Superior: "Both Duluth and Superior are too small to ask such accommodation. We are already running owl service in both towns, but the patronage does not justify the move, much less pay half the expense of operation."

Complaint Against Rochester, Syracuse & Eastern Railroad Closed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of residents of Port Gibson, Ontario County, against the Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., as to the stopping of cars at Port Gibson. Upon investigation by a representative of the commission an arrangement was made with the company which is satisfactory to the patrons of the road at that point.

Public Service Railway Answers Fare Complaint.—An answer to the complaint made some time ago by citizens of the boroughs of Wallington, Carlstadt and Woodridge regarding the fare zone question in that territory has been submitted to the Board of Public Utility Commissioners by the Public Service Railway, Newark, N. J. In its

answer the company insists that it has a legal right to fix fare zones and declares that it has not, as alleged, increased any fares in the territory from which the complaint is made.

Reduction in Fare Between Rock Island, Watertown, East Moline and Silvis.—The Tri-City Railway has informed the Mayor of Rock Island, Ill., that arrangements have been completed whereby residents of Rock Island will be conveyed to Watertown, East Moline and Silvis for a 5-cent fare. Heretofore anyone who boarded a car west of Forty-sixth Street, Rock Island, has been obliged to pay 10 cents to Watertown, East Moline and Silvis, while those boarding Third or Fourth Avenue cars east of First Street, Moline, have ridden for 5 cents.

Negotiations for Settlement of Chicago Suburban Fare Question.—The Township Board of Cicero has renewed negotiations with the County Traction Company, Chicago, Ill., operating the lines of the old Chicago Consolidated Traction Company outside of the city limits of Chicago, to settle the question of fare into Chicago over the County Traction Company's lines and the lines of the Chicago Railways, which operates the old Chicago Consolidated Traction Company's lines in the city, by a compromise of twelve rides for \$1.

New Form of Transfer in Albany, N. Y.—The United Traction Company, Albany, N. Y., began on Sept. 25, 1911, to issue a new form of transfers which differs from the former one only in that the date is printed across the face in large red letters, thus doing away with the necessity of punching to indicate the date. A hearing was held before the Public Service Commission of the Second District of New York recently on the complaint of a resident of Rensselaer against the United Traction Company in relation to the issuing of transfers. The commission was asked to pass upon the right of conductors to refuse a transfer if not asked for by a passenger at the time of paying fare.

Accident Campaign of Louisville & Northern Railway & Lighting Company.—Reference was made in a recent issue of the *ELECTRIC RAILWAY JOURNAL* to the good results obtained by the advertising campaign of the Louisville & Northern Railway & Lighting Company, New Albany, Ind., to reduce the number of accidents on its lines. C. B. Scott, assistant to the general manager, who is in charge of the advertising campaign, states that especial attention is also given in instructing new motormen to impress upon them the importance of exercising extra care in operating cars so as to reduce the likelihood of accidents. Cards dealing with platform accidents, accidents to children and collisions with vehicles are posted respectively at transfer points and public places, in garages and stables and in schools.

Ticket Suit in Reading.—City Solicitor H. P. Keiser, of Reading, Pa., on behalf of the city, has instituted equity proceedings against the Reading Transit Company, United Traction Company and Front & Fifth Street Railway to compel the restoration of the six-for-a-quarter strip tickets on a portion of the Schuylkill Avenue loop. In the opinion handed down recently by the Supreme Court, deciding that the companies were not required to sell tickets on all of the lines of the city because such a mandatory clause was inserted in the ordinance to the Front & Fifth Street Railway to complete the loop, it was stated that such obligation might be imposed on that portion of the line controlled by this particular company, but that this question not having been raised, it could not be passed upon.

Des Moines City Railway Commended.—The Des Moines (Ia.) City Railway, of which J. R. Harrigan is vice-president and general manager, has been commended by the Des Moines Women's Club for prohibiting smoking on the new double-end pay-as-you-enter cars. The resolution thanking Mr. Harrigan is concluded with the statement that "the club would hail with delight the application of the same rule to all the city cars." The secretary of the Iowa State Fair Association has written Mr. Harrigan complimenting him on the manner in which the company transported visitors to the recent fair, stating that the board in charge of the fair was of the opinion that "the company gave better service than ever before and that the crowds were handled in the most satisfactory manner in the history of the Iowa State Fair."

Personal Mention

Mr. S. B. Thompson has resigned from the Third Avenue Railroad, New York, N. Y., to become master mechanic of the British Columbia Electric Railway, Vancouver, B. C. Mr. Thompson was formerly connected with Sanderson & Porter, New York, N. Y., and with the United Railways & Electric Company, Baltimore, Md.

Gen. George H. Harries, vice-president of the Washington Railway & Electric Company, Washington, D. C., has been elected president of the Association of Edison Illuminating Companies. General Harries is treasurer of the National Electric Light Association and was for two years vice-president of the Association of Edison Illuminating Companies. He is also second vice-president of the American Electric Railway Association, chairman of its federal relations committee and a member of the public relations committee of that association.

Mr. E. C. Carpenter, claim agent of the Indiana Union Traction Company, Anderson, Ind., has resigned to accept the position of general manager of the Pittsburgh & Butler Street Railway, Pittsburgh, Pa. Mr. Carpenter became connected with the local system in Anderson under Mr. Charles L. Henry twenty years ago and served under Mr. Henry during the construction of the first interurban electric railway in Indiana, between Anderson and Summitville. He has remained with the Anderson City Railway and its successor, the Indiana Union Traction Company, continuously since that time.

Mr. James Alfred Roosevelt has resigned as general superintendent of the Third Avenue Railroad to become superintendent of transportation of the British Columbia Electric Railway, Vancouver, B. C. Mr. Roosevelt was connected with Stone & Webster, Boston, Mass., for two years and for the past four years has been with the Third Avenue Railroad, first as assistant to the general manager and then as general superintendent. Mr. Roosevelt was tendered a farewell banquet at the Engineers' Club, New York, N. Y., on Sept. 26, 1911, by his associates in the company and his personal friends. Mr. W. O. Wood, president and general manager of the New York & Queens County Railway, Long Island City, N. Y., acted as toastmaster and presented a token of esteem.

Mr. Edward A. Macdonald, general manager of the Third Avenue Railroad; Mr. Thomas J. Conroy, engineer of the Third Avenue Railroad; Mr. J. H. Bradley, vice-president and general manager of the Waterbury Rapid Transit Company; Mr. L. H. Palmer, superintendent of transportation of the Metropolitan Street Railway; Mr. H. C. Donecker, secretary of the American Electric Railway Association; Mr. G. Haskell, Mr. Jack High, Mr. Charles Elliott, Mr. W. L. Conwell and Mr. Samuel Trawick.

Mr. C. C. Elwell, whose resignation as engineer of maintenance of way of the Connecticut Company, New Haven, Conn., to become engineer of the Public Utility Commission of Connecticut was noted in the *ELECTRIC RAILWAY JOURNAL* of Sept. 23, 1911, was born in Maine in 1855, and was educated at the University of Maine as a civil engineer. For three years Mr. Elwell was employed by the United States government in the work of constructing lighthouses on the southern coast. Thirty years ago he began railroad work with the New England Railroad, entering the office of the civil engineer of the company in Boston. Three years later he entered the employ of the Wilmington & Northern Railroad of Delaware on construction and maintenance work, with headquarters in Wilmington. Mr. Elwell afterward became connected with the Baltimore & Ohio Railroad and remained with that company until 1893, when he entered the employ of the New York, New Haven & Hartford Railroad to complete the four-tracking of the company's New York division. He was roadmaster for two years. He was then promoted to the position of superintendent and worked as such for thirteen consecutive years. For the last three years he has been engineer of maintenance of way of the Connecticut Company and the New York & Stamford Railway. Mr. Elwell was one of eight delegates sent to Europe by the New York, New Haven & Hartford Railroad in 1895 to study railroad methods abroad.

Construction News

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

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

RECENT INCORPORATIONS

***Castro Point Railway, Martinez, Cal.**—Application for a charter has been made in California by this company to build an electric railway in Martinez. Capital stock, \$11,000. Incorporators: Frank W. Bilger, T. Blake and H. E. Johnson, all of Oakland.

Etowah Valley Railroad, Dahlonega, Ga.—Chartered in Georgia to build an electric railway to extend from Atlanta through northeast Georgia to the Tennessee State line. Headquarters, Atlanta. Capital stock, \$50,000. Incorporators: G. R. Glenn, H. D. Gurley, John H. Moore, T. J. Smith, J. M. Brooksher, J. E. Tate, H. Head, J. F. Sergeant, Craigh R. Arnold, W. H. Jones, B. F. Anderson and W. B. Townsend, all of Dahlonega. [E. R. J., Aug. 26, '11.]

***East Boston Marginal Freight Railroad, Boston, Mass.**—Application for a charter will be made in Massachusetts by this company to build an electric or steam railway in East Boston to connect many factories and warehouses along the water front with the Boston & Albany Railroad. Authority is given to arrange with the Boston Elevated Railway for the purchase of motive power from that company. A hearing is set for Oct. 6 before the Railroad Commissioners to determine the route of the proposed line.

***West Tennessee Traction Company, Memphis, Tenn.**—Application for a charter has been made in Tennessee by this company to build an electric railway between Memphis, Nashville and Jackson. Capital stock authorized, \$100,000. Incorporators: E. Oppenheimer, A. G. Riley, Alfred Sohm, C. L. Winchester and W. W. Swift.

***Monongahela & Marion Railway, Morgantown, W. Va.**—Application for a charter has been made by this company in West Virginia to build an electric railway between Morgantown and Fairmont. Capital stock authorized, \$50,000. Incorporators: John Madigan, M. E. Fetty, Parker S. Johnson, Sanford Barrickman and John E. Price, all of Morgantown, W. Va.

FRAANCHISES

Jonesboro, Ark.—Preston Hatcher, Jonesboro, has received a six months' extension of his franchise in which to begin the construction of the 3-mile electric railway between Jonesboro and Nettleton. [E. R. J., Aug. 26, '11.]

Pasadena, Cal.—The Pacific Electric Railway, Los Angeles, has received a franchise from the County Supervisors to build the cut-off east of Schutzen Park, extending from the Pasadena short line to the South Pasadena line.

Chico, Cal.—The Northern Electric Railway, San Francisco, has received a franchise from the City Trustees to abandon its tracks on Fifth Street and use its Ninth Street tracks to connect with the Hamilton branch in Chico.

San Francisco, Cal.—A loop for the western end of the Geary Street Municipal Railway has been recommended to the Mayor and Supervisors by Patrick Broderick, the superintendent of construction of this railway, and Public Works Commissioner Charles S. Laumeister.

Fowler, Col.—The Pueblo & Suburban Traction & Light Company has accepted the franchise granted it by the City Council in Fowler.

Belvidere, Ill.—The Belvidere City Railway has received a 20-year franchise from the City Council in Belvidere.

Belvidere, Ill.—The Elgin & Belvidere Electric Company, Chicago, has received a 20-year franchise from the City Council in Belvidere, over the tracks of the city line from the terminus of the Rockford & Interurban Railway to the city limits.

Gary, Ind.—The Indianapolis, Chicago & Meridan Railway, Indianapolis, has asked the City Council for a franchise in Gary. This line will connect Indianapolis, Sheridan, Flora, Monticello, Francisville, Koutz, Valparaiso, Hobart, Gary, Wheeler, Hammond, Warsaw and Columbia City. M. J. Mooreland secretary. [E. R. J., July 15, '11.]

***Utica, Ind.**—Charles W. Kelly, Utica, Ind., has received

a franchise from the Board of County Commissioners to construct an electric line over any road in the county.

Louisville, Ky.—The Board of Public Works of Louisville has sold to B. F. Avery & Sons a franchise for the construction of an electric railway on Sixth Street in Louisville. The company will build a subway at the intersection of Sixth Street with the tracks of the Louisville & Nashville Railway, and will then turn it over to the Louisville Railway, which will build and operate the line.

New Orleans, La.—The New Orleans Railway & Light Company, New Orleans, will ask the City Council for a franchise to double-track some of its lines in New Orleans.

Boston, Mass.—The Boston, Lowell & Lawrence Electric Railroad, Boston, will again ask the Railroad Commissioners for a certificate of public necessity to build an electric railway to connect Somerville, Medford, Winchester, Woburn, Lowell and Lawrence. Charles T. Remington, Boston, general manager. [E. R. J., June 19, '11.]

Lexington, Mass.—The Lexington & Boston Street Railway, Newtonville, has received a franchise from the Selectmen of Lexington to relay its tracks on Waltham Street from near Allen Street to the Concord Turnpike.

Liberty, Mo.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, has received a 200-year franchise from Clay County to build its lines through the county to St. Joseph and Excelsior Springs. [E. R. J., Sept. 16, '11.]

Hackensack, N. J.—The Public Service Railway, Newark, has received a franchise from the Village Trustees of Ridgefield Park to extend its line on Hackensack Road to Queen Anne Road, in Hackensack.

Orange, N. J.—The Mountain Railway, West Orange, has asked the Common Council for a franchise to extend its line from the present terminus at West Christopher Street, in Orange, to the Lackawanna Railroad.

Summit, N. J.—The Morris County Traction Company, Morristown, has received a franchise from the City Council to double-track its line from the present terminus in Summit to the Chatham line.

Cleveland, Ohio.—The Cleveland, Alliance & Mahoning Valley Railway, Alliance, has received a franchise from the County Commissioners to build across public highways and roads in Clark County. This 22-mile electric railway will connect Cleveland, Alliance and Mahoning. [E. R. J., April 22, '11.]

Peniel, Tex.—The Greenville Traction Company has received a franchise from the City Council of Peniel. An extension will be built from Forest Park to Peniel.

Salt Lake City, Utah.—The Salt Lake & Ogden Electric Railway, Salt Lake City, has asked the City Council for a franchise to extend its line to Postoffice Place, in Salt Lake City.

Richmond, Va.—The Richmond & Henrico Railway, Richmond, has asked the Board of Aldermen for a franchise in Richmond. If the franchise is obtained the company will enlarge its power house in Richmond.

Aberdeen, Wash.—The Gray's Harbor Railway & Light Company, Aberdeen, has asked the City Council for a franchise to extend its North B Street line in Aberdeen to Sixth Avenue. It is said that the company is considering plans to extend its line up the Wishkah River.

Vancouver, Wash.—E. R. Ernsberger and Lawrence Harmon, Vancouver, have received a 50-year franchise from the City Council to build an electric railway in Vancouver. The line will be continued into Clark County. [E. R. J., Aug. 19, '11.]

Vancouver, Wash.—The Mount Hood Railway & Power Company has received a franchise from the City Council for several new lines in Vancouver.

TRACK AND ROADWAY

Birmingham, Ensley & Bessemer Street Railway, Birmingham, Ala.—It is reported that this company has ordered 3500 tons of open-hearth steel rails from the Tennessee Coal, Iron & Railroad Company.

Calgary (Alta.) Municipal Railway.—This company placed in operation on Sept. 16 its extension into Tuxedo Park.

***San Fernando, Cal.**—It is reported that H. J. Whitley is considering plans for the construction of a 25-mile electric railway between Los Angeles and San Fernando.

San Jose Terminal Railway, San Jose, Cal.—The organization of this company, which proposes to build a 12-mile electric railway between San Jose and Alviso, has been completed by the election of the following officers: Hugh Center, San Jose, president; M. J. Gardner, Stockton, secretary and treasurer, and John A. Mehling, San Jose, vice-president and general manager. Offices of the company will be established in the Bank of San Jose Building. [E. R. J., Sept. 16, '11.]

New York, New Haven & Hartford Railroad, New Haven, Conn.—Joseph A. Lyons, 237 Lincoln Street, New Haven, has been given the contract for the electrification of this company's branch from Branford to New Haven, a distance of 12 miles.

People's Railway, Wilmington, Del.—This company has placed in operation its extension on King Street from Front Street to King Street wharf in Wilmington.

Freeport-Madison Electric Railway, Freeport, Ill.—A contract has been closed by this company with Hugh G. Palmer, Yorkville, for the construction and financing of the first section of the line from Freeport to Cedarville, a distance of 16 miles. The line will eventually extend from Freeport, Ill., to Madison, Wis., via Cedarville, Rock Grove, Oakley and Dixon. W. T. Raleigh, Freeport, is the promoter. [E. R. J., July 30, '11.]

***Hillsboro Electric Light & Power Company, Hillsboro, Ill.**—Plans are being made by this company for the construction of an electric railway between Greenville, Hillsboro and Collinsville. A franchise for an interurban line from Hillsboro to Taylor Springs, 3 miles south, has already been asked. The survey for this line has been made and the company agrees to build the line within a limited time after the franchise is granted. The line will extend through Coffeen or Donnellson and on south to Greenville through Pocahontas, Pierron, Highland, St. Jacob, Troy and Collinsville, connecting at Collinsville with the Illinois Traction System. J. J. Frey, Hillsboro, president.

***Macomb Southern Traction Company, Macomb, Ill.**—This company has been formed to purchase the old Chandler Railroad, which extends from Lacombe to Littleton, and electrify the line and extend it from Beardstown to Rushville. Capital stock, \$750,000.

Davenport-Muscatine Railway, Davenport, Ia.—This company has ordered 3000 tons of Bessemer steel rails from the Illinois Steel Company.

Duluth (Minn.) Street Railway.—Plans are being considered by this company to build an extension from Seventy-first Avenue in Duluth to Prescott Street in New Duluth.

Peoples Railway, Dayton, Ohio.—This company will rebuild its line on Wayne Avenue between Fifth and Wyoming, in Dayton.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—It is reported that this company will extend its double track along Main Street beyond Allegheny Street, in Follansbee, when the new 60-ft. concrete bridge is completed over the creek at that point. The company will eventually double track its line from Follansbee to Steubenville.

***Oklahoma Northwestern Railway, Oklahoma City, Okla.**—This company has been organized to build a 150-mile electric or steam railway from Oklahoma City to Woodward, via El Reno, Watonga, Canton, Seiling and Mutual. Surveys are now being made from Watonga along the south side of the North Canadian River. Edward A. Wagener, Oklahoma City, president, and W. H. Wood, Watonga, chief engineer.

Ottawa & Kingston Electric Railway, Ottawa, Ont.—Surveys have been completed by this company between Manotick and Smith's Falls. It will be continued at once to Kingston. This is part of a plan to build an electric railway from Ottawa to Kingston and Smith's Falls via City View, Manotick, Kars, Burritt's Rapids and Merrickville. C. L. Rickenson, Manotick, is interested. [E. R. J., Nov. 26, '10.]

Oregon Electric Railway, Portland, Ore.—This company

will soon build about 70 miles of new track. It has awarded a contract to the Colorado Fuel & Iron Company, Pueblo, Col., for the 75-lb. rails to be used for its extension from Salem to Albany.

***Elizabethtown, Pa.**—David Young, Jr., Newark, N. J.; F. H. Allaman, Elizabethtown, and others are considering plans for the construction of an electric railway between Maytown and Elizabethtown.

Lebanon & Campbelltown Street Railway, Lebanon, Pa.—Work has been begun by this company at Lebanon on its line between Campbelltown and Lebanon, via South Londonderry, South Annville and North Comwall. It will connect at Campbelltown with the Hummelstown & Campbelltown Street Railway, Hershey, M. S. Hershey, president. [E. R. J., Sept. 9, '11.]

Ephrata & Lebanon Street Railway, Lebanon, Pa.—Work on this company's line is progressing rapidly. The rails have been laid to a point beyond Lincoln and the bridge over Cocalico Creek will be placed in a few days. Bids will shortly be opened for the bridge over Middle Creek, near Hopeland.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—Plans are being considered by this company for an extension between Middlesex and New Castle.

Northumberland County Traction Company, Sunbury, Pa.—This company has increased its capital stock from \$10,000 to \$500,000, and issued \$2,000,000 in bonds. The company will build an interurban railway to connect the lines in the counties of Northumberland, Union, Snyder, Montour, Columbia, Lycoming, Luzerne and Schuylkill. J. F. Schaffer, Sunbury, and John C. Johnson, Philadelphia, are the solicitors. [E. R. J., May 13, '11.]

Ft. Worth Southern Traction Company, Ft. Worth, Tex.—Stone & Webster have let the contract to the Texas Building Company to grade the right-of-way for this company. G. H. Clifford, Ft. Worth, is interested. [E. R. J., Aug. 12, '11.]

***Industry, Tex.**—Charles F. Knolle, Industry, and associates plan to build a 55-mile interurban line to connect Bellville, Nelsonville, Bleiblersville, Industry, Schoenan, Shelby, Round Top, Warrenton, Oldenburg, Ruthersville and La Grange. The proposed line will connect at Bellville, Tex., with the Gulf, Colorado & Santa Fé Railroad and at La Grange, Tex., with the Missouri, Kansas & Texas Railroad. Meetings are soon to be called at the different towns along the proposed line to appoint committees to secure the right-of-ways.

McKinney, Tex.—A company will be organized at once in McKinney with a capital of \$50,000 to operate the new electric railway in McKinney, which will be completed and placed in operation on Oct. 1. The Commercial Club, McKinney, is interested. [E. R. J., July 1, '11.]

Waco (Tex.) Street Railway.—Material is being received by this company for the improvements of its lines in various sections of Waco. One of the betterments will be the double-tracking of the Cotton Palace line.

***Salt Lake City, Utah.**—George M. Cannon, of the real estate association, has appointed a committee of nine men to solicit a subscription of \$3,000 to cover the expense of the preliminary survey of the proposed electric railway from Salt Lake City to Provo and Parson. With the information obtained from this survey a report will be issued to investors in order to float bonds for construction of the line.

Brattleboro (Vt.) Street Railway.—An extension will be built by this company on its Main Street line in Brattleboro.

Washington & Old Dominion Railroad, Richmond, Va.—It is reported that this company has awarded the contract to the Messrs. A. and C. Wright for grading its line. Charles M. Henckley, president. [E. R. J., Sept. 23, '11.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—Plans are being made by this company to extend its line from Cassville, W. Va., to Mount Morris, Pa., a distance of about 5 miles.

Vancouver, Wash.—Chicago capitalists have organized a company to construct an electric line from Vancouver, north to the South Fork of the Lewis River, thence northeast to Klickitat Pass, a distance of nearly 100 miles. Water power

sites on the South Fork of the Lewis River have been obtained for the development of electrical energy for the new company. Vancouver is to be the present terminus of the line and later direct connection will be made with Portland. H. L. Harmon, Vancouver, and E. R. Ernberger, of the Mount Hood Railway & Power Company, are said to be promoting the project. [E. R. J., Aug. 19, '11.]

Wenatchee (Wash.) Traction Company.—It is reported that this company plans to build about 100 miles of new track, to include an extension from Cashmere to Beverly. Louis W. Pratt, president. [E. R. J., Sept. 23, '11.]

Chicago & Wisconsin Valley Railroad, Madison, Wis.—This company has filed its bond of \$65,000 and begun work on the construction of its line between Janesville and Portage. It will connect Janesville, Friendship, Easton, Portage, Lodi, Middleton, Wausau, Stevens Point, Madison and Merrill. Allen T. Russell, Chicago, general manager. [E. R. J., July 15, '11.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—Work will be begun at once by this company on its 7½-mile extension between Juneau and Hustisford.

***Eau Claire, Wis.**—Surveys are being made for an electric railway to extend from Eau Claire, via Downing, New Richmond and Hudson to St. Paul. The Chippewa Light & Power Company is reported to be interested.

SHOPS AND BUILDINGS

Central California Traction Company, Sacramento, Cal.—This company will establish a new freight depot in Oak Park, a suburb of Sacramento.

Geary Street Municipal Railroad, San Francisco, Cal.—Title has been secured for a carhouse property and plans and specifications are being completed.

Kentucky Traction & Terminal Company, Lexington, Ky.—A new passenger and freight station is being built by this company at Versailles.

Boston & Eastern Electric Railway, Boston, Mass.—It is reported that this company plans to have two stations in East Boston, one near Porter and Orleans Street and the other on Breeds Island near Post Office Square.

Boston & Worcester Street Railway, Boston, Mass.—This company will build two additional car pits, 350 ft. long, at the Wellesley carhouse, besides installing an electric hoist.

Worcester (Mass.) Consolidated Street Railway.—This company has awarded a contract to E. K. Watson & Company, Warren, for the construction of its new carhouse at Gates Lane. The building is to be of brick, with steel trusses, and will have a total length of 450 ft. It will be 114 ft. wide, and of one story, with a height of 20 ft. When completed it will furnish storage for 90 cars.

Ohio Electric Railway, Cincinnati, Ohio.—This company has awarded a contract to Nichol & Carr, Brunson Building, Columbus, for the construction of its new freight station and freight house to be built in East Town Street. The structure will be 150 ft. x 60 ft., of steel and concrete construction. The cost is estimated to be about \$25,000.

Roanoke Railway & Electric Company, Roanoke, Va.—Plans are being made by this company for the construction of a new station at Mason's Creek, Roanoke.

POWER HOUSES AND SUBSTATIONS

Geary Street Municipal Railroad, San Francisco, Cal.—Plans and specifications for the building and equipment of the power house of this company are being prepared under the direction of A. M. Hunt, consulting engineer, San Francisco.

Des Moines (Ia.) City Railway.—Work has been begun by this company on the improvements to its power plant in Des Moines.

Ft. Dodge, Des Moines & Southern Railway, Ft. Dodge, Ia.—This company plans to enlarge its power station.

Oregon Electric Railway, Portland, Ore.—This company will build five new substations in the near future.

Roanoke Railway & Electric Company, Roanoke, Va.—A new one-story substation will be built by this company at Mason's Creek, on the Salem line. It will have a capacity of 500 hp to supply current to the line between the city limits of Roanoke and Salem.

Manufactures & Supplies

ROLLING STOCK

Oneida (N. Y.) Railway is said to be in the market for several cars.

Hattiesburg (Miss.) Traction Company is said to be considering the purchase of several cars.

Beaumont (Tex.) Traction Company expects to purchase two light double-truck cars in the near future.

Elmira, Corning & Waverly Railroad, Waverly, N. Y., is said to be figuring on the purchase of additional cars.

Long Island Railroad, New York, N. Y., has issued specifications for twenty-five steel suburban coaches and combination cars.

Davenport & Muscatine Railway, Davenport, Ia., will order six interurban cars through J. G. White & Company, Inc., New York, N. Y.

Topeka (Kan.) Railway has ordered four 20-ft. 8-in closed pay-as-you-enter cars mounted on Brill 21-E trucks from the American Car Company.

Boston (Mass.) Elevated Railway is reported to be in the market for twenty-five surface cars and twenty-five additional cars for the Cambridge subway.

Sheridan Railway & Light Company, Sheridan, Wyo., has ordered two 21-ft. closed pay-as-you-enter motor cars mounted on Brill 21-E trucks from the American Car Company.

Charles J. Jager Company, Boston, Mass., is in the market for a second-hand double truck car equipped with a 20 or 25-hp motor on each truck. A car of the old convertible type is preferred.

Richmond & Henrico Railway, Richmond, Va., has ordered one No. 310 motor and one type K-36-F controller from the Westinghouse Electric & Manufacturing Company.

Mason City & Clear Lake Railway, Mason City, Ia., has ordered one McGuire-Cummings steel-underframe long-broom snow sweeper and three snow plows from the McGuire-Cummings Manufacturing Company.

Lake Charles Railway, Light & Water Works Company, Lake Charles, La., has ordered two double equipments of No. 92-A motors and K-10-A control from the Westinghouse Electric & Manufacturing Company.

Augusta-Aiken Railway & Electric Company, Augusta, Ga., has ordered six 26-ft. motor car bodies mounted on Brill 39-E trucks from The J. G. Brill Company, through J. G. White & Company, Inc., New York, N. Y.

Gary (Ind.) Connecting Railway has ordered two double-truck combination passenger cars, three compartment cars and one double-truck combination express car and snow plow, mounted on McGuire-Cummings 70-A high-speed interurban trucks, from the McGuire-Cummings Manufacturing Company.

Gary & Interurban Railway, Gary, Ind., has ordered four double-truck city cars, mounted on McGuire-Cummings No. 10-A trucks, from the McGuire-Cummings Manufacturing Company. These cars are to be duplicates of the last eight cars built for the Gary & Interurban Railway by the McGuire-Cummings Manufacturing Company.

Illinois Traction System, Peoria, Ill., is now receiving twelve 57-ft. interurban trailer coaches with M.C.B. trailer trucks, from the St. Louis Car Company. These cars have been designed, built and delivered in about 100 days. They are of an especially substantial type, designed for high-speed, long-distance service.

Isthmian Canal Commission, Washington, D. C., has asked for bids for forty electric locomotives of novel design to tow ships through the locks of the Panama Canal. They will be operated with three-phase alternating current. Bids will be received until Nov. 30. Additional information is contained in Circular No. 650, which can be obtained from the general purchasing officer, Isthmian Canal Commission, Washington, D. C.

Detroit (Mich.) United Railway, reported in the ELECTRIC RAILWAY JOURNAL of Aug. 26, 1911, as having ordered fifty closed pay-as-you-enter motor car bodies from the G. C.

Kuhlman Car Company, has specified the following details for these cars:

Seating capacity	46	Fenders	Detroit
Weight (car body only)		Gears and pinions	G.E.
	17,900 lb.	Heaters	Peter Smith
Length of body...	31 ft. 3 in.	Headlights	Dayton
Over vestibule ...	43 ft. 10 in.	Journal boxes	MCB
Width over all...	8 ft. 6¾ in.	Motors.....	2 G.E., 210-C
Roof	monitor	Seating material	rattan
Underframe	wood	Trucks	Standard O-50
Control	G.E. K-35	Wheels	33-in.

ADVERTISING LITERATURE

Arthur S. Partridge, St. Louis, Mo., has issued list No. 38 of second-hand electric and steam equipment for September, 1911.

Falk Company, Milwaukee, Wis., has issued a circular which illustrates its solid manganese, hardened center and regular special work.

Texas Company, New York, N. Y., has begun to publish a quarterly paper entitled *Lubrication*, which is devoted to the interests of the company. The first issue is dated August, 1911. The products of the Texas Company include Texaco cylinder oils, engine and machine oils, gas-engine oils, railway oils, special oils, black oils, greases, solid lubricants, etc.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4857, describing and illustrating its switchboard and high-tension relays, and containing general notes on the use of relays and their installation. Bulletin No. 4859 describes its line of synchronous condensers especially adapted for floating across the line for controlling the power factor. Bulletins Nos. 4871, 4876 and 4882 describe respectively mercury arc rectifiers, direct-current switchboards for small plants and enclosed flame arc lamps.

Richardson-Phenix Company, Milwaukee, Wis., has issued a 50-page illustrated book with the title "Scientific Lubrication of Machinery." This book contains a very comprehensive treatment of the theory and practice of lubrication, discussing all the existing systems and outlining tests and specifications for oils designed for different uses. The requirements of an efficient lubricating system as outlined in the pamphlet are, (1) a stream of clean, cool oil supplied continuously at just the points where it is needed, (2) an efficient collecting system for the oil used as it drains from the bearings, (3) a filter which will thoroughly remove all dirt, particles of metal and water from the oil and thoroughly cool it. (4) The system must be automatic in its operation and absolutely reliable. The products which the company manufactures to meet these requirements are illustrated and described and price lists and specifications are given.

De Laval Steam Turbine Company, Trenton, N. J., has issued a 32-page booklet entitled "Steam Turbine Centrifugal Pumps and Other Centrifugal Machinery." The booklet illustrates and describes briefly the several lines of machinery manufactured by the company. Another booklet contains an article by Francis Head, entitled "Comparative Tests of Large Engine and Turbine-Driven Centrifugal Pumps," which was reprinted from the *Engineering News* of May 11, 1911. The tests were made at the Torresdale filter plant, of Philadelphia, where there are installed seven compound engine-driven centrifugal pumps, each having a capacity of 45,000,000 gal. per day against a head of about 45 ft., and one steam turbine-driven centrifugal pump of a capacity of 50,000,000 gals. The pamphlet gives the detail results of the test, which show that the turbine-driven pump developed a duty over 21 per cent in excess of the duty shown by the compound engine-driven pump, and required less attention and seemed to be more easily maintained.

TRADE NOTES

Walpole Rubber Company, Walpole, Mass., has added to its present power plant equipment a 750-kw Westinghouse generator set and several boilers, necessitating the erection of a new brick stack 150 ft. high.

Electric Properties Company, New York, N. Y., has moved its offices from 165 Broadway to 10 Bridge Street, where Westinghouse, Church, Kerr & Company, of which it is the holding company, is located.

Rooke Automatic Register Company, Providence, R. I., reports the recent installation of its fare-collecting system by the street railway companies in Watertown, Fishkill, Catskill, Middletown and Port Jervis, N. Y.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, gave its employees their annual picnic on Sept. 23, at which eighty-one persons were present. Prizes were awarded to the winners of athletic events and games which were arranged for both men and women.

Hildreth-Jones Company, Chicago, Ill., inspecting and supervising engineers, has appointed James A. Lister manager of its bridge, structural steel and cement departments, with headquarters in the Monadnock Block, Chicago. Mr. Lister was formerly manager of the Chicago office of the Pittsburgh Testing Laboratory, Pittsburgh, Pa.

N. Curry, of the Canadian Car & Foundry Company, Montreal, Que., has been nominated as president of the Canadian Manufacturers' Association, and as he is the only candidate will be elected by acclamation. George H. Olney, of the E. F. Phillips Electrical Works, Ltd., and E. F. Sise, of the Wire & Cable Company, have been nominated from Montreal as members of committees. The annual meeting will take place on Oct. 10.

Frank Smallpiece has resigned as assistant manager of the Canadian General Electric Company at Montreal to become associated with J. W. Campbell, of Calgary, in the General Supplies Company of that city. Mr. Smallpiece has been connected with the Canadian General Electric Company for thirteen years, and was for some time engaged on steam turbine work. He was appointed assistant manager of the Montreal office about three years ago.

Western Electric Company, New York, N. Y., has received an order from the Great Northern Railway for thirty-two telephone selectors for use on its Cascade division. The company has received an additional order from the Chicago, Milwaukee & St. Paul Railway for seventy-five telephone selectors for use on its Hastings and Dakota divisions. The Atlantic Coast Line has also placed an order with the Western Electric Company for ninety station telephone train dispatching equipments, which will be used to equip 235 miles of track.

Westinghouse Air Brake Company, Pittsburgh, Pa., reports total net earnings for the year ended July 31, 1911, as \$3,034,231, as compared with \$4,653,102 for the previous year. The total surplus at the end of the fiscal year was \$7,054,894, as compared with \$6,931,760 at the end of the previous year. George Westinghouse, president of the company, in presenting the annual report, says in part: "All the plants in which the Westinghouse Air Brake Company is interested are now in excellent condition and well equipped for any probable expansion of trade. A dividend of 5 per cent on the company's holdings in the Russian Brake Company has been received during August, indicating a satisfactory revival of business in Russia. The condition of the other foreign brake companies in which the company holds stock has likewise improved since our last report. Current earnings continue at about the average rate for the year."

Union Switch & Signal Company, Swissvale, Pa., has received an order from the New York, Westchester & Boston Railway for block signal and interlocking apparatus, comprising thirty-two automatic signals to be installed on the 6-mile, four-track section between West Farms and New York City and Mount Vernon, N. Y.; eight automatic signals on the 2-mile, double-track section between Mount Vernon and New Rochelle, and twenty-four automatic signals on the 8½-mile, double-track section between Mount Vernon and White Plains. The signals will be installed to permit of a 2½-minute headway at the maximum speed of express trains. Energy for the operation of the system will be supplied at 110 volts, 60 cycles. The interlocking apparatus, consisting of six plants, is of the Union F style. The plants will be operated from 110-volt storage battery energy, derived from motor-generator sets placed in the lower floors of the tower buildings. The signal and telephone work will be installed according to plans and specifications prepared by the signal department of the New York, Westchester & Boston Railway under the direction of John Roberts, signal engineer.