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### Freight Revenue in Rhode Island

Gross freight revenue of the street railways of Rhode Island in the year ended June 30, 1908, according to the report of the Commissioner of Railroads for 1908, amounted to \$182,442, as compared with a total passenger revenue in the same period of \$4,317,465. The freight revenue was but 4.2 per cent of the amount received by the roads from the transportation of passengers. When these results are compared, however, with those of the preceding year, a significant aspect of the development of the business during the 12 months is disclosed. The

increase in the gross revenue from passenger traffic over the year ended June 30, 1907, was equivalent to 1.2 per cent; the increase in the freight revenue was 13.8 per cent. Of the total freight revenue the Rhode Island Company, operating the electric lines of the New York, New Haven & Hartford Railroad in the State, reported \$142,842, or 78.3 per cent. The number of miles of road operated by this company in the State was 284.13, indicating an average gross revenue from freight traffic of \$502 per mile. The number of freight cars reported by the company was 45, while the total shown by the street railway companies of the State was 84. Unfortunately, no statistics bearing on the tonnage transported or the rates received are given, but it is evident from the gross results as published that the volume of business handled is increasing at an encouraging rate.

### Preparing Shop Employees for the Witness Stand

The increasing number of cases in which the mechanical department of a street railway is required to co-operate with the legal branch of the company's service in the settlement or contest of claims justifies reference to the matter of testimony on the witness stand under direct and cross-examination. It is a fact that most people who have not had experience on the stand labor under considerable nervousness when confronted by opposing counsel. It is very important, therefore, that shop employees who are called into a case shall be encouraged so far as possible to maintain their self-possession, to say as little as is necessary to answer the questions asked, although avoiding any appearance of concealment and not to volunteer statements not directly requested. Simple, direct and responsive answers create the best effect on the jury.

In this connection the preparation of accident reports deserves comment. Through loyalty to a company it often happens that the employee who witnesses an accident or who reports upon the condition of the car after it reaches the shop fails to state the precise facts in so far as they are damaging or apparently injurious to the company's case. This is a mistaken course, for progressive claim departments desire to settle in cases where the company is to blame, rather than fight a case which may be lost in the end at heavy cost. Wherever the responsibility lies, the company can conduct its case only on the strength of a full and unbiased report of the situation. If the legal department knows the worst it can act intelligently, but if some of the facts are withheld out of a false regard for the company's position, the opposition secures just so much advantage before the jury. It is hard enough at best to obtain a fair hearing before the average jury, and any impression of secretiveness or indirectness on the company's part is a sure cause of trouble.



### Proposed Merger of Chicago Elevated Roads

The details regarding the proposed merger of the Chicago elevated roads that have been made public by the committee which has the negotiations in charge relate to the financial, rather than the operating, features of the consolidation, and indicate that many questions still remain unsettled. It is proposed that the outlying elevated lines shall be leased by a corporation to be styled the Central Terminal Company, or other similar name, which is to have a paid-in capital of not less than \$4,000,000, and is also to acquire the loop in the central business district. How the purchase or control of the loop is to be financed has not been made public. Of the capital of the Terminal company it is proposed that \$4,000,000 shall be somewhat in the nature of a reserve fund, since until this sum is expended, it may be invested in marketable interest-bearing securities; it may be expended, however, under the broad terms of the leasing plan made public by the committee, only for the acquisition by the company "through construction, purchase or otherwise, of plant equipment or other property for use in its business." Whether the provision for this fund is preliminary to an extension of the loop or to an enlargement of existing facilities, or both, or as a safeguard in the event that the need for extraordinary improvements should arise, is not discussed by the committee.

The expenses of operation, "repairs and replacements," as well as all damages, taxes and legal expenses accruing during the term of the lease are to be borne by the Terminal company. The extent of the expenses for repairs and replacements will be regulated by the requirements of the Terminal company under the clause of the plan which provides that each of the companies, before turning over its property to the leasing corporation, shall put it in "good condition, in accordance with a standard to be agreed upon." The Terminal company then will agree to maintain that standard during the term of the lease. The tentative plan makes specific mention of only one company in this connection; that is the Chicago & Oak Park Elevated Railway, which is to "make large expenditures for track elevation and to bring the road up to the required standard." Contemplating extensions of the various properties, the plan provides that each lessee company shall agree to make such extensions of and improvements of its lines as may be requested by the Terminal company subject to conditions on this subject that may be stated in the lease. Such extensions and improvements shall be financed through the issue of bonds by the lessee companies to be purchased by the Terminal company or otherwise, as may be agreed upon in the lease. While future financing will therefore be conducted by the leasing corporation, the individual companies are to be delivered free of floating debt and car equipment notes, which are to be taken up by such bonds as it may be necessary to issue. Interest on "extension and improvement" bonds will be treated by the Terminal company as additional rental.

A number of readjustments of existing conditions will have to be made before the plan can be completed. The plan states that in treating with the Northwestern Elevated Railroad and the Chicago & Oak Park road the two properties are considered as one, subject to the agreement that

the total amount of mortgage indebtedness of the combined properties shall not exceed \$19,000,000. The total amount of outstanding bonds on the two roads is now in excess of this sum, but if no other adjustment should be arranged some of the Northwestern bonds might be exchanged for preferred stock under the conversion clause or the issue might be redeemed. Since, however, the Terminal company could not carry out the plan of acquiring the Union Loop, as projected, without some substantial consideration for the equity in this property, which is an important asset of the Northwestern company, it is evident that the latter corporation has an advantageous starting point from which it can trade.

Including the South Side Elevated Railroad, the Chicago & Oak Park Elevated Railway and the Northwestern Elevated Railroad, together with the Union Loop, comprising part of the Northwestern property, the miles of single track operated by the properties would be about 117. If the Metropolitan West Side Elevated Railway is added the total would be about 168 miles of single track. The Manhattan Railway of New York operates 118 miles of track, so that if the Chicago consolidation includes all of the companies it will involve much the greater track mileage.

### Drawbacks of Hydro-Electric Service

Many a railway manager operating his own steam-power plants has sighed profoundly at the size of fuel, labor and repair bills and wished he could change places with those of his confrères who buy power from some hydro-electric company for perhaps 1 cent per kw-hour delivered at the distributing points. But there are other considerations than mere cost of power. No railway company likes to have its service literally stranded by low water in the summer or left out in the cold because of frozen penstocks in the winter. Such interruptions are annoying to any user of power, but are more serious to a railway company than to a manufacturing company, which can stop its work with less inconvenience to the general public. Moreover, the manufacturer can usually purchase power at a lower price per kw-hour than the railway company because of his higher load factor. From the standpoint of the passenger, the breakdown of a railway in towns of moderate size may not be so bad if his destination can be reached in, say, less than an hour's walk, but in blizzard weather, on an interurban road, it is quite a different matter. On one line the delays from the interruption of an hydro-electric transmission exceeded the total time losses of all other troubles whatsoever. The ironical feature of this case is that the equipment of this road was but recently changed from steam to electricity. Whenever the wires are reported dead the roundhouse doors are opened and the old steam locomotives are sent out to keep the service going. Under these circumstances further electrification in this territory can hardly be expected. As a rule, the contracts with water-power companies provide that the power company is responsible for breakdowns caused by mechanical and electrical troubles to the extent of the value of the power which would have been delivered if the line had remained intact, but the company is not penalized for low water or other conditions over which it has no control.



### Economical Conditions in Power Plant Operation

Recent observation of the work of a number of electric railway power plants suggest several points which tend to increased economy of production. In one station a reduction in the rate of coal consumption per kw-hour delivered at the switchboard was attributed to the installation of new air pumps and the consequent maintenance of a better vacuum under the variable load conditions of the station. The absence of leaks also tended to reduce the steam consumption of the auxiliaries. In another installation it was found profitable to assign the same firemen on each watch to the same boilers, so far as practicable. Operating conditions were thus met more skilfully, since it is a practical fact that there are differences in the behavior and characteristics of even similar boilers in the same room or group of batteries. Constant familiarity of the firemen with a certain set of boilers led to much better handling than where the firemen were permitted to work at their will anywhere in the range of the boiler room.

In another case the economies were attributed to a reduction in the draft between the economizer and the stack. This was clearly a local problem, and one from which general conclusions could not be drawn, except to emphasize the value of investigating all the conditions in the steam end of the station. Some plants suffer from too little draft through the economizer; others, perhaps, from too much. That increased efficiency was obtained shows the value of analyzing the situation in specific cases. Another plant found better economy in the construction of flues of equal cross-section on all boilers of the same size. A point of this kind is often overlooked, since it would be taken for granted in a new station that similar apparatus would have similarly dimensioned fittings. In actual practice, however, incongruities creep into old and long-established installations as changes and additions are made, and often these are so distinctive that the higher efficiency of production suffers. Symmetry in design and extensions has a closer bearing on economy of operation than is always realized.

Improvement of costs through the suppression of boiler scale is a familiar method of securing the results which modern conditions demand. One plant had scale on its tubes to an average thickness of 7/16 in. for a recent year. Treatment of the scale by chemical methods practically eliminated it, and the coal consumption fell from 3.04 to 2.81 lb. per kw-hour. In another station improved efficiency followed the installation of an additional battery of boilers which permitted the old equipment to be kept in a cleaner condition, resulting in a higher rate of evaporation per unit of fuel. The imposition of a heavier load and a longer run per day on the boilers of another plant brought about savings in the expense of operation. In the less efficient year the average hourly boiler rating in service was 400 kw, the monthly output being 56,000 kw-hours and the fuel consumption 8.19 lb. per unit of energy delivered at the busbar. In the last year the average boiler rating in service was 715 kw per hour; the output for the month was 60,000 kw-hours and the fuel consumption 7.23 lb. The energy output only increased a little, but the distribution of the load was improved. Losses from banking were decreased. This was a plant of old-time design, operated only on peak loads, but it was improved in efficiency

none the less. In another instance leaky door frames on the boilers gave poor results, and in another a feed water temperature of about 140 deg. Fahr. failed to give the good results that followed the installation of heating apparatus capable of supplying the boilers at over 200 deg.

### Farm Lore and Railroading

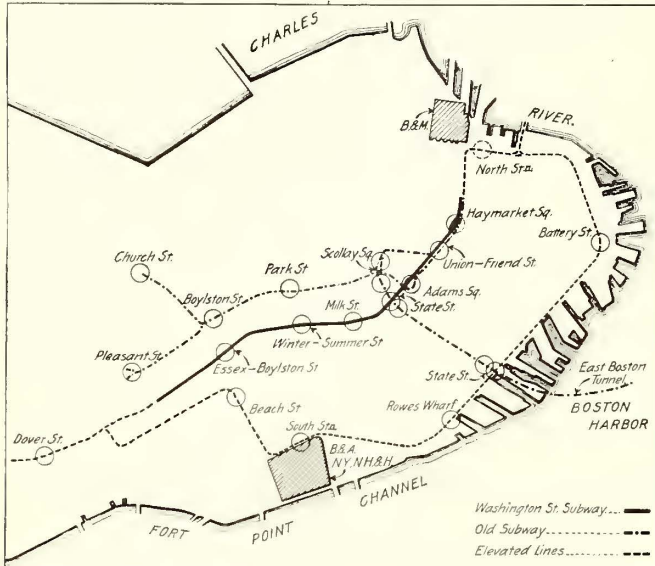
Herbert Spencer, in writing about what constitutes useful knowledge, said that if a man were to memorize the distances between all the towns in the United Kingdom he would know something of undoubted value, but yet not worth the time of learning. It is quite possible that many readers of this paper will render a similar dictum if we venture to point out a couple of cases where the managers' bucolic knowledge turned two railway enterprises from failure to success. The first instance involves the purchase of horses, success in which is considered the acme of shrewdness. For some years a certain city and interurban system had endeavored to make a success of its combined fast freight and wagon delivery. The business was easily secured, but the expense of maintaining the horses and frequently buying new ones made the profits of the department decidedly negative. Eventually, the business was put in charge of a railroad man whose freckles and tan had been gained on a farm. In very little time all of the sickly brutes foisted on the company at high prices were replaced by sound animals quartered in a neat brick and cement stable, and from that time forward the freight and express business has been most successful. It might be added that the good horses cost considerably less than the lame, blind and halt.

The second tale concerning useful knowledge deals with an interurban railway within half-a-day's journey of the other. The territory through which it passes is rather sparsely peopled, while the farms yield very little, owing to the intense cultivation to which they have been subjected for generations. Apparently, the prospect of working up a profitable farm freight business was very small, but here the railway manager's farming experience came to the rescue. He was sure that this territory, because of its abundance of rich grasses, would make fine dairying country. First, he induced many of the farmers to enlarge their herds and, later, at his suggestion, several persons bought large tracts for the sole purpose of sending milk to market in the large cities near one of the terminals. Our farmer-railroader was not content merely to point out the availability of the land for the milk business, but made a thorough study of the market conditions and the cost of keeping the cows. This enabled him to discuss the subject in a businesslike manner and permitted him to fix a transportation rate which would insure a profit for his shippers as well as for his company. To-day the district served by this company is one of the best dairy sections in the State, and, to paraphrase a famous saying, a dozen kine chew their cuds where but one cow ruminated before. In a greater or less degree cases like those quoted have occurred elsewhere, but these two are enough to prove that in at least one department of electric railroading hard common sense knowledge wrung from the soil may find wide and profitable application in electric railway work.



### ELECTRICAL EQUIPMENT OF THE WASHINGTON STREET SUBWAY, BOSTON

The Washington Street subway in Boston, which was opened for traffic on Nov. 30, 1908, is the latest example of an installation designed to facilitate safe and flexible train service at high speeds underground in the heart of a large city. The architectural features of the tunnel and stations were described in the *ELECTRIC RAILWAY JOURNAL*



Map of Subway and Elevated Lines in Boston

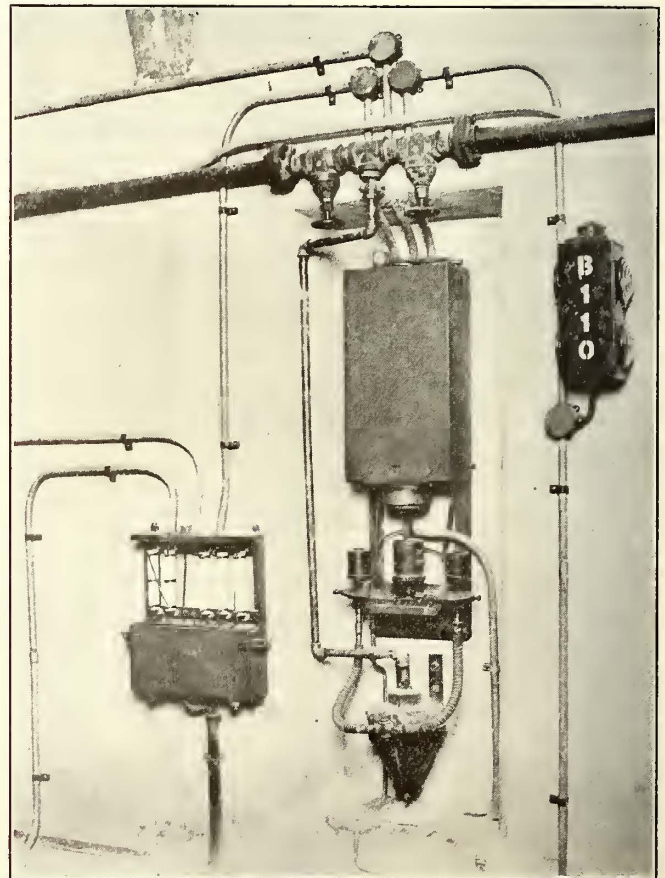
of Nov. 28, 1908. They were designed with special regard for public convenience and safety, and the arrangements made for the supply of power for the different services in the new tunnel similarly exhibit a comprehensive plan for continuous operation under both normal and emergency conditions. The tunnel services include power supply to the third rails, lighting supply, power supply for drainage pump, moving stairway and fan operation, automatic block signals, ticket office heaters and illuminated signs in the stations, trolley supply for construction, repair and emergency car service, and private company telephone and telegraph lines, as well as provision for public telephone service at all stations. This equipment, with the track construction, feeder installations, and station fittings required solely for transportation service has been installed by the Boston Elevated Railway Company, which operates the tunnel in connection with its elevated lines as a part of a through route between Forest Hills, Dudley Street and Sullivan Square. The tunnel proper was constructed by the Boston Transit Commission. The total cost of its construction, including administration, engineering, interest and all other expenditures, except for real estate and easements permanently taken, will be about \$5,500,000.

The tunnel is of double-track construction throughout. In general, the station platforms have been staggered, with separate platforms for the traffic in each direction, entrances to which are in most cases on private property or side streets. The two tracks are at slightly different levels at most points. The State Street station is at an unusually low level, and an installation of moving stairways has been made at this point. The greatest depth of the top of the rail in the tunnel below the surface of the street is 43 ft. Each platform is 350 ft. long, to accommodate 8-car trains, and each has at least two exits and two entrances. The total length of the tunnel, including open inclines, is 6110 ft. The shortest curve has a radius of about 500 ft.

The general character of the track construction in the tunnel at station platforms and on curves between stations is shown on page 938.

The track in the tunnel consists of 85-lb. A.S.C.E. section T-rails, laid on hard pine ties set in broken stone ballast. The track is bonded at each joint with two 350,000 circ. mil bonds under the joint plates. The ties are treated with "Woodolene," and are 6 in. x 8 in. x 8 ft. long. Every third tie is 9 in. longer to carry the third-rail insulator. The rails are fastened to the ties with 3/4-in. x 5 1/2-in. screw spikes. Continuous joints are used, and the ties are spaced about 23 in. apart, or 17 to a 33-ft. rail length. The third rail is also an 85-lb. section. The lower portion of the track drawing shows the construction used on the sharper curves. Here a guard rail is used, the section being Pennsylvania Steel Company's No. 96. Filler blocks are installed between the guard rail and the running rail, and the guard rail is supported by rail braces. All cables are run in vitrified clay, concrete-incased conduits which form a narrow walk on each side of the tunnel. Safety niches are built in the walls at short intervals.

The drainage of the tunnel is cared for by three pumping stations located, respectively, at Beach, Elm and Union Streets. In each of these chambers two pumps are installed, one with a capacity of 100 gal. per minute and the other with a capacity of 1000 gal. per minute. The smaller pump



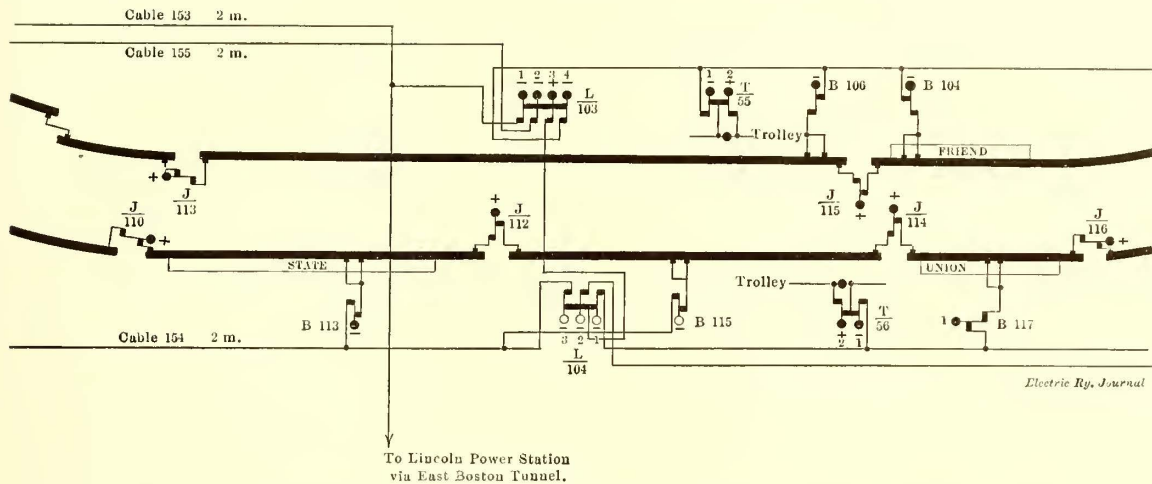
Washington Street Subway—Automatic Block Signal and Accessory Apparatus Mounted on Wall of Tunnel

in each chamber is direct-driven by a 3-hp, 550-volt, direct-current motor, and the larger pump by a 20-hp motor. All pumps are of the centrifugal type, located in the bottom of a well in each case. The smaller pumps are designed to handle the leakage and drainage of the tunnel under normal conditions, while the larger units start up automatically in case of an excessive flow of water, such as would be occa-



sioned by a break in a large street main. Each pump is controlled by a float in the well of each chamber, the smaller pump being arranged to start first and to stop last. The motors are of the shunt type, and are started by automatic rheostats controlled by contactor switches and solenoids in the float circuits. Power is derived from either a special motor cable run through the tunnel or from a tap connecting with the third-rail feeder lines nearest each pump

at Lagrange Street, Hayward Place, Milk Street and Adams Square. Each is equipped with two single inlet centrifugal fans, direct-driven in each case by a 6.5-hp, 550-volt direct-current motor, one motor being apportioned to each fan. The capacity of each fan is 25,000 cu. ft. of air per minute, giving an average velocity in the tunnel of about 1 ft. per second, and providing three changes per hour in each section of the tunnel. The ventilating equipment of the sub-



Washington Street Subway—Third Rail Feeder Connections and Sectionalizing Switches

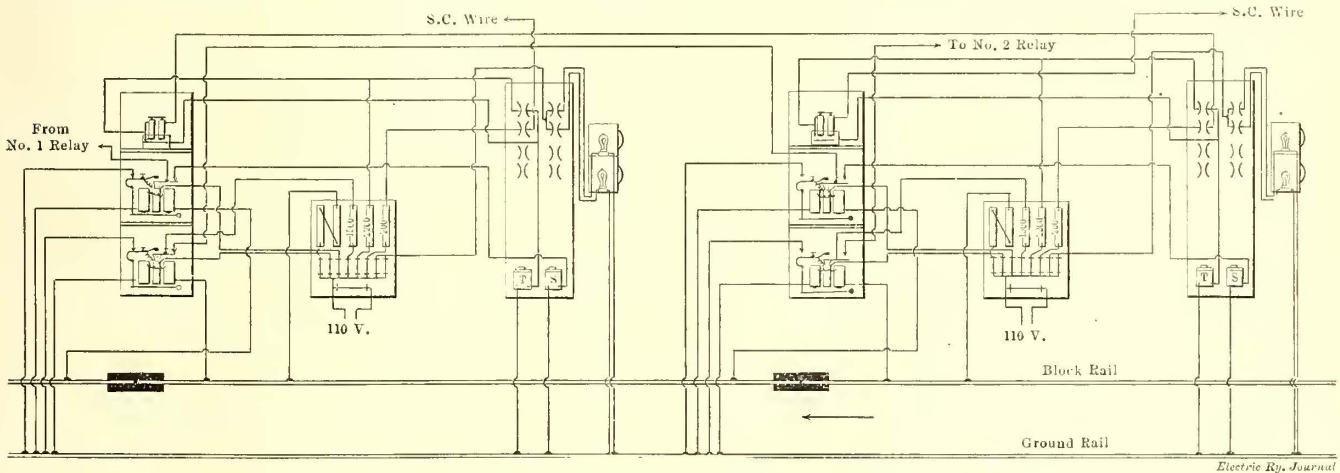
chamber. In case of the failure of the cable which regularly supplies current to the pump motors, and to fan motors in the ventilation chambers, the tap leading to the third-rail feeder is automatically thrown into connection. The pump chambers are designed to operate without the presence of an attendant, although regular inspection of the apparatus is necessary.

As in the Tremont Street subway and the East Boston tunnel, fresh air is admitted at the stations and portals and withdrawn from the tunnel at points about midway between. It was not thought in general practicable to discharge the vitiated air directly into the outer air at the points where the former is taken from the tunnel, nor was it deemed practicable to discharge through grated areas in the sidewalks, the latter during the day being densely

way was described in the ELECTRIC RAILWAY JOURNAL of April 24, 1909, page 780.

A short section of the feeder connections which supply current to the third rails is shown in the upper diagram on this page.

The third rails are divided into sections which correspond with the signal blocks, and the easterly track is supplied with current independently of the westerly track, so that in case of breakdown the trouble will be minimized. The ends of the third rails at each section are connected by single pole knife jumper switches which are normally kept open. If one of the large cables supplying any third-rail section fails the jumper switches can be closed by hand so as to maintain a continuous feed from adjoining third-rail-sections. The feeders for the northern end consist of



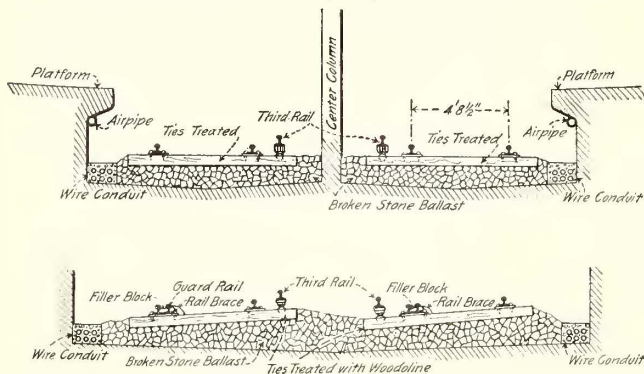
Washington Street Subway—Wiring for Automatic Signals for One Block

crowded. Air admitted at the portals and at the station entrances and leaving the tunnel at intermediate points is drawn through specially constructed ducts, in some places underneath and in others above the tunnel, but opening into the tunnel between stations, having a minimum cross-sectional area of about 40 sq. ft., and a length of from 270 to 430 ft. to fan chambers. These chambers are located

three 2,000,000 circ. mil underground cables brought to the tunnel from the company's Lincoln Wharf power station on Atlantic Avenue. These cables terminate on a bus in a switch box at the North elevated station. From this point connection is made with the tunnel distribution system through taps to the third rails. At the State Street station an additional 2,000,000 circ. mil cable from the Lincoln



Wharf power station is brought into the tunnel for feeding the westerly track in each direction. Switch boxes are installed near State Street station, and these are provided with an emergency cross connection between the positive busbars in each box, so that if the cables on one side go out of service, the opposite lines can be connected up. Normally the tie line switch in one cable box is open, the switch in the other side of the tunnel being closed so that only one change is needed to throw the two sets of feeders together. South of State Street three 2,000,000 circ. mil feeders are



Washington Street Subway—Cross-Sections at Platform and on Curves

carried through to the vicinity of Essex Street, where a second pair of group switch boxes is installed, with tie line connections for emergency service. Beyond this point the third-rail sections are served by two 2,000,000 circ. mil cables, which terminate in a box near the southerly end of the tunnel, where the switches are arranged to connect each side of the tunnel with a separate cable leading to Central power station, on Albany Street. A cross-over is installed south of Boylston Street, and to carry out the separation of north and south bound feeders, the cross-over is sectionalized, half being fed from the east side of the tunnel and half from the west side. There are no circuit breakers on any of the feeder lines supplying the third rails in the tunnel, these devices being installed only at the power stations.

Throughout the tunnel over each track is carried a No. 00 round trolley wire for use in case of emergency. This is supported by hangers and span wire construction with wall fastenings between stations, while at stations it is hung from the girders by wooden supporting blocks. The trolley wires are fed by taps from the same cables which supply the third-rail sections, but there are only five section breaks in each wire. At each section break a two-point switch box is installed, with connections for feeding around the break or for feeding in each direction independently. Normally each trolley section is fed from but one end. In addition to the section breaks in the tunnel, provision is made for the complete isolation of the tunnel trolley at each portal. All cables in the tunnel are triple braided rubber insulated; no lead-covered power cable was installed.

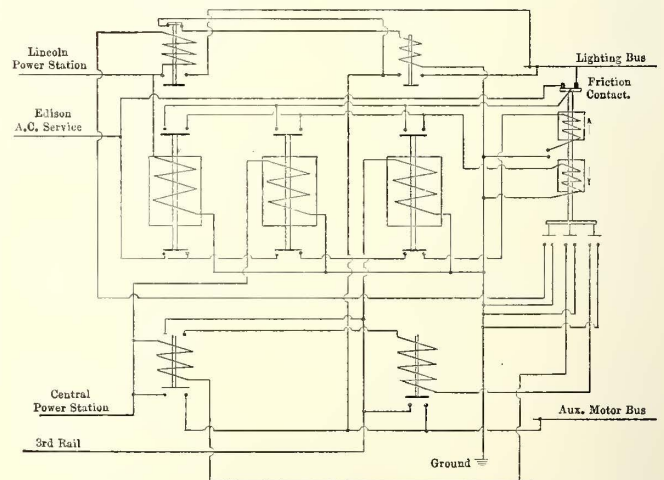
Plans of the tunnel feeder system have been prepared by the company to facilitate the operation of trains by trainmen in case of trouble. These drawings are arranged to show, in instruction book form, what sections of the third rail can be killed or made alive by given switches in any locality in the tunnel. In case a train becomes disabled so that it is necessary to cut out the third-rail section on which it has stopped while repairs are made it is easy to determine from the drawings just what switches to operate.

The tunnel is lighted by about 1700 16-cp incandescent lamps, consuming 64 watts each, installed in

series of five lamps each. No arc lamps are used in any part of the tunnel. All the wiring for the lighting distribution outside of the main vitrified clay conduits is run in iron conduit, the lights in different sections being controlled from fireproof distribution boxes. In general, the system of inter-station illumination is similar to that adopted in the East Boston Tunnel. The station lights are installed about 12 ft. above the platform. A special feature is the use of a line of lamps 10 ft. apart and from 15 ft. to 20 ft. above the platform edge, to illuminate the edge of the platform. The edge itself is painted with a broad white band that makes it conspicuous. The total number of lamps per station averages about 150. Special care has been taken to keep the lamps out of the direct vision of passengers. Frosted bulbs are used generally in exposed locations, such as in lobbies and passageways. Throughout the tunnel "H K" wall outlets are used, the size and shape of the white porcelain being altered according to location. Illuminated transparencies for announcing train destinations are installed at all stations at right angles to the track, centrally above the platform.

In each station are two switchboards, one being located at each end of the platform. Each of these boards controls half the station lamps. The switch for controlling the power supply to the section of third rail in front of the platform is located in the same chamber as the lighting control. At one of the boards in each station is located a double-throw single-pole automatic switch, which, in case of failure of the main lighting cable which runs through the tunnel, throws the lights for half the station on the third rail. At the other switchboard of the station is located a single-pole double-throw hand switch which throws the other half of the station lamps on the third-rail feeders. Snap switches are located in the switchboard booths at the ends of the platforms to control the individual lighting circuits.

In the tunnel between stations two staggered lines of char glass bulb lamps are installed. The lamps in each line



Electric Ry. Journal

Washington Street Subway—Wiring Diagram of Automatic Lighting Connections

are spaced 24 ft. apart. All track lights are provided with shields to protect motormen's eyes. At intervals of 500 ft. distribution boxes are installed on each side, each box controlling 50 lights arranged in 10 circuits. These circuits are taken off the central point of a double-throw single-pole switch, hand operated, through a busbar and fuse connection. The switch connects the lights of the section of the tunnel with the trolley wire when thrown upward, and with the main lighting cable when thrown downward.



Care has been taken to preserve continuous lighting of the tunnel under all circumstances. At State Street station a switchboard has been installed with automatic equipment for supplying the tunnel lights in normal and emergency conditions. South of State Street the lights on the north-bound side of the tunnel are supplied by a No. 00 cable running to a point opposite Winter Street station. Beyond this point the balance of the lights on this side is supplied by a No. 0 cable in series with the first, and connected with it through a knife switch in a wall box, so that if trouble occurs on the cable north of the switch the lights on the No. 0 section can be supplied from the trolley or third rail. Similar cables are installed between State Street station and the South tunnel portal, on the south-bound side of the tube. North of State Street station the tunnel lights are fed by a No. 0 cable on each side. The auxiliary motors and heaters for ticket booths are furnished with current through a No. 0000 cable running south from State Street to Summer Street, where the cable is reduced in size to No. 00.

The scheme of automatic operation of the lighting and power supply at State Street station switchboard is shown on page 938. All lighting cables are brought to a common bus, and all auxiliary power cables are similarly concentrated at the center of distribution and control. The sources and order of supply for lighting service are: Lincoln Wharf power station, Central power station, the tunnel third rail, and the service of the Edison Electric Illuminating Company of Boston. The order of supply for auxiliary power distributed from State Street station is, first, Central power station, and second, third-rail connection. The switchboard consists of a motor service panel, a lighting service panel, and an automatic control panel on which are mounted solenoid switches for automatically throwing the services from one source of power to another. These switches are arranged so that only one source of supply is connected at any one time. If the current from one source fails, the switches, which are of the General Electric contactor type, open and close by gravity, throwing the lighting or power cables instantly on the next source. The wiring is so arranged that no matter if the current supply fails on an alternative source, any source remaining will at once take up the load. If all the sources fail, the first source to have current restored takes up the load, and as the different sources come back into service, the emergency supplies are cut off until finally the normal supply is once more at work. Interlocks are provided to prevent the connection of the Edison service, which is 550-volt alternating current, with the auxiliary motors, which are all wound for direct current only. Under no circumstances do the Edison current and the railway company's current come on the circuits together. The Edison current is supplied through a step-down transformer located at State Street, the secondary line being grounded on one side.

The tunnel is equipped with 16 automatic block signals of the electropneumatic type, designed for the Boston Elevated Railway. The longest block is about 1500 ft., and the shortest block 600 ft. The compressed air supply is furnished by compressors located at Sullivan Square, Central power station, and the Guild Street shops. A 2-in. pipe line is carried through the tunnel for distribution of air at a pressure of about 90 lb. per sq. in., and at each end the pipe is connected with the line on the Atlantic Avenue elevated structure, to provide for emergency feed in case of trouble at any point in the tunnel.

The wiring of the signals for a complete block is shown

on page 937. A modified Brown polarized relay is used. The design of the signal equipment was made under the immediate personal supervision of Paul Winsor, chief engineer of motive power and rolling stock, and W. C. Smith, inspector of signals. The indications to trainmen are given by red and green lamps mounted in a narrow case at the right and above the track. The contactor equipment occupies a space only 47 9/16 in. high by 14 1/4 in. wide. At each signal is an automatic stop which is practically the same as that in use on the present elevated division in Boston.

At State station there are installed four moving stairways, built by the Reno Inclined Elevator Company, of New York. The vertical rise of these machines is 21 ft. There are three single file moving stairways, each having a capacity of 3500 passengers an hour, designed to carry traffic up or down as the conditions require. They are made reversible by operating a switch. There is also one double file moving stairway with a capacity of 7000 passengers an hour. The single file machines are operated by 7 1/2 hp, 550-volt motors wound for 450 r.p.m., and connected to the stairways by Renold silent chain drive.

The moving treads have attached at each side 3-in. flanged rollers 12 in. apart, which are self-lubricating and run on steel tracks. The treads are bolted to a special steel bushed chain which passes around sprocket wheels at each end of the stairway. In an official test 31,000 passengers were carried during a period of three hours. The double file machine carried 7000 passengers per hour with 14 hp developed at the motor. The single file machines carried 3500 per hour with 7 1/2 hp. The efficiency of all the machines, including the motors, was over 80 per cent. The power consumption per 1000 passengers lifted 21 ft. per hour was about 2 hp. In order to stop the escalators instantly in case of accident or failure of the current supply, all the machines are provided with a safety clutch, which comes into action and prevents the stairways from running backward with the load on. The speed of the treads is 100 ft. per minute. Switches are located so that the moving stairways can be stopped and started from either top or bottom, or from the switchboard room. The stairway motors are supplied with current from the same circuits which operate the other auxiliary tunnel motors.

### HARTFORD & SPRINGFIELD POSTER

The Hartford & Springfield Street Railway uses posters in cars to advertise the advantages of the service offered

#### Hartford & Springfield Street Railway's Striking Poster

by the company. These posters have been placed in cars operated east of Springfield, Mass., and south of Hartford, Conn. A copy of the poster has been received from Thomas C. Perkins, vice-president of the company.



## ANNUAL MEETING ARKANSAS ASSOCIATION

The second annual meeting of the Arkansas Association of Public Utility Operators was held at the Arlington Hotel, Hot Springs, Ark., May 12, 13 and 14. With few exceptions all of the lighting and railway companies in the State were represented. The supply dealers were also well represented. Through the courtesy of Edward Thomas Hardin and the Hot Springs Street Railway Company enjoyable entertainment was provided for the ladies and guests.

D. A. Hegarty, president of the association, was in the chair.

In the annual report of Secretary J. E. Cowles attention was called to the publicity campaign carried on from his office during the past year. More than 3000 documents had been distributed among the public utilities of Arkansas with a view to improving legislative conditions.

The annual address of the president was read by D. A. Hegarty, general manager, Little Rock Railway & Electric Company. An abstract follows:

### ADDRESS OF PRESIDENT D. A. HEGARTY

We are now living in an age where the manufacture and distribution of electricity, gas, water and service rendered by electric railways, both city and interurban, is attaining its highest efficiency. The accomplishments and advancements have been made while public utility companies, classed the same as manufacturing corporations called trusts, were being assailed by demagogic politicians and legislation in the forms of tax commissions, public service commissions and laws framed that are practically confiscatory to corporations, depriving them of earning fair remuneration on the money invested.

As the public utilities are the greatest factors in the growth of a city they should be treated with fairness in the granting of franchises and terms in order to give them a chance of expanding and helping the city to expand. We have had several examples during the past year where the franchises of public utility companies have expired or are about to expire, as the cities and the companies have not been able to reach any agreement; stagnation has come to a great many businesses connected directly or indirectly with the companies and investments in the cities have been prevented as capitalists will not invest any more except where they know they will get a square deal; and limited franchises without a renewal clause do not give the investor protection.

The position public utility corporations occupy at the present time is this: That the cost of electricity, gas, water and car fare was much higher 20 years ago than it is to-day when land values and food products were only one-third of what they are to-day. The increase in costs of food and rentals has made a higher cost of labor, so it is the increase in land values that is the greater reason for the increased cost of living and not the corporations as the people are led to believe. If the law-makers and commissions would be fair in legislation they would legislate to reduce the cost of rentals and foodstuffs, which would give the greatest benefit to the largest number of consumers and not place all the burden on the corporations.

This State of Arkansas is one of the richest in natural resources in the United States and is practically undeveloped. This can only be done by inviting capital to invest by liberal laws for taxation and protecting the investment when it has been secured. We should not make the mistake of some of our sister Southern States of getting capital to invest within our borders and, after it has been safely secured, enacting laws that practically destroy the investment.

During the legislative session just closed a number of measures were introduced containing drastic and confiscatory laws against public utility companies as well as other corporations, but the majority of the Senators of the State of Arkansas, being farseeing and progressive men with the love of the upbuilding of this great State, defeated each and every one of these measures as they were placed on the calendar for their judgment. One bill that has passed both the House of Representatives and the Senate pro-

vides for the appointment of a tax commission with unlimited power, and all we can hope is that the commission will always be composed of honest, fair-minded men who will deal with us justly and squarely and not try to have the corporations bear an unjust burden of the taxation.

At the second session J. M. Hewitt, president, Marianna Electric Light & Power Company, was in the chair. The first paper was presented by C. J. Griffith, superintendent, Little Rock Railway & Electric Company, and was entitled "The Use and Abuse of Transfers." This paper will be found elsewhere.

Edward T. Hardin, Hot Springs Street Railway, called attention to the satisfactory reduction in the number of transfers issued that had been made by his company. From June 1 to Dec. 31, 1908, a reduction of 11 per cent in the number of transfers issued had been brought about with no decrease in the fare passengers. This had been accomplished by requiring care on the part of the conductors when issuing the transfers and by introducing a regulation arranging for the issue of transfers at junction points only and with short time limits. Mr. Griffith, stated that the Little Rock Company has obtained good results by insisting that the conductors use every care in punching transfers. With an average of 3500 transfers issued per day but four or five are ever found to be wrongly punched.

A paper on "Damage Suits," by L. E. Sawyer, attorney, Hot Springs Street Railway. This paper will be found elsewhere. In discussing this paper W. A. Sullivan, of Ford, Bacon & Davis, Little Rock, related the circumstances surrounding a damage suit against the Philadelphia & Western Railroad which was won by the company because of the valuable evidence presented in the form of systematic reports made by foremen.

The Question Box was introduced by D. A. Hegarty, who spoke in particular regarding the saving to be effected from buying coal on specification. Arkansas coal might have from 15 per cent to 20 per cent ash and if it were bought on specification a penalty or bonus could be received from or paid to the coal dealer according to whether the ash component was greater or less than the specified per cent.

The Little Rock and Pine Bluff companies had tried to get coal dealers to sell them coal according to specifications drawn up from those of the United States Geological Survey, but the dealers refused to sell in this way because there was a market available which did not require such close watching of the product. The specifications formulated by Mr. Hegarty placed a penalty of 10 cents a ton for every increase of  $\frac{1}{4}$  per cent of sulphur. Concerted action on the part of all public utilities in the State was urged so that the dealers might be induced to sell according to specification. A committee was appointed to study the situation and draft specifications. Arkansas coal runs from 12,000 to 13,000 b.t.u. per pound and has about 15 per cent to 20 per cent ash when properly burned. R. Swartz, Hot Springs Light, Water & Gas Company, had arranged testing apparatus in his plant so coals could be easily tested under actual working conditions. He had found the Arkansas washed slack to be the most efficient according to cost. The firing of coal had largely to do with the amount of ash. Some hand-fired coal gave from 20 per cent to 30 per cent ash, while the same coal fired with the Jones underfeed stokers in his plant left but 15 per cent ash.

Several papers were presented on electric lighting, gas and other utility subjects.

The executive committee announced that the next meeting would be held at Pine Bluff, Ark., in 1910, the exact



date to be announced later. The following officers were elected and installed to serve during the coming year:

NEW OFFICERS

President, B. C. Fowles, general manager, Pine Bluff Corporation.

First vice-president, J. M. Hewitt, president, Mariana Electric Light & Power Company.

Second vice-president, S. A. Stern, Home Water Company, Little Rock.

Third vice-president, C. J. Griffith, general superintendent, Little Rock Railway & Electric Company.

Secretary (re-elected), J. E. Cowles, electric engineer, Little Rock Railway & Electric Company.

Treasurer, E. T. Hardin, superintendent, Hot Springs Street Railway Company.

## THE USE AND ABUSE OF TRANSFERS\*

BY C. J. GRIFFITH, SUPERINTENDENT RAILWAY DEPARTMENT,  
LITTLE ROCK RAILWAY & ELECTRIC COMPANY

The transfer was introduced in good faith by street railway companies for the purpose of permitting a passenger to continue a journey on a line other than the one on which he pays fare. It was not intended to be used in a reverse direction or that a transfer should be issued upon a transfer. However, since its introduction the transfer has gained in popularity and is almost universally used and in many cases with very few restrictions, and it is issued and accepted indiscriminately by a great many companies. The writer believes that responsibility for the conditions existing to-day in a great many cases rests with the operating officials of street railway properties. True, city councils have passed in many cases ordinances which have created conditions and imposed hardships that street railway companies did not anticipate and which in some cases have resulted in great loss to the companies affected, caused by the extension of the transfer privileges.

Previous to the adoption of electricity as a motive power for street railways many small companies were operating mule-car lines, consisting of one or more routes, and issued transfers only to their own lines and not to foreign lines, but when the electric cars began to displace the mule cars many consolidations of interests took place; lines were extended and additional lines were built, reaching far out into the suburban districts. Naturally the transfer system was extended by the new combination of interests without the least regard for future results. Being as these interests were so eager to complete and equip their new organizations, a thing so small as a transfer was entirely overlooked and, in fact, its effects on the earnings of a company have just recently been discovered.

### DANGER IN EXTENSIONS OF TRANSFERS

Little did the traction companies believe when the transfer privileges were being extended that they were creating a condition that would some day cause them great loss of revenue and even bankruptcy. The earnings per passenger and the cost of the service rendered have been gradually approaching each other, due to the extension of the transfer privileges and the increased distance one rides for a 5-cent fare, and sooner or later must result in some new method yet to be adopted that will give to street railway companies a just compensation for service rendered. Whether or not it will result in the adoption of the fare zone system, as in Europe, or a charge for a transfer, will remain to be seen; but certainly present conditions cannot always obtain.

The writer does not believe that one can dispute the fact that the transfers affect materially the earnings of a company. If the transfer is issued and accepted indiscriminately and no check of it is made it invites abuse both by the public and by dishonest employees; and there is practically no end to the amount of abuse that can be perpetrated.

With this condition obtaining the earnings per passenger will be reduced to an alarmingly low figure. Statistics show that the percentage of transfer passengers to cash passengers have increased in the last 10 years about 50

per cent and the earnings per passenger have decreased in many cases as much as 30 per cent. This is indeed an alarming condition and one worthy of much thought and consideration by those engaged in the operation of street railway properties.

The employees, of course, are responsible for a portion of the abuse of the transfer privilege, but not to the extent most people believe. The favorite method used by employees to perpetrate fraud is trading transfers among themselves. They may in some cases issue transfers in trade for other commodities, but this practice, as well as any other, can be readily discovered by properly checking all transfers accepted for each day.

The writer is of the opinion that the public is the greatest offender in the abuse of the transfer privilege and will resort to almost any means to defraud a company of that which justly belongs to it. Passengers have been known to secure a transfer on returning from lunch and give it to some friend to use in going to lunch, resulting in three persons going to lunch for 20 cents, for which service they should pay 30 cents. In an establishment employing a great number of people this endless chain can be worked with little fear of detection by officers of the street railway company.

Many forms of transfers have been introduced with the idea of preventing abuse by the public and employees. Some companies have even gone so far as to use transfers with pictures supposed to represent a likeness of the passenger using the transfer. In the writer's opinion the transfer has not yet been designed that will entirely eliminate abuses. The writer believes that the condition existing in a great many cases is directly due to the non-enforcement of operating rules. If you have transfer rules and disregard them nothing can prevent fraud on the part of both the public and employees.

### TO PREVENT ABUSE

To prevent abuse of the transfer privilege the first necessity is a set of operating rules that deal directly with the transfer question, and the second is to see that these rules are rigidly enforced. The time limit on a transfer should be so extended as to permit a passenger to catch the next car on the line to which the transfer is issued and a conductor should not accept this transfer when he knows positively that the passenger could have caught the preceding car.

Transfers should not be accepted at other than transfer points, and this rule should be rigidly enforced. A transfer should be requested by the passenger and issued by the conductor at the time the fare is paid. A transfer should be refused if the passenger should neglect to ask for it until some time after paying his fare unless the conductor is absolutely positive that the passenger is really entitled to it. Even when the transfer is given in such a case the conductor should not forget to remind the passenger that the transfer should have been requested on payment of the fare and that it is against the rules of the company for the conductor to issue a transfer under any other conditions. This will have a tendency to impress upon the passenger the necessity of asking for a transfer at the time the fare is paid.

In conclusion the writer believes that both "the use and abuse of the transfer privilege" can be greatly reduced by requiring the conductor to mail all transfers taken up on each trip. A suitable envelope should be provided showing the date, line, trip number, run number and terminal leaving time. It should show on its face the number of transfers accepted on out-bound trip and the number accepted on his inbound trip, and should be signed by the conductor.

These transfers should be deposited in a suitable box placed at one or more convenient points on the system and should be taken up periodically by a clerk, whose duty should be to check the time of issue with the time of acceptance and determine whether or not the transfers were issued and accepted correctly and the conductors held personally responsible for all errors and the proper discipline administered. It would seem to be a rather expensive business for large companies to check all transfers issued and accepted, but the writer has found from experience that it is a paying investment and that enough clerks to perform the duty will earn their salary many times over.

\*Abstract of address delivered before the Arkansas Association of Public Utility Operators, Hot Springs, Ark., May 12 to 14, 1909.



## DAMAGE SUITS\*

BY L. E. SAWYER, OF RECTOR & SAWYERS, ATTORNEYS, HOT SPRINGS STREET RAILWAY

Public utility corporations especially are being held day by day to a greater responsibility not only to the public, but to their employees. The tendency of juries in following public prejudices and the temptation of complaining litigants to overreach the truth are making the legal department of a public utility corporation a matter of great moment.

Damage suits grow out of what is termed "negligence." It is bound to be of negligence of the employees of the company. Stockholders do not operate the road, but those employed by them, be they directors, managers, superintendents, foremen or laborers. A damage suit can grow out of the negligence of the directors of a corporation in requiring certain things to be done or not to be done, in requiring the purchasing agent of a corporation to purchase a certain class of material or to sanction the purchase by a purchasing agent of machinery or appliances that are not of the best. Sometimes the very policy that is encouraged by the directors and management of the road leads to very serious consequences that find their end in a court of law. For the purpose of this address we will confine ourselves to the subject of damages growing out of defective machinery and appliances in construction and maintenance and operation and the personal negligence of the employees in operating and handling equipments.

### DEFECTIVE EQUIPMENT

The tendency of the Legislature is to hold a corporation more directly accountable for defective machinery, not only to the people, who are not supposed to detect a defective car wheel, a defective step or a defective coupling, but to the employees of the company themselves, although they may know the danger and the reason that attend the use of the particular defective appliance; yet if they operate it and use it under order of the superior office their contributory negligence is absolved and the company is held liable in some States or there is a comparative degree of negligence to be settled, which no jury on earth is able to measure. All that we can say is that the testing department of a public corporation is becoming one of the most important wherein "an ounce of prevention is worth a pound of cure." Everything connected with the operation should be subjected constantly to the most rigid examination and test and records kept of it; for no corporation should be held to a greater degree of care than this, and it should have at hand whenever called upon by the legal department records to show the condition and defects of any appliance of machinery and the report of the very latest inspection.

Manufacturing and wholesale houses that sell appliances and equipments should have them thoroughly tested and the company purchasing appliances and equipments should have them thoroughly tested and the construction and repair departments should be vigilant and exhaustive and the testing department should have its records kept properly with correct dates and by proper officers and always ready at the command of the legal department.

### NEGLIGENCE OF EMPLOYEES

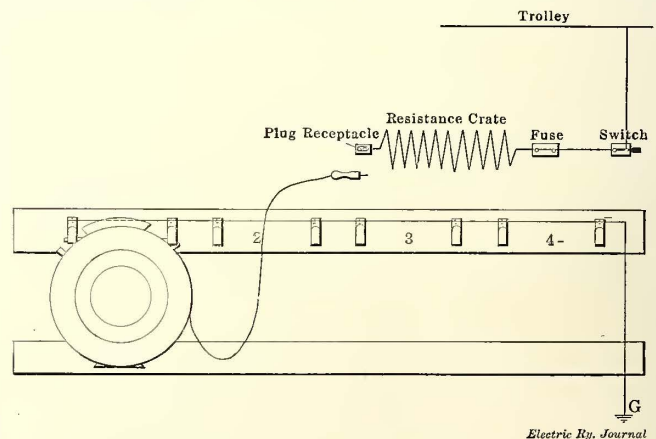
The personal negligence of employees is a matter of great importance; those whose duty it is to employ what we term in law "servants" of a corporation should exercise just as much care and judgment in the selection of their men as the time and circumstances will permit. Not only men who are qualified to do the work, but men who, when called upon to face the juries, have, by their conduct and bearing, the confidence of the people with whom they associate and who will make an impression upon the jury. We can take a good case of defense on the facts and yet have those facts detailed in a bad way by a witness in the employ of the company who has no moral standing in the community and lose the case. We can take an uncertain case with an employee who is a good witness of good moral standing and win it. Employees should be thoroughly trained, lectured and instructed before assuming responsibility to the

public in operating a public utility. A negligent employee by his negligence will permit bad conditions to exist in the equipment; a negligent employee by his own negligence and carelessness will permit bad customs to grow up and even violations of a strict order of the company will be permitted to continue until they become a matter of custom and then a matter of practice, which often becomes the turning scale in a lawsuit. We can safely say that there is not one case out of 20 where the employee was negligent and his negligence caused the accident; but very often we will lose the case because the employee after the accident or at the time of the accident was not diligent in getting the names of the witnesses, statements of the witnesses, calling the attention of bystanders to conditions as they exist which clearly showed the negligence of the parties injured, and very often for this reason the suit is lost and the company is mulcted. We, the legal department, want everything; expressions and statements of bystanders, what the bystanders saw; we want distance, speed, conditions. Every employee of a public utility corporation should get all the facts connected with the accident and get them down so that when he is called upon by the legal department they can be presented. This should be done at once; it should be done by a record and the employees should be instructed along this line.

Whenever judgments amounting up into the thousands begin to concern a corporation it means a lessening of salaries, dissatisfaction to stockholders and public censure; it means saturating the minds of the people who become possessed with the idea that a public utility corporation is absolutely indifferent to property, human suffering or human life. Every person connected with a public utility corporation should have these principles at heart and do all he can in every respect to see that the public mind is disabused and that the best appliances and equipment are used, constantly tested, and that men of sterling worth and integrity are employed and that everything possible is done at all times to prevent injury.

## USEFUL HEADLIGHT RACK

At the shops of the Sterling, Dixon & Eastern Electric Railway at Dixon, Ill., a headlight rack has been so arranged that but a moment's time is required for a motorman to make certain that his headlight is in operating condition before he hangs it on the car. As shown in the sketch, the rack is provided with hooks for supporting four headlights. These hooks are connected to ground, and above the rack is a plug receptacle connected with the



Useful Headlight Rack

trolley circuit through a resistance grid, fuse and switch. During the day the headlights for the four cars operated are hung on this rack, and at night, before placing one on a car, it is only necessary to put the lamp plug in the nearby receptacle to ascertain whether the lamp is in good operating condition. Acknowledgment is made to Wayne P. Hendricks, superintendent, for the accompanying sketch.

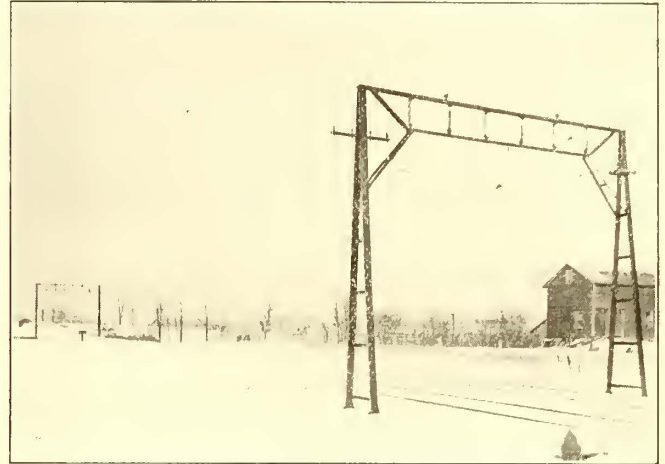
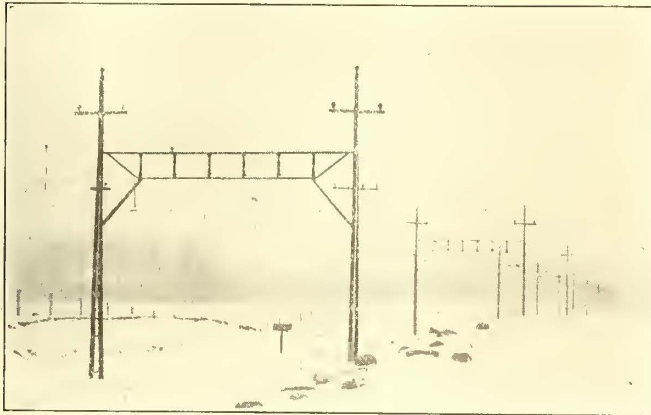
\*Abstract of address before Arkansas Association of Public Utility Operators, Hot Springs, Ark., May 12 to 14, 1909.



**STEEL CATENARY BRIDGES FOR LINES IN CENTRAL NEW YORK**

Several articles have been published in this paper on the catenary bridge construction erected by the Archbold-Brady Company, Syracuse, in New York for the Syracuse, Lake Shore & Northern Railroad and the Rochester, Syracuse & Eastern Railroad. This overhead construction is the result of a study made by Thomas H. Mather, chief engineer of the railroad companies, and the contractors on

of the bridges are 28 ft. center to center. Anchor bridges are placed only where the construction changes from catenary trolley to ordinary trolley, as in city streets. No. 0000 grooved copper trolley wire is used and the catenary hangers are spaced 30 ft. apart. On curves pull-off poles are used with a bridle construction and the pull-offs are run to each hanger rod, that is, every 30 ft. On the construction on the Syracuse, Lake Shore & Northern Rail-



Two Types of Direct-Current Catenary Construction on Syracuse, Lake Shore & Northern Railroad

the subject of a light overhead bridge construction which should be comparable in price with the ordinary wooden pole construction. In the latest work, which is on the Rochester, Syracuse & Eastern Railroad, a design has been secured in which the cost is not materially greater than where wooden poles with spans have been used.

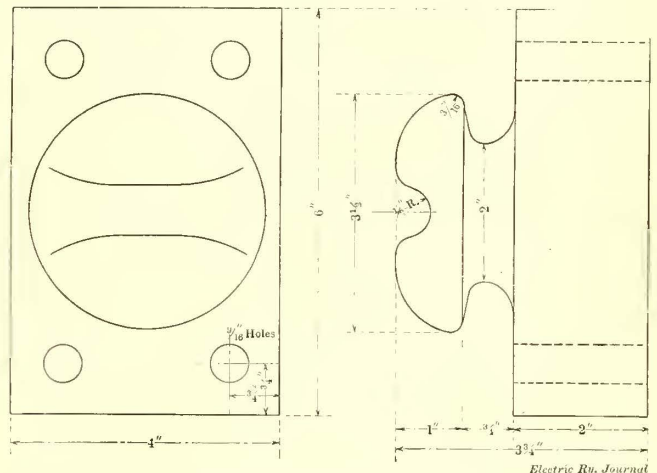
Two styles of bridges were used on the Syracuse, Lake Shore & Northern Railroad. In one style the high-tension transmission lines are carried on extensions of the bents; the other style was used where the high-tension lines had to be carried around cities or villages and the high-tension attachments were omitted. Both styles of bridges are shown in the illustrations. On the Rochester, Syracuse &

road, where the photographs shown in the illustrations were made, 7-16-in. strand high strength steel messenger wire was employed, mounted on porcelain pin insulators attached to steel pins on the top member of the bridge. On the construction on the Rochester, Syracuse & Eastern Railroad it is proposed to use the two 500,000 circ. mil copper feeders as messengers, and thus eliminate the cost of the steel messengers.

The copper messenger is to be carried on a porcelain saddle, recently designed by Thomas H. Mather, chief engineer, and R. A. Dyer, Jr., electrical engineer of the railroad company, and illustrated in the line engraving.



Wooden Pole Line on Rochester, Syracuse & Eastern Railroad



Plan and Side Elevation of Saddle Insulator for Messengers

Eastern work it is not necessary to carry the high-tension lines around any of the villages, and, therefore, all the bridges for that road are to have the high-tension attachments.

The standard spacing of the bridges is 300 ft. on both tangents and curves, but some spans are reduced to 200 ft. to give proper spacing for highway crossings, etc. The standard height of the trolley wire is 18 ft. and the bents

These saddles, which are to be furnished by the Ohio Brass Company, are to be lagged to a timber which will be protected from decay by preservative compound, and are to be mounted on the tops of the catenary bridges. This timber provides additional insulation and is a safety precaution against grounding in case the insulator should break.

The cost of the construction per mile of double track on



the Syracuse, Lake Shore & Northern Railroad was, approximately, \$4,100, where two high-tension attachments were used on each bridge. This figure includes the cost of placing the foundations, erecting and painting the bridges, special construction on curves, the catenary insulators, the two messenger cables, hanger rods, messenger clips, trolley clamps, necessary strain insulators, yokes and clamps, and also the labor of stringing the trolley wire, high-tension wires, feeder wires and four telephone wires. It does not include the high-tension insulators nor the cost of the wires themselves, which in this case consist of two No. 0000 trolley wires, six No. 2 copper high-tension wires, two 500,000 circ. mil copper feeders, and four No. 10 copper telephone wires.

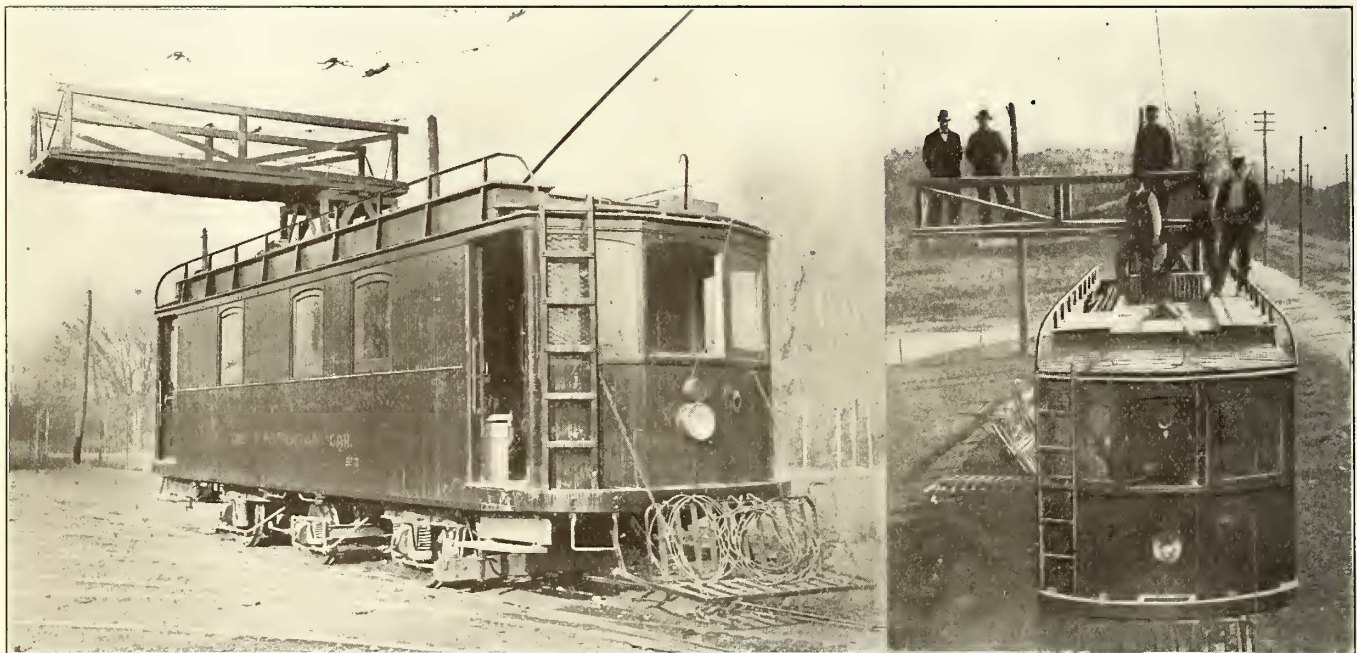
The cost of the wooden pole construction as shown in the illustration on the Rochester, Syracuse & Eastern Railroad, including labor and material, outside of the wires and cables, was, approximately, \$3,325 per mile, so that the additional cost of the bridge construction, as stated above, is less than \$800. On the Rochester, Syracuse & Eastern

it is believed that this would not be more than \$200 per mile, even under extreme conditions, and here the cost of wooden pole construction would be increased also.

### THE HARRISBURG LINE CAR

The Central Pennsylvania Traction Company, of Harrisburg, Pa., has been using for some time the novel line car shown in the accompanying illustrations. Perhaps its most interesting feature is the adaptation of the roof for storage purposes, the top being covered with bins which are 8 in. to 10 in. deep and have hinged flat trap doors. These bins contain all the tools and material usually needed in line repair work, and are readily accessible. An extra long bin on one side of the car contains the digging and raising tools. Each side of the car is furnished with hooks to carry poles or ladders. At night the roof is amply lighted with clusters of incandescent lamps.

The car body is 30 ft. long, 8 ft. wide and 6 ft. 6 in. high, and is mounted on a six-wheel Robinson radial truck.



Side and End Views of the Line Construction Car Built by the Central Pennsylvania Traction Company, Harrisburg, Pa.

bridge work the elimination of the steel messengers will make a saving of about \$400 per mile, including material and labor. On account of the reduced price of structural steel, the price of the bridges was reduced about \$275 per mile, so that the catenary construction on steel bridges with concrete foundations will cost, approximately, \$3,425 per mile, or only \$100 per mile more than the wooden pole construction.

On the new construction it is planned to put the telephone wires on 25-ft. poles, spaced 150 ft., adjacent to the fence line. The cost of this telephone construction over and above the cost where the telephone wires placed on the bridges, will be, approximately, \$160 per mile. This plan will have the advantage of separating the telephone wires from the high-tension wires a considerable distance.

The \$160 added to the \$100 difference would make a difference of about \$260 per mile under the conditions on the Rochester, Syracuse & Eastern, and it is believed that those conditions would not vary greatly from those on most roads. Variation in cost would come principally through the difference in cost of foundation material, but

The tower has a motor and worm gear hoist, with an automatic circuit-breaker to prevent it from rising out of its frame. The tower is raised to its maximum height in half a minute by the motor, or in one minute by hand. The motor is controlled either from the inside of the car or from the top of the tower. The maximum height from the rail to the top of the 13-ft. x 4-ft. table when the tower is raised is 19 ft. Two trolleys are used.

The inside of the car is equipped with a work bench, vise, anvil, pipe jaws, tool lockers, ropes, pole truck, etc. One reel of trolley wire is always carried on the car. This reel is mounted, and in stringing a line the wire is passed over the sheaves through the frame at the tower, so that the car can receive power from the new wire. The car is furnished with four electric heaters.

The specifications for this line car were drawn up by P. Frank Gerhart, C.E., electrician of the company, and built under his supervision in the company's shops. Smith & Wallace, of Woburn, Mass., have secured the specifications from Mr. Gerhart and are now building this type of line car for general sale.



### BLOCK SIGNAL INSTALLATION AT SPOKANE

An interesting block signal installation has just been completed for the Spokane & Inland Empire Railroad Company to protect the operation of the trains of its Inland and Cœur d'Alene divisions while on or near a single-track bridge over the Spokane River. At one end of this

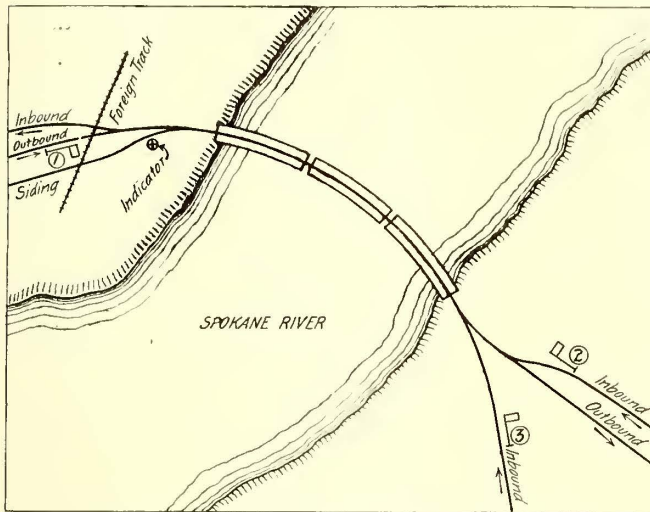


Diagram Showing Location of Block Signals

bridge are the shop yards and at the other the junction of the two main lines. The installation of signals was made by the General Railway Signal Company, Rochester, N. Y., and includes three electric motor semaphore signals for



Block Signal at Spokane

governing main line movements; one lamp switch indicator for governing movements from a siding to the main line; four sections of track circuit and the necessary batteries, transformers, relays, etc., for the operation and control of the signals.

An accompanying diagram shows the relative location

of the bridge and the branching tracks at both ends. The movement of trains over this bridge, which is located on a curve, is very frequent, because the bridge serves as the entrance to the shops and the city terminal for all the traffic of the Spokane & Inland division to Colfax and Palouse, Wash., and Moscow, Idaho, and for the older double-track line to Cœur d'Alene and Hayden Lake, Idaho. The bridge, including approaches, is 500 ft. long.

Electrically operated normal danger semaphore signals are installed 400 ft. from the ends of the bridge on the outbound track on one side of the river and the two inbound tracks on the other side. The signals and the polyphase relays used are similar to those installed on the electrified zone of the New York Central. Twenty-five-cycle alternating current taken from 55-volt mains and reduced in voltage through suitable transformers is used on the track circuits to operate the track relays. The signal lamps are supplied directly from the same mains. The track relays will not operate on direct current or alternating current of any frequency other than 25 cycles. The signal motors are actuated by current from 10-volt primary batteries placed in shelters, and are controlled by model 9 d.c. relays, which are in turn controlled by the polyphase track relays.

Only one of the running rails is given up for signal circuits, and this rail is sectionalized by insulated joints. No reactance bonds are used, suitable reactance being inserted in the relay control circuits. The track circuits and signal control are so arranged that when a train enters the approach section in advance of any one of the signals it causes the signal to clear if the single-track section on the bridge is unoccupied, the siding switches are properly set and no cars are standing within fouling distance of the main line on any of the branching tracks. The movement of any signal to the clear position holds the other two signals in the stop position and causes a red light to burn in the siding indicator.

### GROWTH OF COMMUNITIES AS AFFECTED BY CORPORATIONS

George H. Davis, vice-president, American Cities Railway & Light Company, and member of the firm of Ford, Bacon & Davis, has contributed an interesting article to the *Manufacturers' Record* on the "Growth of Communities as Affected by Corporations." In discussing the proper return on the investment in public utility enterprises, Mr. Davis says:

In discussing the proper return on the investment in public utility enterprises, Mr. Davis says:

Exclusive of returns on borrowed capital, which should be approximately 5 per cent per annum, agricultural, mining, manufacturing and mercantile businesses should, and do, yield when efficiently operated, at least 15 per cent per annum on the money invested by equity holders. Ten per cent of this is for the hazard, labor and responsibility of management, which fall entirely upon the stockholder. If a city regulates plants manufacturing and selling gas, electricity or other public conveniences through extortionate taxation or reduction of rates to a point of less profit than suggested, it will result in the paralysis of the industry to which such regulation is directed. This is simply an application of the law under which money flows in the course of least interference to the safest harbor. If any State or city has ambitions to be great, let it seize the present opportune moment and announce to the world a fixed policy toward investments for the next 50 years in which individual businesses and corporate businesses, private or public, are treated absolutely on a parity in regulation, taxation and the general exercise of police power or other necessary interference.



**PERFORMANCE OF ELECTRICAL EQUIPMENT ON THE LIVERPOOL & SOUTHPORT RAILWAY**

The performance of the electrical equipment of the Liverpool & Southport Railway, a branch of the Lancashire & Yorkshire Railway, of England, was made the subject of the presidential address before the Institution of Mechanical Engineers, London, April 23, by John A. F. Aspinall. The equipment of this line has been described in several previous issues of the *ELECTRIC RAILWAY JOURNAL*. The line is 18½ miles in length, and is part of the Lancashire & Yorkshire Railway, one of the principal steam railroad

quency of the trains has been more than double since electrical equipment was installed, the rapid acceleration and high average speed of the electric trains have permitted the company to dispense with the use for passenger service of two of the four tracks in the four-track section. This has resulted in a saving of the expense of maintaining the passenger stations on these tracks which are now given up to freight. It is also interesting to note that in spite of the fact that the number of passengers carried has increased 14 per cent, the total weight of rolling stock moved per day, as compared with steam service, has decreased from 78,393 tons to 69,160 tons.

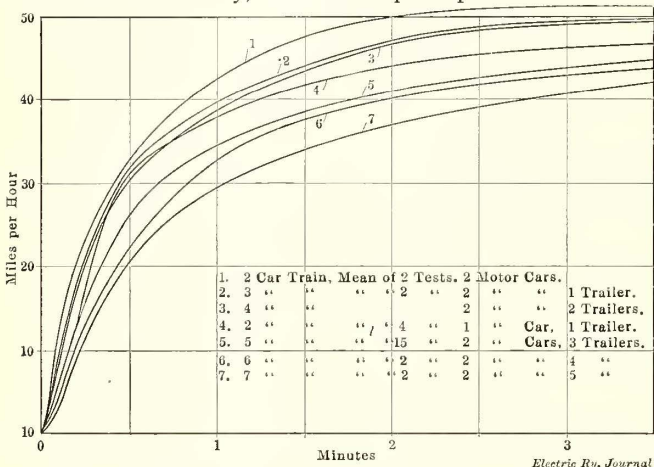


Fig. 1—Speed Time Curves for 2, 3, 4, 5, 6 and 7-Car Trains

lines of England. There are 15 passenger stations between Liverpool and Southport, and the entire length of electrified line amounts to 4 miles of four tracks and 25 miles of double tracks. The electric rolling stock consists of 38 motor cars and 53 trail cars, with a total of 5814 seats. All cars are approximately 60 ft. over all. The former steam equipment consisted of 30 locomotives and 152 cars, with a total of 5084 seats.

**CONDITIONS FAVORABLE FOR ELECTRIFICATION**

In discussing this subject Mr. Aspinall says that every case has to be considered with the utmost care to determine whether some great commercial advantage will be shown—otherwise electrification is not desirable. He does not believe, for instance, that on a long run, say that between London and Manchester or Liverpool, where the

**ECONOMY IN ELECTRICAL SERVICE**

During the transition stage electrical and steam service were conducted on the same tracks under the same condition. This afforded an opportunity of comparing the coal consumption of the locomotives and of the power house. It was found that the six-wheeled coupled tank engines which did the work in 1904 consumed 80 lb. of coal per train-mile with express trains, and 100 lb. with local trains. This excessive locomotive consumption was due to the high acceleration required. The consumption of coal at the power station in 1908 works out to 49 lb. per train-mile, or 0.412 lb. per ton-mile, for the electrical trains. The consumption of energy at the train is 112 watt-hours per ton-mile for express and local trains, including all switching work.

**THIRD-RAIL**

The center of the third-rail is located 1 ft. 7¼ in. outside the gage line of the nearest track rail, and its top is 3 in. above the top of the track rail. Mr. Aspinall states that it would have been impossible on account of platform clearance conditions to have used the New York Central type of inverted third-rail. The Liverpool & Southport Railway also employs a fourth-rail, or return, but it is not insulated as in the London lines. It is bonded to the track rails and acts simply as an auxiliary return.

**RAIL WEAR**

Considerable wear and corrosion have been experienced on the track rails and third-rail, and corrosion in the fourth-rail. The wear on the track rails is attributed by the author largely to the low center of gravity and rigid support of the electrical equipment. Thus 12 tons of the

TABLE I—PARTICULARS OF ACCELERATIONS FOR 2- TO 7-CAR TRAINS

No. of Cars in Train	COMPOSITION OF TRAIN		Maximum Speed in M.P.H.	TIME IN SECONDS TO ATTAIN M.P.H.					SPEED IN MILES PER HOUR AFTER MINUTES					MEAN ACCELERATION UP TO						
	Motor Cars	Trailer Cars		m.p.h.					m.p.h.					Minutes		Miles per Hour				
				10	20	30	40	50	½	1	1½	2	2½	3	¼	½	1	10	20	30
2	2	..	51.5	5	11.5	25.5	49.5	120	32.5	42.75	47.75	49.8	50.5	51.2	2.3	1.59	1.04	2.92	2.54	1.72
3	2	1	49.625	7	14	27.75	60	..	31.5	40.0	44.2	46.9	48.6	49.4	2.8	1.54	0.97	2.09	2.09	1.59
4	2	2	49.25	7.5	15	29	65	..	30.3	39.0	43.75	46.5	48.2	49.2	1.95	1.472	0.95	1.94	1.94	1.51
2	1	1	46.75	9.5	17.5	28	72	..	31.0	38.5	41.8	44.0	45.3	46.3	1.71	1.52	0.99	1.54	1.67	1.56
5	2	3	44.75	9.5	20.75	40	100	..	25.6	34.65	38.5	41.0	42.7	43.8	1.56	0.92	0.847	1.54	1.4	1.09
6	2	4	43.875	11.5	26	50	116	..	22	32.8	37.6	40.3	42.0	43.1	1.29	1.09	0.803	1.27	1.12	0.88
7	2	5	42.0	13.0	30	64	162	..	20	29.4	34.0	37.0	39.3	40.9	1.14	0.978	0.72	1.12	0.95	0.68

steam trains make a speed of 55 m.p.h., it would be commercially desirable to go to the expense of electrical equipment in order to double the speed.

The great advantage of electricity is to gain an increase in traffic by more frequent service, and also to increase the earning capacity of the rolling stock, track and station platforms.

**INCREASED CAPACITY ON THE LIVERPOOL & SOUTHPORT RAILWAY**

On his own line between Liverpool and Southport there are four tracks for part of the way, but although the fre-

weight of a motor with its four axles, or more than 25 per cent of the total, is not carried on springs. It is probable that with a higher center of gravity and a greater amount of the weight spring supported, the rail wear would be much less. But the advantages of direct drive would be lost, and as Mr. Aspinall says the gears wear extremely well, he concludes that it may be desirable commercially to wear out a cheap rail instead of expensive mechanism. It must also be remembered that it has not been practicable to operate steam trains at the same schedule as that usually adopted for electric service, and consequently there is no



information as to how the tracks would have been affected if they had been so operated.

CARS

The cars used are of the end-door type and the doors are opened and closed by the passengers. The most crowded cars are emptied during the rush hours in about 50 seconds at terminal stations. Intermediate stations only require 15 seconds to pick up and set down passengers. With considerable baggage to handle, local trains can be operated with two guards and a motorman, while express trains need simply one motorman and one guard. An

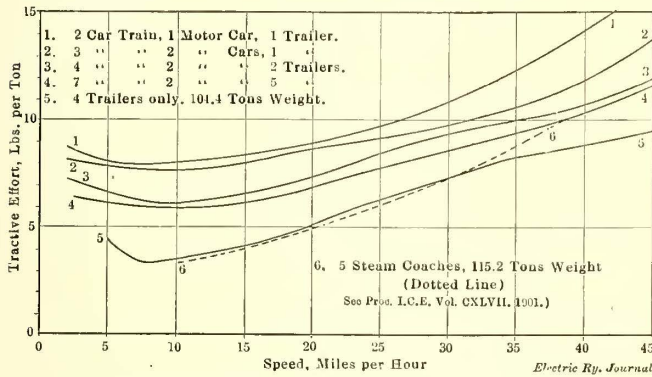


Fig. 2—Tractive Effort for 2, 3, 4 and 7-Car Trains

effort is being made to induce the passengers to enter at the rear door and leave by the front door at intermediate stations. The cars are equipped with automatic vacuum brakes.

STORAGE BATTERIES

An attempt was first made to operate without storage batteries. The railway was originally equipped with a power station containing four 1500-kw generators and one 750-kw generator and four substations, each equipped with four 600-kw rotaries and one with three 600-kw rotaries. There were 12 trains, each taking a maximum power during acceleration of 1000 kw to 1200 kw. The fluctuations of load were great. When the battery substations were installed they were placed between the rotary substations, rather than at them, partly to improve the voltage conditions on the line. The results have amply justified the policy that was adopted. The coal consumption was reduced by 8.5 per cent and the consumption for train service became

the substation output. The total efficiency from alternating-current busbars to circuit-breakers on the trains is then about 81 per cent.

In considering the question of coal consumption per unit, Mr. Aspinall says that the most reliable figure to take for comparison is the coal burned at the power house per unit of direct current delivered to the third-rail—that is, with all losses due to conversion. This, for the 12 months ended Dec. 15, 1908, was 3.28 lb. per kw-hour.

TESTS AND RECORDS

In the appendix the author publishes interesting diagrams and data. Among them is a series of speed-time curves based on different schedules, station stops and lengths of train. With the same rate of acceleration, about

TABLE III—MILEAGE BETWEEN OVERHAUL

Halt Year Ending	Stand-ard Bogies	Wheels between Turning up of Tyres	150 h.p. Armature	All Classes Armature Bearings	Life Brushes	Life Shoes	Life Brake Blocks
	Miles	Miles	Miles	Miles	Miles	Miles	Miles
June, 1906	17,750	.....	.....	.....	11,000	.....	1,683
Dec., 1906	28,800	39,000	124,000	44,000	11,680	112,500	1,784
June, 1907	32,700	38,000	115,000	41,700	12,640	127,300	1,915
Dec., 1907	32,600	49,400	87,300	49,000	15,550	116,000	2,150
June, 1908	32,800	42,300	128,000	63,000	13,300	78,500	2,320
Dec., 1908	28,500	30,300	171,030	87,100	10,900	102,000	2,680

1 m.p.h.p.s., these diagrams indicate the rapid increase in the energy of consumption with an increase in speed.

Figs. 1 and 2 show speed-time and tractive effort-speed curves for trains of different lengths. In each case allowance has been made for the effect of grades, and the tests were made in both directions to eliminate as far as possible the effects of head winds. The author remarks that in Fig. 2, curves 2 and 3 do not follow paths parallel to curves 1 and 4, but they are true representations of the figures obtained. He explains that this is probably due to sudden variations in the wind.

Tables I and II correspond respectively to Figs. 1 and 2. In these tables "tons" are the English tons of 2240 lb. each. Table III gives mileage between overhaul for different parts of the equipment.

The original diameter of commutators was 17½ in., the present average diameter being 16⅝ in., representing a loss in diameter of ⅞ in., or about 0.175 in. per annum, 0.003 in. per 1000 miles; about one-half of this is due

TABLE II—PARTICULARS OF TRAIN RESISTANCE

Curve No.	No. of Cars	COMPOSITION OF TRAINS		Weight of Train	Length of Train		TRAIN RESISTANCE AT VARIOUS MILES PER HOUR IN POUNDS PER TON								
		Motor Cars	Trailer Cars		Tons	Fl.	Inch.	5	10	15	20	25	30	35	40
1	2	1	1	71.537	121	8	8.5	8.0	8.5	9.0	9.5	10.75	12.5	14.0	.....
2	3	2	1	117.175	183	4	7.75	7.75	8.0	8.6	9.0	9.75	10.5	12.0	13.75
3	4	2	2	143.275	248	6	6.5	6.0	6.5	7.25	8.5	9.25	10.0	11.0	12.0
4	7	2	5	221.575	430	0	6.25	5.75	6.25	7.0	7.75	8.5	9.5	10.5	11.5
5	4	Trailers only		104.4	246	8	4.52	3.55	4.18	5.2	6.34	7.09	8.36	8.81	9.45
6	5	Ord. bogie coaches		115.2	285	0	.....	3.3	.....	5.0	.....	7.4	.....	10.5	.....

0.412 lb. per ton-mile. The load factor was increased from 0.68 in 1905 to an average of 0.94 between 1906 and 1908.

EFFICIENCY OF TRANSMISSION

Tests were made to determine the over-all efficiency of transmission. Between the a.c. busbars and the third-rail the percentage of power-house output lost was found to be as follows: Cables, 1.97 per cent; transformers, 2.95 per cent; rotaries, 5.37 per cent. Total, 10.29 per cent. It is exceedingly difficult to ascertain the exact losses in the live rails; calculations made, however, in various ways seem to indicate that these losses amount to about 9 per cent of

to wear, and one-half to turning up. The commutators can be worn down at least to 15½ in. diameter, so that their total life will probably be about 12 years.

It is proposed to build between Milan and Genoa, Italy, an electric railway which will require 19 tunnels through the Apennines and about 372 bridges. The distance is 176 km, or 109 miles, and the estimated cost of the work about \$46,000,000. The line is to be double track and is to run 20 three-car trains a day, each car seating 50 passengers. The line is to be operated by water-power.



## MEETING OF THE COMMITTEE ON POWER DISTRIBUTION, ENGINEERING ASSOCIATION

A meeting of the committee on power distribution of the American Street & Interurban Railway Engineering Association was held at the headquarters of the association, 29 West Thirty-ninth Street, New York, on May 14 and 15. There were present James Heywood, chairman and superintendent of lines and cables, Philadelphia Rapid Transit Company; G. W. Palmer, electrical engineer, Boston & Northern and Old Colony Street Railway; W. J. Harvie, chief engineer, Utica & Mohawk Valley Railway Company, and E. J. Dunne, superintendent of distribution, Public Service Railway Company, Newark, N. J. The other two members of the committee, S. L. Foster, chief electrician, United Railways of San Francisco, and W. G. Matthews, superintendent of overhead lines, Denver City Tramway, were unable to be present, but both sent letters expressing interest in the work and reporting on various subjects which had been assigned to them by the chairman.

Mr. Heywood announced at the opening of the meeting that the executive committee of the association had suggested certain topics for consideration by the committee. These topics had been assigned to different members of the committee, who reported on them. They were considered *seriatim*.

The first was on the disposal of condemned underground cables, that is the question of rehabilitation vs. scrapping, and the methods of separating the lead, insulation and copper. A variety of practice was found to exist in the disposal of underground cables. Some companies in scrapping cables sell the cable in its original condition. Others separate the materials by hand, or in some other way. One of the members of the committee reported that he had been using a special furnace in which the insulation is burned off. In this process the lead falls into trays below the retort and the copper is left as bare rods. It was decided to embody particulars of this and other furnaces in the coming report.

Considerable time was given to discussing the proper design and construction of manholes. The relative merits of brick, concrete and other materials and the proper shape, method of drainage and ventilation of manholes were considered, as were also the methods of supporting the cables in the manhole and the proper design of cover. Mr. Heywood agreed to prepare a drawing showing the ideal design of the manhole as a result of the discussion. Blue prints of this manhole will be sent to the members of the committee for further consideration and criticism before the next meeting of the committee. At that time the final form will be settled, and it is expected that in the report the committee will be able to recommend a type of manhole which, in its opinion, is the most desirable for general conditions.

The next subject discussed was that of bonds and bonding methods. Quite a full account of the methods followed in San Francisco was received from Mr. Foster. In the discussion it developed that while with nearly all rails the space between the angle plate and the rails is very limited for bonds, this condition is especially marked in certain sections of rails and angle plates. The committee decided to call this fact to the attention of the maintenance of way committee and the standardization committee, to learn whether it would not be feasible to design an angle plate which would be amply strong mechanically and yet provide more space for the bonds and bond terminals.

The committee decided to prepare a series of recommendations on the most desirable methods of bonding.

It was found to be the general practice among railway companies to hold the superintendent of lines and cables, or the engineer of the distribution system responsible for the efficient condition of the return system, and it was the opinion of the committee that, under these circumstances, this engineer should have supervision over the installation of the bonds.

Another subject considered by the committee was that of economical maintenance. The first topic taken up under this heading was preservation of wood and iron poles, and it was decided that the report should give the latest data on this subject. The question of the requirements of overhead appliances was then considered, and it was suggested that a series of tests of the different overload appliances to determine their mechanical and electrical strength, absorption qualities and aging qualities be conducted by the committee. Such a test would include all the standard straight line hangers, such as the round top, cap and cone and West End; pull-offs of the West End and cap and cone types and all the different forms of strain insulators. The chairman agreed to take up the question of these tests with the president of the association.

The committee also gave considerable time to a discussion of the subject of specifications for overhead appliances, trolley wire and cables. If practicable, the committee will recommend for adoption to the association this year a series of specifications covering these materials.

The subject of lightning arresters was also considered. This will probably be made the topic of a special report at the next meeting.

Catenary construction also received attention. The principal topics considered were the relative merits of single and double catenary, the proper distribution of steady strains, the character of the working conductor, the spacing and character of the suspenders, the most desirable form and material for the insulators, and the design of the supports. Valuable information on the subject of catenary design appeared in the last report of the committee, and it is planned to bring this up to date this year by embodying the record of the improvements made during the past 12 months. The committee also considered the conditions under which poles of telephone, electric light or other companies should be used by railway companies and the conditions under which the wires of such companies should be put on railway poles, as well as the charges to be made under conditions of this kind. In some parts of the country local regulations require the use of the same set of poles by two companies, and several member companies of the association have reported that telephone and other companies are demanding compliance with stringent rules where these conditions prevail.

The committee will issue no data sheet this year. Another meeting of the committee will be held during the first part of July.

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The National Board of Fire Underwriters has recently issued the 1908 edition of the rules and requirements for the construction and installation of fire doors and shutters as recommended by the National Fire Protection Association. Work carried out in accordance with these rules has a favorable bearing on the reduction of rates. The booklet is issued by the National Board of Fire Underwriters, 382 Ohio Street, Chicago, Ill.



**PROGRESS IN DETROIT INVESTIGATION**

The fourth meeting of the Committee of Fifty, which is investigating the street railway situation in Detroit, was held in the Common Council chamber, Detroit, on May 3. Reports of progress and of results accomplished were received from the various committees to which the consideration of special subjects had been allotted.

**COMMITTEE ON STATISTICS AND REGULATION**

This committee reported that it had requested traction companies in 12 cities to give answers to certain questions. Replies had been received from all but two of the companies.

**COMMITTEE ON TAXATION AND PAVING**

Statements of taxes paid by the Detroit United Railway and the lines which now form part of the Detroit United Railway system within the present corporate limits of the city of Detroit, from Jan. 1, 1900, to Dec. 31, 1908, were presented by the committee. The figures were taken from the books of the company by the company's accountant and verified by the accountant for the committee, W. D. Gridley. The committee stated:

These exhibits cover all taxes paid upon the company's property within the city limits or the one-fare-zone, that is, all of the company's lines over which city passengers are carried without extra charge, whether levied for city, State, county or township purposes or in the form of a special tax upon the gross earnings.

In the tabulation of these expenditures, the accountants have, pursuant to the request of your committee, charged to each calendar year the taxes paid for that year, irrespective of whether the same were paid in advance or otherwise, that is to say, the city taxes being paid in July or August for the city's fiscal year ending the June 30 following, one-half of these taxes are charged in one calendar year and the other half in the following year.

Included in this exhibit will also be found the cost of sprinkling car tracks for 1904 to 1908, inclusive; removing snow and ice from 1903 to 1908, inclusive, and the taxes on express cars from 1903 to 1908, inclusive.

The memorandum of F. H. MacPherson & Company, accountants, relative to the segregation of taxes for the years 1901 to 1908, inclusive, states in part:

The general taxes are shown in the aggregate, as it is impossible, or at least impracticable, to separate them as between lines or routes. In consultation with the officer in charge of the tax department, he states that, familiar as

he is with the subject, he would not undertake to separate them and do so with any degree of accuracy.

In arriving at the specific tax, the gross passenger earnings are divided by the total mileage in operation. Having arrived at the earnings per mile this is multiplied by a fixed figure, representing the number of miles in operation at the time the tax went into effect. This figure was arrived at in a conference between Messrs. Hutchins, Brooks, William B. Thompson (then city treasurer), and P. J. M. Halley, about 10 or 11 years ago, as we are informed.

With the exception of the special taxes, all other taxes are included within the year in which imposed, regardless of the date of payment, and where the tax year does not coincide with the fiscal year of the Detroit United Railway the taxes have been apportioned.

The cars on all suburban lines are assessed in the city, both for city and State and county purposes, and are not assessed in any of the outlying towns or villages.

**DETROIT UNITED RAILWAY RECAPITULATION OF TAXES PAID IN ONE-FARE ZONE, 1901 TO 1908, INCLUSIVE**

Year.	Inside City.	Outside City.	Total.
1901.....	\$103,191.61	\$2,325.88	\$105,517.49
1902.....	114,520.44	2,928.90	117,449.34
1903.....	130,516.44	3,086.41	133,602.85
1904.....	135,644.42	2,891.07	138,535.49
1905.....	119,162.30	3,605.09	122,767.39
1906.....	123,746.51	4,366.46	128,112.97
1907.....	130,008.26	1,613.22	131,621.48
1908.....	134,842.63	2,279.90	137,122.53

**EXTENSIONS AND REARRANGEMENT**

This committee kept the following objects in view:

1. To have as many double tracks and as few loop lines as possible.
2. To secure an even and fair distribution of service.
3. To render all educational institutions and manufacturing centers easy of access.
4. To so arrange that a person boarding a car in any part of the city may reach any other part by the most direct route and in the shortest time possible.
5. To relieve the congestion of traffic in the center of the city by diverting it in other directions.

The committee stated that very little extension of tracks had been made for 15 years, and that the growth of the city and the establishment of many new manufacturing industries made the extension of the street railway service imperative. A list of lines that, in the opinion of the committee, are needed, was given. The report continued:

The present main track mileage for "city service" is

**DETROIT UNITED RAILWAY**

REMOVAL OF SNOW AND ICE—SPECIFIC CHARGES AND PAYROLL DISTRIBUTION

	1903	1904	1905	1906	1907	1908
Jan....	\$2,026.13	\$15,788.63*	\$3,817.19	\$1,055.08	\$1,839.64	\$1,560.94
Feb....	2,162.55	7,465.30	6,226.93	558.68	1,470.99	5,340.23
Mar....	79.90	3,850.18	1,211.37	1,069.28	650.23	1,355.72
Apr....	79.95	318.65	106.77	122.17	149.84	.....
Nov....	549.60	83.64	250.58	153.60	83.50	44.35
Dec....	4,031.49	1,238.72	450.37	1,077.10	1,587.60	1,528.41
	\$8,929.62	\$28,745.12	\$12,063.21	\$4,035.91	\$5,781.80	\$9,829.65

\*The winter of 1903-4 was the worst in the history of the railway in the particular of many and heavy storms, making the cost of repairs to the electrical equipment of cars so excessive that it was decided to charge a portion of the expense to removal of snow and ice, and in January, 1904, an arbitrary charge of \$9,000 was made accordingly.

**DETROIT UNITED RAILWAY**

**EXPRESS TAXES PAID TO CITY OF DETROIT, 1903 TO 1908, INCLUSIVE**

Year	D.U.R. Total		Flint & Pontiac		Orchard Lake		Wyandotte	
	Trips	Amount	Trips	Amount	Trips	Amount	Trips	Amount
1903....	6,984	\$3,492	4,398	\$2,199	1,346	\$673	1,240	\$620
1904....	7,004	3,502	4,444	2,222	1,344	672	1,216	608
1905....	7,020	3,510	4,392	2,196	1,400	700	1,228	614
1906....	7,340	3,670	4,692	2,346	1,414	707	1,234	617
1907....	7,544	3,772	4,942	2,471	1,360	680	1,242	621
1908....	7,674	3,837	5,048	2,524	1,394	697	1,232	616
	43,566	\$21,783	27,916	\$13,958	8,258	\$4,129	7,392	\$3,696

**DETROIT UNITED RAILWAY**

**SPRINKLING TRACKS—SHOWING NUMBER OF TANKS OF WATER USED, MILEAGE AND COST, 1904 TO 1908, INCLUSIVE**

	1904			1905			1906			1907			1908		
	Tanks	Mileage	Cost	Tanks	Mileage	Cost	Tanks	Mileage	Cost	Tanks	Mileage	Cost	Tanks	Mileage	Cost
January .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
February .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
March .....	.....	.....	.....	.....	163	739	.....	.....	.....	.....	.....	.....	.....	.....	.....
April .....	90	394	\$34.30	918	3,801	274.20	826	3,108	\$255.62	909	3,419	305.85	413	1,697	\$150.35
May .....	958	5,806	335.00	975	3,861	279.70	1,759	6,878	574.55	2,350	8,709	718.45	913	3,651	274.80
June .....	1,547	8,250	523.50	1,393	5,538	391.80	1,847	7,752	623.80	2,647	9,331	789.45	2,242	7,894	586.40
July .....	1,216	6,016	391.25	1,340	5,650	382.53	2,195	9,334	722.55	3,240	10,448	988.55	2,691	8,855	700.40
August .....	1,599	7,923	503.60	1,458	5,906	429.40	2,880	11,652	853.70	3,272	11,690	975.00	2,257	9,249	622.70
September .....	834	3,969	249.15	1,117	4,601	333.50	2,316	10,049	706.85	2,467	8,722	787.65	2,439	10,176	698.75
October .....	833	3,854	269.00	768	3,690	243.40	870	4,122	288.05	2,492	9,397	857.40	1,910	7,632	580.85
November .....	645	2,880	211.80	64	363	28.35	292	1,756	91.55	156	652	70.00	205	926	85.65
December .....	.....	.....	1.40	.....	.....	.....	23	188	5.25	.....	.....	.....	10	80	12.29
	7,722	39,092	\$2,519.00	8,196	34,149	\$2,417.03	13,908	54,839	\$4,121.92	17,563	62,468	\$5,504.30	13,080	50,160	\$3,712.19

NOTE.—In preparing this statement it was necessary to refer to the daily reports of the track department. The figures arrived at are substantially correct, but owing to the depending on the judgment of compiler, might vary slightly on rechecking. The reason is this: When not in use for sprinkling, the tank cars are used for hauling purposes, and some days are used partly for each purpose. If the regular run of a car is, say, 73 miles for a day and it uses 12 tanks of water, a trip was figured at approximately 6 miles, and if a day was found where the car ran 60 miles, yet only used, say, 5 tanks, it was figured that 3 miles was sprinkling and 30 miles hauling.



195,746 miles, of which 167,206 miles is within city limits. Of the above there is to be removed 9,364 miles, leaving a balance of present "city service" main track of 186,382 miles. New double main track to be built, 57,633 miles. New main track to be built to change single into double track, 26,164 miles. Total "city service" main track under proposed plan, 270,179 miles.

Any treatment of the traction problem in Detroit purporting to be exhaustive would be incomplete, in view of our rapidly growing population, which may be estimated at 1,000,000 10 years hence, without anticipating the demands of a future subway system.

Chicago and Boston began their subway construction by building a short, central subway with outlets in various directions. This seems the logical process of construction, as subways can be readily extended in such directions and at such future time as the needs of the city demand.

This method of construction renders possible the undertaking of producing a subway system in a gradual manner, one commensurate with the city's requirements and the state of the public treasury.

It is imperative to form now the nucleus of a subway, for in no other way can we contribute so much to the rapid growth and development of the city.

The subway system should be constructed and owned by the city and leased, at a fair rental, to whatever company is, for the time being, operating the street car lines; or until such time as our city is ready to take over the entire street car system.

The city should not seek to indemnify itself for the cost of the subway by making the rent rates oppressively high. Increase in taxable values will take care of the cost of the subway before the bonds mature.

Absence of heavy grades in Detroit will materially reduce the cost of subway construction here, as compared with the cost in other cities.

#### REPORT ON CLEVELAND TRACTION SITUATION

A special committee made a report, of which the following is an abstract:

We recently, at our own expense, made a brief visit to Cleveland, to secure at first hand, such information as might be available regarding the history and future possibilities of street railway transportation in that city.

The street railway question is in Cleveland, as in Detroit, the problem of the hour.

Your committee visited Mayor Johnson and his advisers, City Solicitor Newton D. Baker and City Clerk Peter Witt; United States Judge Tayler, under whose jurisdiction the receivership exists; the present receivers, Warren Bicknell and F. A. Scott, officials of the Cleveland Railway, and many men prominent in both professional and private life, among these President Andrews, of the Cleveland Railway; Frederick L. Taft, the attorney who, on behalf of certain creditors of the Municipal Traction Company, started the first suit that threw the properties into the present receivership; Fred H. Goff, president of the Cleveland Trust Company; A. B. duPont, former president of the Municipal Traction Company; John J. Stanley, one of the vice-presidents of the Cleveland Railway; Henry J. Davies, secretary and treasurer of the Cleveland Railway, and Prof. E. W. Bemis.

Four months were required to complete the appraisal of the Cleveland properties, the railway companies employing, at their own expense, 15 or 16 men to look after their interests. The city utilized the force of the city engineer to a large extent, but expended during this time between \$8,000 and \$9,000 for stenographic work alone.

This company, under Mayor Johnson's direction, operated for six months, between May and November, 1908, on a 3-cent basis, with 1 cent for transfers. During these six months a deficit accrued, the sum of which is variously estimated, Mayor Johnson claiming the deficit to be only \$100,000, while the receivers state it will amount to \$800,000. The reason for the discrepancy between the statements of Mayor Johnson and the receivers of the Cleveland Railway as to the actual amount of the deficit at the time the receivership was instituted can only be arrived at after a careful and exhaustive analysis of the various items in the accounting.

Mayor Johnson claims that assets are omitted which

should be included, thus reducing the deficit. The receivers' statement to the court omits many possible assets on the ground that they are "ear-marked" assets and of such character as to render them not immediately available for the payment of preferred claims.

The actual deficit will become definitely known only after final revision of the accounts by the court.

During this period, when every effort was being made to demonstrate the possibility of a 3-cent fare, transfers were cut off, wages lowered and the service reduced approximately 25 per cent. This radical curtailment in service was followed by a spontaneous resentment by the people against such inadequate service.

In connection with this period of operation by the holding company, the statement is made by F. L. Taft, that while practical municipal ownership was in operation, "there was a strong tendency to let out the old, experienced employees and give the places to others for political interests."

From various sources the committee gathered that the people of Cleveland are changing in their demand for cheap rides, and coming to the viewpoint that good service and necessary extensions are the most important matters.

From Nov. 13 last to Feb. 1, the receivers operated on the Johnson 3-cent basis. Mr. Bicknell stated that while expenses were cut by dropping superfluous employees, etc., still the deficit for the last half of November was over \$19,000; for December, over \$53,000, and for January, nearly \$66,000, a total of more than \$138,000. Meanwhile great dissatisfaction continued to prevail as to the quality of service.

On Feb. 1 the receivers raised the rate to a 5-cent fare on about 65 per cent of the lines, leaving the remainder of the lines operating under a 3-cent fare, and during February the roads earned a profit of \$28,978.71. The present average profit under existing rates of fare is \$45,000 a month, and the average rate of fare on all lines is 4.34 cents.

The committee found the interview with United States Judge Tayler, in whose jurisdiction the present receivership is being operated, of much interest. Judge Tayler stated that "the traction interests have agreed to accept the plan that is now pending in the Common Council, and I believe that in a very short time it will be adopted and put into effect. The entire philosophy of that plan is that the people shall have just as good service as the rate of fare will pay for, and no more, and if at any time better service is wanted the machinery is provided to give the service by simply increasing the rate of fare whatever may be necessary within the limit fixed.

"I think," said Judge Tayler, "it will be the first and only case in the United States where an important service corporation has been limited to 6 per cent net earnings on its appraised value, and I thoroughly believe myself that the experiment here will be a success, and point the way to a solution of the traction problem for all cities. There may be friction at the start between the city's commissioner and the company's officials, but that will be self-adjusting when the plan is once in full operation."

It is a question with some parties to the controversy whether this provision of a set rate of interest with no profit beyond is not destructive to the best ends, the theory being that such a limitation in returns removes all incentive, with a stagnatory tendency to reduce the efficiency of service.

The consensus of opinion among men who have their money invested in the Cleveland Railway Company seems to be that, while not believing that the ordinance as it is now being framed up will be a success as far as its practical workings are concerned, they are still willing to give it an honest trial.

While Mayor Johnson assured the committee that he still believes in 3-cent fares, he also tacitly admitted that he has abandoned hope of getting anything better now than a maximum rate of seven for a quarter. A. B. DuPont acknowledges the necessity for an increased rate of fare.

The question of a reasonable speed within the city limits is receiving considerable attention. The present rate in Cleveland is 9 m.p.h. as compared with 10 m.p.h. in Detroit. The tendency seems to be toward an 8-mile rate.



## PROMOTING PROFITABLE TRAFFIC

BY ERNEST GONZENBACH, GENERAL MANAGER, SHEBOYGAN LIGHT, POWER & RAILWAY COMPANY

At the last convention, held at Atlantic City, a great deal of rhetoric was used up in discussing ways and means of promoting traffic on electric lines. Judging from the broadsides of ideas with which the subject was peppered and the heavy caliber of the artillery and artillerists who participated in the melee, the issue seems to be important. At that time I took a position ridiculing the ordinary summer park as a profitable traffic producer for electric railways, a position which I have maintained for a good many years. The craze for summer parks broke out about 15 years ago, and it ran through this country from Maine to California like the San Jose scale through a Jersey apple orchard. There have been a few electric railway executives who have been immune from this disease, and at the present time there are a good many more, who hastily invested thousands in air castles and midsummer nights' dreams, who are just beginning to realize that all is not gold that glitters. But the summer park is by no means a total failure. There are many roads where such a park has stood between the owners and a receivership; but even in these cases the enormous expenses of a park are a staggering percentage of the net revenue produced for the railway.

There is just one redeeming feature of this means of traffic promotion, and it is this: Whatever results are to be had will come in a hurry, and this effect, presumably, has been the motif underlying the excuse for continuing the summer park. It is a traffic cocktail which acts immediately. The answer to the argument against summer parks has always been, "What can you give us that is better?" This Yankee answer has been a poser, because, frankly, no one has ever suggested anything much better in the way of a traffic promotion scheme. In the case of the company I represent we have been looking for a long time for some means of increasing earnings without going to the extreme cost and doubtful success of a young Coney Island.

We look at it in this way: Our company operates an electric lighting department, and we are keeping one or two solicitors busy wearing out shoe leather and button-holing the prospective electric light consumer. It does not make very much difference whether the prospect intends to use two or three lights in his house or a 100-hp motor. We get after him, hammer and tongs, and usually we land him. Now, the average new consumer added to our services during the year produces a revenue considerably less than \$30 per year. If we get this consumer at a soliciting expense of about 40 per cent of his first year's business, we consider ourselves lucky, and we know of a great many companies who are willing to spend 70 per cent of the first year's revenue to get a consumer. It took a good many years before electric lighting companies woke up to the necessity of getting after business with a fine-tooth comb and with well-trained, straight-shooting solicitors. Henry L. Doherty seems to have been the first one to do it, and the general impression is that he made a fortune out of it. Since that time most of us have meekly followed in his footsteps.

The electric railway business now is in exactly the same condition the electric lighting business was in before we had our well-organized soliciting department. To be sure, we are spending money liberally in all sorts of advertising schemes. We get up beautifully lithographed pamphlets

and blare forth our wares with brass bands and bill-posters, like a circus parade. It reminds one of days of old, when the only campaigns known were the ones in which gunpowder and swords were used. When the invention of powder was as young as the electric railway business is to-day, guns of all sizes were loaded with heavy charges of fine shot, which were discharged into the blue atmosphere, which they punctured full of beautiful round holes, all with the hope of hitting *something*. Napoleon had notions of his own, and he encouraged the use of condensed solid arguments fired directly into the face of the party he wanted to convince. And usually he landed him. Arguments have been growing more condensed and direct in war and peace since then, and sooner or later we of the electric railway field will have to adopt the tactics of all the great war lords and our brothers in the lighting business, who load their guns with solid shot of heavy caliber, use expert gunners, aim at a definite mark, and usually *hit it*.

This is the way I looked at the situation when I undertook on behalf of my company to cultivate the elusive commuter. The first thing to do is to catch the commuter.

A passenger riding regularly every day on a 5-cent fare will produce a gross revenue of about \$30 per year; adding to this the expenditure of his family and those of his friends who go out to see him, each commuter's family living within the 5-cent fare limit is worth at least \$50 per annum. If we can get him to move out somewhere near the 10-cent fare limit, each family is worth from \$90 upward per year, and that revenue comes without one cent of additional investment and without a cent of additional operating cost. In the lighting business we would break our necks getting a \$70 a year consumer who will cost us no additional investment or operating cost. In the railway business we are apparently so rich and well satisfied with ourselves that we consider it beneath our dignity to go after this business. But the means of catching him has been the cause of much concern to us. General literature describing the beauties and advantages of a railway line would not make any particular hit with him. We tried the real estate men. They were enthusiastic, and each one knew two or three prospects, and for a while we were tempted to leave the whole matter in their hands. Then we happened to remember that some years ago, and even to-day, some electric lighting companies still insist that they do not need any solicitors, because the electric wiremen, being naturally anxious to get wiring jobs, were in themselves pretty good solicitors; however, we notice that the electric wireman is not depended upon these days for new business, and we decided that the wiremen and real estate men were in the same class.

We then thought that a good plan would be to get up a list of prospects and send them copies of some recognized monthly magazine devoted especially to suburban living. It did not work particularly well, because these magazines are expensive and are written for the well-to-do man who can afford to live in the country and who already lives there. When it came to finding suitable literature to present to the man who is going to be induced to live in the country because it is going to benefit his pocketbook there was nothing to be had. We approached two or three publishing houses with a proposition to get out something suitable for our purpose, and they were all willing, even anxious—but we were not after we learned the price. The proposition finally boiled down to our getting up something which was written directly *at* the man, which would hit the nail on the head, and which could be distributed at



a low cost. Such a publication we compiled partly from original writings and partly from copy prepared by competent horticultural writers. We made it up in the form of a magazine after we decided that the plan was right and that we would stick to it. But the proposition looked too costly for a small road, even when produced under the most favorable conditions as to cost, and we therefore decided to invite other electric railways to participate, and sent out the invitations. We have had enough satisfactory responses to warrant our going ahead, but many of them were highly amusing and shed an interesting sidelight on the business. We are satisfied, however, that we are on the right track, and that we shall develop a line of traffic which is profitable, but will take somewhat longer to bring results than the well-recognized present methods. In other words, we are going to feed our revenue on solid, life-sustaining food instead of stimulating it with traffic cocktails.

We propose going even further than that, and shall put on one or more hustling solicitors to work in co-operation with real estate men, and they will go right after the individual man. We are going to train these men to talk persuasively on the subject of suburban living. We shall exploit some individual instances of successful and economical methods of living along our railway lines. We are seriously considering the construction of a model suburban home of about an acre and arrange with a competent occupant to give us figures on how much of his living expenses he can produce on the place, and such a model suburban place will be designed for occupation by some one above the laboring class. All this may seem far-fetched, visionary and impractical to some people steeped in tradition, and we expect to be laughed at in the same way Mr. Doherty was laughed at, and the same way in which dozens of others have been laughed at, but we cannot get it out of our minds that we are on anything but the right track in the way of traffic promotion. If our company were large enough to carry on a campaign of this sort alone, without any co-operation from other companies, we would not say a word about it, but inasmuch as we are a small road and the undertaking of supplying traffic-promoting literature is one which can only be handled by a combination of several companies, we have been obliged to seek co-operation. Of this we now have enough to warrant something like a well-organized campaign. Spring and summer are the seasons in which to present arguments in favor of suburban living, and the only inducement which prompts a somewhat early discussion of this subject has been the fact that numbers add strength to any campaign, and the more interest there is the earlier success will come.

#### ADVERTISING OWL-CAR SERVICE IN DETROIT

The Detroit United Railway distributes posters advertising the time at which the owl cars on all the city lines



### Detroit United Lines OWL CARS



leave the city hall or other terminal points. The poster also calls attention to the fact that "all interurban cars await the closing of theaters." A reproduction of the headlines is given herewith.

A bulletin issued by the Interstate Commerce Commission shows that the total length of road in the United States operated under the block signal system on Jan. 1, 1909, was 59,548.7 miles.

#### FOLDER DESIGN CONTEST ON BOSTON AND NORTHERN AND OLD COLONY LINES

The passenger department of the Boston & Northern and Old Colony Street Railway companies has recently concluded a prize contest for designs for the cover of its forthcoming summer timetable folder, the contestants being pupils of high schools located in the districts of the two companies or contiguous thereto. About a month ago H. A. Faulkner, passenger agent, wrote a letter to each high-school principal and supervisor of drawing on the lines of the system, stating that the companies offered a prize of \$25 for an advertising folder design suitable to the department's uses and also offered to pay \$5 each for any other designs of which use is made later, either in regard to the design as a whole or the idea contained. The designs were required to be submitted in two colors. The originality or adaptability of the idea for the purposes of advertising trolley trips counted largely in the decision as to the best design and a board of judges was secured by the company consisting of Henry T. Bailey, former State supervisor of art in the public schools, and at present editor of the *Art School Magazine*; George French, editor of *Profitable Advertising*, Boston, and G. Fred Crosby, illustrator, Boston. An abstract of Mr. Faulkner's letter follows:

Dear Sir—From time to time the passenger department of the Boston & Northern and Old Colony Street Railway companies is continually issuing advertising folders descriptive of the trips upon these lines. These require special designs upon the covers. It is always possible to secure plenty of these from professional artists, but it occurred to me that several good purposes could be served if we could interest in this matter the pupils in the drawing classes or others having artistic talent in the high schools.

To this end we are willing to offer a prize for the best design furnished by a pupil of the high schools of our districts and contiguous territory. For what we consider the most adapted for our uses we will pay \$25. For any other designs submitted of which we make use at any time later either as a whole as submitted or for the idea contained, we will pay \$5.

Designs should be drawn for use on a folder, the up and down dimensions of which are  $7\frac{3}{4}$  in. with a width of  $4\frac{1}{4}$  in. and should be drawn either this size or larger in the same proportion so that they could be reduced to this size, preferably larger. The designs should be in two colors, any two colors.

The originality and adaptability of the idea or suggestion in the sketch for our purposes of advertising trolley trips will count largely in the judgment, although these points being equal, of course, preference would be given the most artistically executed work. One pupil might have a very bright and original idea and not be able to execute it quite as effectively as another who could make a very artistic finished sketch of an idea that was much less new and adaptable. What I wish to impress is that all points will be considered and no pupil need hesitate to submit a sketch merely because of not being quite so far advanced in technique as another.

It seems to me that this should serve to put to practical use the instruction being received by your pupils and tend to stimulate strongly the interest felt by them in this branch of study. Therefore I ask for your co-operation and trust that you will present this offer to your pupils.

The board of judges passed upon upward of 200 different designs and awarded the first prize to George Haumann, of the Revere High School. So much interest was aroused by the contest that the company decided to give a second prize of \$15 and a third prize of \$10. Letters of thanks were received from many teachers for the companies' stimulation of interest in drawing, and the advertising secured has been most gratifying. A large demand for folders and resulting created traffic is anticipated.



## PRIZE ESSAYS ON HOW TO AVOID ACCIDENTS

Early in February of this year the Nashville Railway & Light Company posted a notice on the trainmen's bulletin board, offering prizes of \$10, \$5 and \$2.50, respectively, for the three best papers written by trainmen on the subject, "How to Avoid Accidents." Only motormen and conductors then in the employ of the company were eligible to enter the contest. The papers submitted were sent to the office in the author's own handwriting, and were then typewritten and given an identification number before being submitted to the judges. Five employees of the company's claim department were selected as judges, and all papers were passed on by them without knowing the author's name. No attention was paid to any deficiencies in grammar, spelling or punctuation, but the awards were made strictly on the merits of the suggestions contained in the papers.

Through the courtesy of H. A. Davis, superintendent, railway department, the three prize essays are reprinted here exactly as they were submitted to the judges:

### FIRST-PRIZE ESSAY, BY B. D. HARGIS

The management of street railways should employ the most reliable men for motormen and conductors that they can procure, and should avoid overworking them if possible to do so, as they are liable to become negligent through fatigue. All cars should be equipped and kept in proper condition for signalling and running. No person should be permitted to ride on front vestibule except it be an official of the company who is interested in the transportation of the public. Unless it becomes necessary to do so in case of overcrowded cars, and in such cases the motorman should be allowed sufficient room to handle his car easily.

Motormen, as well as conductors, should endeavor at all times to carry out all rules and regulations of the company pertaining to running cars and handling the public. Motormen should be cool-headed, energetic and submissive, and always on the alert, and be persuaded that drivers, pedestrians, etc., do not understand manning a car as you do, and possibly do not realize the danger that there is in crossing the track in front of a moving car. You readily see the danger and should protect against it and not take any chances for an accident, even though you are entitled to the right of way. Motorman should see that his headlight is burning by night or whenever occasion demands it. Avoid running at dusk with the headlights switched to rear of car, as some one is liable to mistake the direction of the car and carelessly drive in front of another car, displaying no headlights. Always be in a position to see any object that chances to come into the car's way, and be ready to stop the car at once if necessary. Be very cautious when running upon a slick track, and do not excuse yourself by exclaiming "slick track." Acquire the habit of knowing the condition of your track, and when slick reduce speed until you can properly control your car and begin in time to stop. Great care should be exercised in running through fog or upon dimly lighted streets. Under the conditions never run your car at a speed that would require a greater distance to stop than you can see clearly ahead of your car. Avoid conversing with any one while you are running your car, as this invariably distracts your attention to some extent and gives a chance for an accident. Approach all curves and switches in a manner to insure safety to the car and passengers and observe all slow or stop signals. Notice very carefully at all street crossings, alleys, etc., for carriages, loose stock, etc., and remember to ring your bell. Approach a meeting car slowly and be prepared to stop instantly if necessary, especially if the car you are meeting is standing, as you might strike some one who passes from behind the standing car. Learn to make graduating stops at stations and avoid jerking the car when you leave the station, for you are liable to throw some infirm persons, or even others who are not expecting it. Don't get the habit of passing the station a few feet before you stop,

for the majority of people will think that the car is going to pass, and they will catch it while in motion and are liable to receive injuries from the jerk. Never start your car until you get the proper signal, and then not be too quick to start where there are several to get on.

Conductors should devote their attention to their duties at all times, and should give all signals to motormen clear and distinct.

He should see that there isn't anything left along the passways for people to stumble over. And he should not permit any intoxicated or infirm person to stand near the edge of the platform, or even approach the edge of platform while the car is running. Do not permit a lady under any circumstances to pass to the outer edge of platform in order to be ready to get off as soon as the car stops, as she is apt to misjudge the speed of the car or her ability to leave a car in motion, and sustain injuries which you could have prevented. This also applies to infirm persons. Don't allow any one to ride upon the car bumper, as they are liable to get knocked or thrown off, or might be struck by a trolley wire in case of a broken wire. Remain on the rear end of the car as much as possible and train yourself to observe any one trying to catch the car at any time, and if they catch the car assist them in getting on. Never try to get them to let go after they once catch the car, for if they do they are most sure to fall. While collecting, be most careful about signalling ahead, and if you have the least doubt about all being safely aboard, you go to the rear and see that they are aboard before you signal car ahead. Never depend upon any passenger for information regarding this point unless you know they are absolutely reliable and understand the work, and then you rely upon your own judgment.

Do not allow any one to signal car ahead for you while you are collecting except it be a conductor or division superintendent in the present employ of the company. When passengers are leaving your car, allow them sufficient time to get clear of everything that might catch their clothing and damage them and possibly throw the person. Don't ever signal car ahead while ladies are leaving it until you are absolutely certain that they are clear of the car. Notice that no passenger leaves your car and passes around in front of a car on the opposite track. Always get your passengers on safely and give old and disabled persons a chance to get seated before starting car.

### SECOND-PRIZE ESSAY, BY W. T. CLARK

1. Cars cannot be operated without a track to operate them on. Consequently, the track should be as near perfect as possible, especially where there are curves and switches, as the car is more apt to jump the track there than on straight tracks, and might cause a serious accident. For this reason there should be a track inspector to go over the different lines from time to time and report any deficiency in the track whatever, and probably avoid many accidents.

2. The trolley wire should be kept in as perfect position as possible, as the trolley pole is more apt to jump on imperfect trolley wire than one in its proper place, and break some connecting wire, and it strike some one or something living and cause a serious accident.

3. No car should be operated on the road unless it is in as perfect running order as it can be. For this reason the shed foreman should never allow a car to leave the shed to be operated on the road without everything being in good order. First, the brakes should be equalized and in perfect condition. The sanding device should be in perfect order. The sand in the sand boxes should always be dry, and never wet or clogged. The gong bell should always be easily rung, and the bell punch should always be in such condition as not to hang and thereby prevent the motorman from ringing the bell at the proper time. In fact, everything should be in perfect order. By having the car in good running order when they leave the sheds many accidents may be avoided.

4. As the motorman has to operate the cars, the greatest responsibility rests on him in regard to accidents, consequently, he should be a man of good judgment, perfectly sober, not easily excited, not quick to become angry. A man that is a perfect judge of distance, he should have perfect hearing and good eyesight in order that he may



hear and see any object that may be approaching near his car. He should never enter a curve or switch with his car running fast or out of switch on full current, as his car is liable to jump the track and cause an accident. He should never run down steep grades on full current. In passing other cars and objects that may obstruct his view from anything that may come from behind the car or object, he should have his car running slow in order that he could stop his car at once in case any one or any thing should come out in front of his car. He should always observe the bell signals and act accordingly. He should observe all stop signs and never allow himself to operate a car on the road when not in good running order. If he will observe these rules many accidents will be avoided. A car never should be run fast in dark places at night. I believe that the streets should be lit up better along the car lines in many places at night. If so, I believe accidents would be avoided.

5. Conductors should always be on the watch and be very careful and not too hasty in ringing the motorman ahead while passengers are getting on and off of cars, especially old and crippled people. He should never be too hasty in ringing the motorman ahead while feeble and delicate people are getting their seats. He should never be so negligent that he should not watch after such people. Conductors should always try to give the motorman the proper signal bells. He should try to stay on the rear platform as much as possible and stay near the right-hand side in order to catch any one that should lose his balance in boarding the car and start to fall. In coming in contact with boisterous characters he should be very careful how he approaches them in order to save trouble for himself and the company. By observing these rules, and many others of the company, he will avoid trouble and accidents.

6. Track greasers should never grease the top of the rails in the curve, as the wheel may get grease on it, and in bad curves some one might be in the way, and as it is impossible for the motorman to use sand in the curves it would be hard for him to stop the car, and he might have a bad accident. Also, I believe accidents may be avoided if so many passengers should be stopped from standing on the rear platform while the cars are crowded. The conductor has to be in the car collecting fares, and cannot always be where he can see passengers that may run around the car just as he may ring the motorman ahead; many accidents may be avoided by making some provision in regard to passengers crowding the rear platform and try to stop it.

#### THIRD-PRIZE ESSAY, BY A. J. ALLEN

The street car accident is a disease. Like a doctor in treating a disease in man, we must first get at the cause of the accident, then we can treat the same. The whole of the people in the city and country around are at times at the mercy of the men running street cars. Hence, to serve all these people to the best advantage with fewest accidents that injure health and take lives by reckless running, I would employ the best men, mentally, morally and physically, obtainable for foremen, to keep the whole chain of business in as near the right way as possible. Men of sober, sound business judgment, to know the kind of men to employ, to let go and to retain. As father used to say, if the land is well prepared for the seed, the crop is half made. So with this great business well organized and running under the best management, the accidents will be 50 per cent less. One great mistake some foremen make is speaking harsh and mad-like to some employees. Men are all more or less revengeful; it makes men worse to abuse them. While, if every man liked his foreman, he would have a better feeling for the company's interests, would strive hard to take the best care of the cars and keep down any kind of trouble connected with the business of which they are in charge. One of the worst things to cause bad accidents is the possibility of time being too little that is allotted to a given road for a trip. I would consider all switches to wait on, the length of the road, passengers to stop for, etc., and allow time enough that men will not have to run recklessly and cause smashups. Another very bad discord is cars coming from the barn on the road with the brakes so defective that a motorman

cannot stop his car at all without great effort. Bad brakes cause many accidents. I would have a brake expert for keeping all brakes in repair, and have the master mechanic to vigilantly look after that particular, and accidents would be much less. Cars should be repaired at once when sent in for repairs, so that motormen can have less cause for accidents.

Now, a man, according to Page on "Practice and Theory," is best when he has a sound mind in a sound body. If you can have that kind of a man always for motormen and conductors, accidents will be less. To have these I would have monthly hygienic lectures for the men by the company's doctor. Men should have regular hours to work, to sleep, to eat, etc., to be healthy and run cars well. Men working too long hours may get sleepy, tired, worn out, have a don't care feeling, neglect some important part in the business, run over wagons or anything anywhere on the track because his mind is not clear for want of the required rest. It is done before he is conscious of it. A teacher once said to me, "the use of a bad pen is poor economy." I say the use of wornout street car men, or overtaxing their minds and bodies, is breeding accidents. New men are always dangerous; they are unskilled and do not know when to act. Seventy-five per cent of the accidents, I think, are caused by new men. By skilled men, having regular habits, being excused when sick, etc., the company will have less use for new men, for the old ones will be stouter and last longer. Motormen, to keep from having accidents, should exclude all people from the front platform; they attract his attention from his duty; should see that his gong rings clearly, that his brakes are working right, ring his gong at all cross streets, see that people do not run in front of his car when passing a car stopped unloading people; not depend too much on his skill in holding or stopping that he runs up too close to wagons, etc., on the track going down hill and mash into things with bad results. A motorman should always keep in his mind the places or switches to meet each car on the road, and never pull out on a single track until the last car coming meeting him that he is due to meet has passed. Some of the worst accidents we have had in Nashville were due to this one cause. Motormen should never pass a car under full current that is stopped, for people may run in front of their car. Conductors should keep the rear step clear, not allow men to get on step a block before getting off. If drunk they will fall off.

When up to the front of car loaded, can't get back, post a reliable man on platform to signal conductor when all are on, and avoid people falling. The conductor can bar his doorway with his hands when cranks and drunkards start to jump off when the car is running, and avoid bad accidents. I have kept hundreds of men and women from falling by catching them when "hopping" a running car and they made missteps, feet slipped, etc. The conductor must keep three bells indelibly fixed in his mind and be ready to snatch them in a second. He should watch for women, etc., coming around behind his car; they get onto the step as the car starts, unseen, and may fall. Watch old men, drunkards and cranks as they leave the car, and never signal the motorman ahead until they are safely landed. Better to stop the second time at a station than have a man who is tardy in getting off at first stop to jump off of a running car and get crippled, then bring suit for damage.

The Allgemeine Electricitate Gesellschaft has secured an order from the Midi (France) Railway for an electric locomotive for freight and passenger service. The normal speed of the locomotive will be 45 km (27.9 miles) per hour and the maximum 75 km (46.5 miles) per hour. The line potential is 10,000 volts, single-phase. The locomotive will carry two Winter-Eichberg motors, each of 800-hp capacity on an hour rating, and 600-hp capacity on a continuous rating. The locomotive has three driving axles and two trailing axles. The motors will be connected to driving rods without the use of gearing.



**EXPENSES FOR OPERATION, RENEWALS AND DEPRECIATION OF MILWAUKEE CITY SYSTEM**

During the hearing of the Milwaukee fare case by the Railroad Commission of Wisconsin, C. N. Duffy, comptroller of the Milwaukee Electric Railway & Light Company, submitted in evidence a letter written by him to Edward W. Bemis, superintendent, City Water Department, Cleveland, Ohio, regarding operating expenses, renewals and depreciation. The statistical information contained in the letter of Mr. Duffy relates to the charges of

**THE MILWAUKKEE ELECTRIC RAILWAY & LIGHT COMPANY, MILWAUKEE CITY RAILWAY SYSTEM—YEAR 1907.**

(1) OPERATING EXPENSES EXCLUSIVE OF RENEWALS AND DEPRECIATION.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures.....	4.46	1.18
Maintenance of equipment.....	5.75	1.51
Operation of power plants and substations.....	8.58	2.25
Operation of cars.....	23.47	6.14
General expenses.....	10.01	2.62
	<u>52.27</u>	<u>13.70</u>

(2) OPERATING EXPENSES AND RENEWALS EXCLUSIVE OF DEPRECIATION.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures.....	10.58	2.78
Maintenance of equipment.....	6.25	1.64
Operation of power plants and substations.....	8.58	2.25
Operation of cars.....	23.47	6.14
General expenses.....	10.01	2.62
	<u>58.89</u>	<u>15.43</u>

(3) RENEWALS.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures.....	6.12	1.60
Maintenance of equipment.....	.50	.13
	<u>6.62</u>	<u>1.73</u>

(4) OPERATING EXPENSES AND DEPRECIATION EXCLUSIVE OF RENEWALS.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures.....	14.34	3.76
Maintenance of equipment.....	14.59	3.85
Operation of power plants and substations.....	8.58	2.25
Operation of cars.....	24.47	6.14
General expenses.....	10.01	2.62
	<u>70.99</u>	<u>18.60</u>

(5) DEPRECIATION.

	Per cent of gross earnings.	Per car-mile (cents).
Maintenance of way and structures.....	9.88	2.58
Maintenance of equipment.....	8.84	2.32
	<u>18.72</u>	<u>4.90</u>

the Milwaukee City railway system to these accounts during the year 1907, and is published herewith. An abstract of the letter of Mr. Duffy, dated Feb. 29, 1908, which accompanied the tables, follows:

Your letters requesting certain information relative to the operating results of the street railway system of this company in 1907 were referred to the writer by the president and general manager.

Enclosed herewith please find the operating expenses in "per cent of gross earnings" and "per car-mile (cents)" of the Milwaukee city railway system, only, for the year 1907, in the following tables:

- (1) Operating expenses, exclusive of renewals and depreciation.
- (2) Operating expenses and renewals, exclusive of depreciation.
- (3) Renewals.
- (4) Operating expenses and depreciation, exclusive of renewals.
- (5) Depreciation.

The figures shown are based on an average annual depreciation charge of 7 per cent on the cost of reproduction new of the physical property covered in "way and structures" and "equipment," approximately as valued by the Wisconsin State Railroad Commission, as of Jan. 1, 1907, plus additions and betterments made in the year 1907, subsequent to the date of the valuation.

The depreciation charge of 7 per cent per annum is intended to provide only for depreciation resulting from deterioration and wear and tear incident to use, without regard to obsolescence or supersession.

The figures shown represent the actual cost of renewals and replacements of the physical property of the company covered in "way and structures" and "equipment," made in the year 1907, but not included in "operating expenses" as shown in (1).

The foregoing information supplements the full reports of the hearing regarding the Milwaukee fare case before the Railroad Commission of Wisconsin, which appeared in the issues of the ELECTRIC RAILWAY JOURNAL for March 6 to April 24, 1909, both inclusive.

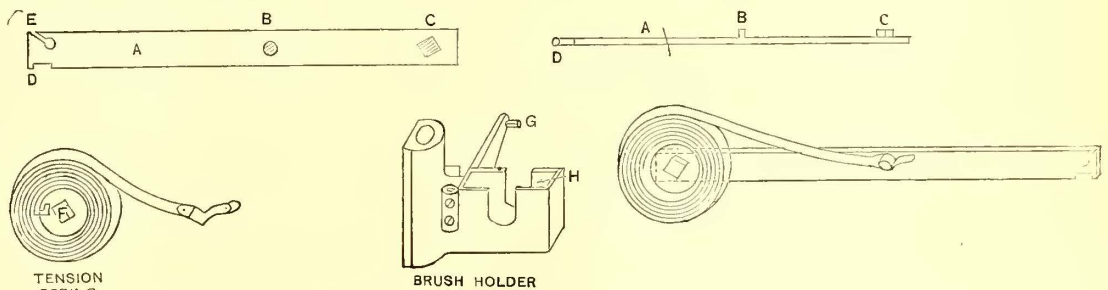
**RESTORING TENSION TO BRUSH-HOLDER SPRINGS OF COMPRESSOR MOTORS**

BY GEO. M. COLEMAN

On type D and D E G Westinghouse air compressors it is found very difficult, after the tension of the brush-holder spring has weakened from constant use, to restore the tension of the spring without removing the front or back of the motor. In so doing one is apt to spill the oil and experience other inconveniences. The device shown in the accompanying drawing was designed to overcome this difficulty and it has the further merit of doing so for very little money. It is constructed as follows:

A is a piece of iron  $\frac{3}{4}$  in. wide,  $\frac{1}{8}$  in. thick x 8 in. long. B is a  $\frac{1}{16}$ -in. rivet,  $\frac{1}{2}$  in. long, securely fitted in the iron strip A. C is a square lug  $\frac{1}{2}$  in. long firmly attached to the strip A. E is an opening provided to hold a cotter pin so it can be inserted in the brush-holder stud which holds the brush spring. D is a small projection made to pull out the cotter pin before removing the spring.

With this little device the brush-holder spring is easily removed by pulling out the cotter pin with the projection D. The brush spring is then placed on the square lug C at any position so the desired tension can be had. The lug C is made  $\frac{1}{4}$  in. long, just one-half the depth of the square hole in the brush-holder spring. Next, place the square



Device for Restoring Tension to Brush-Holder Springs of Compressor Motors

hole of the spring on the brush-holder lug G, which will receive it. (As stated before, the lug C fills half the hole.)

The end of the spring is then lifted on the holder H and the iron can be removed. The cotter pin is placed in the opening provided by E and inserted in the hole of the stud G, thus completing the operation.



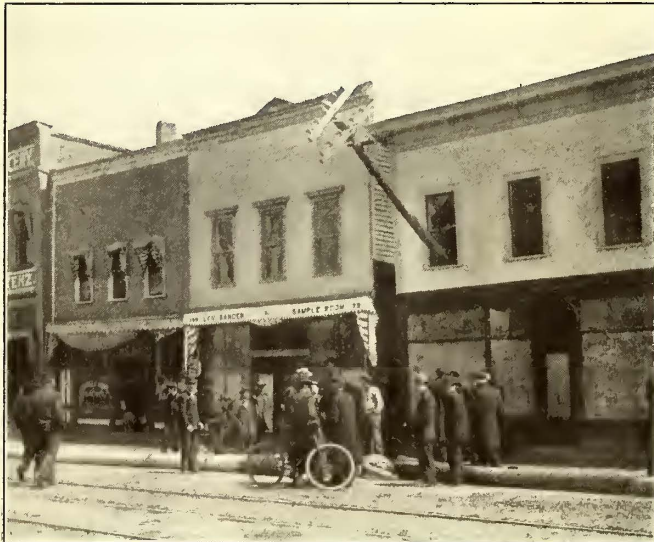
## COMMUNICATIONS

### PECULIAR ACCIDENT

EASTERN WISCONSIN RAILWAY & LIGHT COMPANY,  
FOND DU LAC, WIS., May 6, 1909.

To the Editors:

The accompanying photograph (see illustration) shows the result of an unusual circumstance. The broken trolley and light pole shown was struck by the dome of a boiler from a heating plant which exploded more than a block away. This flying piece of metal weighed a little more



Peculiar Accident at Fond du Lac

than 200 lb. and passed entirely over the court house, which has a tower more than 100 ft. high. The dome struck the pole several feet from the ground driving it into the second-story window of a vacant store, as illustrated. The boiler which exploded was supposed to be carrying about 5 lb. pressure.

R. T. GUNN, General Manager.

### DISCHARGED EMPLOYEES

NEW YORK, May 15, 1909.

To the Editors:

I have read with interest the letters in your recent issues advocating the maintenance of a record bureau to investigate the past history of all applicants for employment upon railway systems, but doubt whether it would be of much value to secure this information. Testimonials, even when genuine, can hardly be relied upon greatly. Too many people will prevaricate to get a position for a friend and afterward reconcile their conscience to doing so on the plea that if the man could have another chance he, might reform. Again, testimonials are often faked, and even the man who comes to a road with a good record may go wrong under temptation. But even if every testimonial told the truth it is doubtful whether a company which hires perhaps hundreds of men during a month can make any serious investigation as to their previous records.

The only safe plan is not to depend upon the past, as suggested by your recent correspondents, but to detect the dishonest man after he gets on the road. This cannot be done from behind a roll-top desk. The company should have both the proper equipment for detecting the grafter and the proper methods for inspecting that equipment. Some purchasing agents will haggle over a few dollars in the

price of a register or urge the manager to keep antiquated registering devices in service, when the cost of a modern machine would be saved within a week. The use of good registers should be accompanied by a careful and logical system of register inspection. A great deal can be said on this latter point, but it is hardly pertinent here. It is safe to say, however, that if the companies will watch their fare collections carefully they will have little need to investigate the pedigrees of their employees.

SECRET SERVICE MAN.

### PHILADELPHIA TRANSIT SITUATION

At the meeting of the board of directors of the Philadelphia Rapid Transit Company on May 17 an increase of wages was voted to all motormen and conductors in the employ of the company, raising the wages of these employees from 21 to 22 cents an hour. This increase goes into effect on July 1, and involves the addition of about \$300,000 a year to the company's payroll.

Various communications from individuals and associations were received in reference to new lines, extensions, additional transfer points, etc. All these communications were referred to a special committee, composed of Mayor Reyburn, of Philadelphia; George D. Widener, A. B. Loeb, William H. Shelmerdine and J. J. Sullivan. This committee was instructed to investigate the merits of the various communications sent to the board, and report its conclusions at the earliest practicable date.

It was reported to the board that \$350,000 had been spent for track improvements since March 1 of this year. The board voted \$300,000 for additional improvements of this nature, this amount to be made available immediately.

A reply was approved to the letter of George Burnham, Jr., president of the City Club, of Philadelphia, asking the co-operation of the company in an investigation of its affairs. The reply, written by John B. Parsons, president of the company, stated:

I am instructed by the board of directors, before whom I laid your letter of May 4, to say that they decline to embark with the City Club in the enterprise suggested in your communication.

The reports of this company are full and explicit; its affairs have been twice examined into recently by disinterested committees, and the results of these examinations have been published and are accessible to all inquirers. Moreover, under the contract between the city and this company, its books are open to the investigation and inspection of the city comptroller at all times, and the Councils of the city have recently appropriated \$4,000 to defray the costs of a new audit of the company's business.

In view of these facts, the board of directors of the Philadelphia Rapid Transit Company feels that no possible good would be accomplished by the acceptance of your proposal.

### ASSOCIATION CIRCULARS

A confidential circular has been issued by the American Street & Interurban Railway Association describing the practice of various electric railways regarding averages and shortages.

Data sheet No. 38 has been issued, asking for information concerning the wages of conductors and motormen on city and interurban lines.

Certain of the English lines have adopted the practice of marking points at which motormen can cut off the current and coast to the next stopping point.



### CONFERENCE ON INTERURBAN RULES

The conference on rules for interurban electric railways, of which an announcement was published last week, will be held at 10 a. m., Tuesday, May 25, in the New Willard Hotel, Washington. The conference will be conducted under the auspices of the committee on interurban rules of the American Street & Interurban Railway Transportation & Traffic Association. J. N. Shannahan, general manager, Washington, Baltimore & Annapolis Electric Railway Company, is chairman of the committee. The purpose of the meeting is to receive and consider any suggestions to the code of rules for interurban electric railways presented by the committee at the 1908 meeting of the association at Atlantic City. It will be remembered that when this report was presented the association decided to continue the committee, and asked it to submit the rules contained in the code of the different railway companies and railroad commissions for criticisms. This has been done, and a number of criticisms and suggestions have been received. These will be considered at the Washington meeting.

In addition to the members of the committee who will be present, a number of officials of interurban railways who are interested in the subject of rules have expressed an intention of attending the conference, which is open to all. Invitations have also been sent to the railroad or public service commissioners of New York, Indiana, Wisconsin, Illinois and other States, as well as to the Interstate Commerce Commission, and it is expected that delegates from a number of these commissions will be in attendance.

### ROLLER AND BALL BEARING TROLLEY BASE

The Trolley Supply Company, Canton, Ohio, has added to its extensive line of electric railway devices the "National" combination roller and ball-bearing base shown. It is equally applicable for city and interurban service, is but  $4\frac{3}{4}$  in. high and weighs only 80 lb.

The roller bearing feature of this design resembles the same manufacturer's "Peerless" base, but in addition it is supplied with a ball race around the center pin to take off the end thrust friction and thus render it frictionless in its



Combination Roller and Ball-Bearing Base

sidewise motion. The uniform tension maintained by the spring up and down is another important point emphasized by the maker of this combination base.

Every effort has been made to secure a simple and rugged base to the end of keeping the maintenance cost at the lowest level. The castings are of malleable steel; the rollers of cold-drawn steel working in a cage which prevents binding; and the ball race set in a phosphor bronze ring, from which the balls cannot work out or seat themselves. In general, the base requires little inspection, as no oil is needed for either the roller or ball bearings and the spring adjustment is practically permanent.

### MULTI-VAPO-GAP LIGHTNING ARRESTERS

The Lord Electric Company, New York, has just put on the market a new type of lightning arrester which has no moving parts. It is based on the principle that static current, or lightning, will pass through a highly hygroscopic mass, through which it is impossible to transmit dynamic current, just as lightning will travel through the clouds, which are composed of myriads of moisture globules. The arrester, as thus constructed, consists of a hygroscopic material, inclosed in a closed porcelain housing, and connected across the line. The impedance is practically nil, owing to the fact that the moisture globules, though mechanically separated, are infinitely close together, but the composition of the body of the material prevents the flow of the normal current, as it is of course impossible to establish or maintain an arc between the globules. Owing to the multiplicity of vapor gaps no air-gap is necessary. These features, together with the low impedance, make the building up of static on the line impossible.

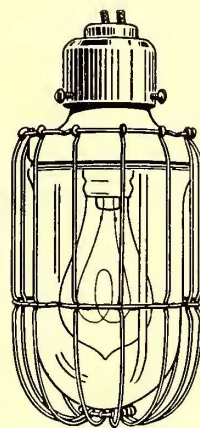


Station Type Arrester

The arrester is equipped with a tell-tale which indicates and records the passage of the discharge. This adjunct can also be used to open the circuit, a valuable feature when testing. The arrester contains no metal, aside from the terminals, and no charcoal, coke, carborundum, graphite or any other form of carbon. It is designed for use in stations on lines, and also on cars.

### COMBINED RECEPTACLE AND WATERPROOF GLOBE

The F. Bissell Company, Toledo, Ohio, is offering to electric railway companies the "Newgard" combined receptacle and waterproof globe shown in the accompanying cut. This lamp is especially serviceable for open places,



Guarded Waterproof Globe

like railway platforms and in the exposed portions of the car houses, repair shops and power plants. It is made entirely of non-absorbent and non-corrosive materials. The cap or receptacle part is made of strong, highly-glazed porcelain, and the clear globe of flint glass. The latter is threaded to a screw in the porcelain cap, the two parts being kept watertight by a rubber gasket. The contact wires entering at the top of the receptacle are rubber insulated and of No. 14 B. & S. gage. The top is filled with a composition that will not soften under heat, crack or absorb moisture. As the braid on the rubber-covered wire is carried just beneath the surface of the cap and then discontinued, it does not carry moisture to the interior of the receptacle. The diameter of the globe opening is  $2\frac{3}{4}$  in. and the length of the globe 6 in.

For special cases, where the lamp is liable to be struck by heavy objects, it is desirable to use a special wire guard, as illustrated. This guard is made of heavy steel wire, so shaped that the globe is held directly in the center and in a position which permits its easy adjustment.



# News of Electric Railways

## Transit Affairs in New York

On the recommendation of Commissioner McCarroll, the Public Service Commission has dismissed the proceedings brought against the Nassau Electric Railroad and the Brooklyn Heights Railroad for improved service on the Sixty-fifth Street and Eighty-sixth Street, the Fifth Avenue, the Sixty-fifth Street and Fort Hamilton, and the Sixty-fifth Street and Bay Ridge lines. The companies have increased the service on all the lines, and the dismissal of the complaint by the commission is made without prejudice to resumption of the proceedings in case the companies do not maintain a service which the commission deems satisfactory.

The Appellate Division of the Supreme Court of New York handed down a decision on May 14, sustaining the report of Benjamin F. Tracy in reference to the debt limit of New York City on June 30, 1908. The report was made as the result of suits to enjoin the issuance of bonds for the construction of the Fourth Avenue Subway in Brooklyn. Mr. Tracy found that the city of New York had a borrowing capacity of approximately \$106,000,000 on June 30, 1908.

The Public Service Commission has received from the Secretary of War at Washington permission for the construction of the four-track Harlem River tunnel, which is to take the proposed Broadway-Lexington Avenue subway into the Bronx. The tunnel is to run from Lexington Avenue and 130th Street to Mott Avenue, the Bronx, and will be about 1208 ft. long.

The application of the Hudson & Manhattan Railroad for a franchise to extend its subway from Thirty-third Street and Sixth Avenue, New York, up Sixth Avenue to Forty-second Street and thence to the Grand Central Station at Fourth Avenue and Forty-second Street, which has been approved by the Public Service Commission, has been referred by the Board of Estimate to a special committee consisting of P. F. McGowan, president of the Board of Aldermen, John F. Ahearn, borough president, and Herman A. Metz, comptroller.

The Public Service Commission has modified the order issued on April 28 directing the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad to install fenders on all their cars, and has extended the time in which the companies may submit to the commission drawings and specifications showing the types of fenders which they propose to use. The modification consists in limiting the fender installation to one fender on the forward end of each car, instead of on both ends, and excepting from the operation of the order cars equipped for operation by the third rail. The fenders are to be installed by July 15 and the drawings and specifications are to be submitted to the commission for approval by May 25.

Residents and property owners in the vicinity of 175th Street and St. Nicholas Avenue have petitioned the Public Service Commission for the construction of a subway station at St. Nicholas Avenue and 175th Street.

On motion of Commissioner Bassett, the Public Service Commission has discontinued the proceeding against the Brooklyn Heights Railroad on motion of the commission in regard to the number of cars to be operated on the Flushing-Ridgewood line. Recent observations showed that during the morning, westbound, between 6 a. m. and 9 a. m., 36 cars were being operated past the maximum load point as compared to a previous average of 25 cars, the count showing only two overload half-hour periods as against five in the first inspection. Between 5 p. m. and 8 p. m. the corresponding increase in eastbound traffic was from 30 to 33 cars, and the overloading decreased from three half-hour periods to one.

The Public Service Commission issued a formal order on May 14 requiring the Interborough Rapid Transit Company to convert five additional trains into side-door trains by Aug. 15 and to continue the process at the same rate until all the cars to be used in the express service have been turned into side-door cars. The company is also ordered to increase its equipment by the purchase of new side-door cars until it shall be able by Oct. 15, 1909, to maintain an express service in the subway during the rush hours on a headway of 1 min. and 30 sec. The company is given the privilege of adopting either the center side door, which the company favors, or the double-end side door, which Bion J. Arnold, consulting engineer to the commission, recommended. The order of the commission requiring the company to construct a second experimental train of eight double-end side-door cars has been rescinded.

## Engineering Association Data Sheets

Data sheets Nos. 10a, 10b and 10c have been issued by the committee on equipment of the American Street & Interurban Railway Engineering Association. The letter transmitting the data sheets says that the answers to the questions will be used by the committee in the preparation of its report, and adds:

"The benefit that has accrued to street railway companies through the work of this committee in the past, as is particularly instanced in the advances made in the quality of carbon brushes, may be cited in justification of the earnest consideration of these data sheets that we solicit.

"We respectfully request that prompt attention be accorded these data sheets as the time is short in which the committee has to work.

"Please forward replies to L. L. Smith, chairman, master mechanic, Chicago & Milwaukee Electric Railroad, Highwood, Ill.

"PAUL WINSOR, President.

"JOHN W. CORNING, Secretary-Treasurer."

The data sheets ask for the following information:

### STEEL-TIRED VS. ROLLED-STEEL WHEELS.

#### STEEL-TIRED WHEELS.

1. What is the outside diameter of your tires when new?
2. What is the outside diameter when scrapped?
3. What is the thickness of your tires when scrapped, or to what thickness do you allow them to run before you consider them unsafe?
4. How many turnings are given them?
5. What is the approximate mileage between each turning?
6. Do you have trouble with loose tires after they are worn approaching the limit of wear?
7. How is tire secured to wheel? (a) Straight bore tire, shrinkage only; (b) Lipped tire and shrinkage; (c) Lipped tire and Gibson retaining ring; (d) Double lip retaining ring, riveted; (e) Double lip retaining ring, bolted; (f) Mansell retaining ring, riveted; (g) Mansell retaining ring, bolted; (h) Interior tire flange, riveted to center; (i) Interior tire flange, bolted to center; (j) Tire fused to center.
8. Which type do you consider the best?
9. Do you have any broken centers or tires?
10. Give make of centers and tires used.
11. Are the centers cast iron or steel?
12. Are the wheels used in city or high-speed interurban service?

#### ROLLED-STEEL WHEELS.

1. What is the outside diameter of your wheels when new?
2. What is the outside diameter when scrapped?
3. What is the thickness of your rims when scrapped?
4. How many turnings are given them?
5. What is the approximate mileage between each turning?
6. Do you find the temper or hardness of steel uniform throughout, or are they softer at the last turning than at the first?
7. Which do you consider the safer for high-speed interurban service, rolled-steel or steel-tired wheels?
8. Which of the above do you consider the more economical, scrap considered?
9. What diameter of hub face which bears against collar of axle liner do you regard most desirable for equipment having motors: Not over 45 hp. Over 45 hp and less than 100 hp. 100 hp and over.

#### CARBON BRUSHES.

1. Have you as yet any specifications for carbon brushes? If so, what are they?
2. What test, if any, are they given after they have been received from the manufacturer?
3. Have you experimented with chatter wheel, slip ring or other tests recommended last year, and what results did you obtain?
4. Have you made any changes by using a better grade of brush since last year; if so, did you find the higher-priced brush more economical both as to brush renewals and commutator wear?
5. Give make and grade of brush used on representative types of your motors, stating whether commutators are grooved or ungrooved.
6. Give average mileage of brushes on representative types of your motors.
7. Have you noted any improvement in the manufacture of brushes since last year?
8. Give any other information regarding your experience with carbon brushes, with either grooved or ungrooved commutator, that might be of interest.

### Cleveland Traction Situation

Owing to the absence of Mayor Tom Johnson from the city, no definite steps were taken last week toward the street railway settlement in Cleveland. On his return to Cleveland on May 15, the Mayor stated that he would be ready to take up negotiations again on May 17. The original time for reaching a conclusion on the matter, as fixed by the Mayor, expired on May 15, after which he said bids would be received for grants on lines whose franchises expire in the spring of 1910, but consideration of this matter has been extended for three days. So far as known, no responsible parties have arranged to bid on these routes.

Dangerous tracks in various parts of Cleveland are causing the receivers concern. They can put only the amount of money allowed by the court into repairs, and have already been compelled to suspend repair work on some of



the lines. The prospect of securing more money decreases as the time approaches for the payment of the principal of some of the bonds. It is believed that the bondholders will object to further expenditures until there is a settlement and their claims have been taken care of through payment of the obligations or renewals under satisfactory conditions.

Fred C. Alber, former assistant to A. B. du Pont, president of the Municipal Traction Company, has filed with the receivers an accounting of the \$3,500 which was charged against him on the books of the company when the receivers took charge. Of this amount, he stated that \$2,000 was paid out in strike bills in May, 1908. Vouchers for the remainder spent by him were filed with the receiver, together with a check for \$160, the balance on hand. This account caused much discussion during the hearing before the master commissioner on claims, but no explanation was given at the time as to what had been done with the money, other than that it had been turned over to Mr. Alber.

At the meeting of the Council on the morning of May 17, most of the time was taken up in discussing the question whether the ownership of the pavement laid by the Cleveland Railway in building its tracks should be submitted to arbitration. City Solicitor Baker commended a motion made by Dr. Waltz to the effect that a board of arbitration should decide what portion of the cost of the pavement shall be included in the capital account of the company, and it was passed. This pleases the company, as ownership of the pavement could not be established, although the company paid for it in the belief that the cost would be considered a part of the expense in constructing the lines. From the discussion preceding the vote on this motion, it would seem that some members of the Council are opposed to allowing a board of arbitration to decide the very point that will be placed before it through the passage of the motion.

After considerable discussion on May 17, the Council voted against the proposition of Mr. Andrews to consider all stockholders alike in any settlement that may be made. Mr. Andrews stated that a settlement seems out of the question if the administration insists upon considering the stockholders of the Cleveland Electric Railway and the Forest City Railway separately, and extending to one any rights and privileges that are not extended to the other. He says there is only one company and that the stockholders must all receive equal consideration.

On Monday evening, May 17, the company presented to the Council a new franchise calling for six tickets for a quarter and omitting many objectionable features. F. H. Goff explained the gentlemen's agreement that had been entered into, and said that it had been lived up to by the company. He also repeated the statement, previously made by Mr. Andrews, that the stockholders would all have to be treated alike, as Mayor Johnson had insisted on the delivery of new certificates to the stockholders of the Forest City Railway a year ago, at which time Mr. Goff advised against it. On May 18 the Council committee of the whole refused to recede from its demand of seven tickets for a quarter, despite the fact that the company reaffirmed the statement that this rate cannot be accepted. The Mayor then proposed that the system be managed through a holding company, half of the directors of which shall be appointed by the city and half by the stockholders of the company. Mr. Andrews objected to this.

**Cost of Snow Removal in Boston.**—It cost the Boston (Mass.) Elevated Railway less to remove snow last year than during any winter since 1905. In fact, the expense on this account last winter was the smallest in the history of the company. The average expense per winter for the past five years has been about \$85,000, whereas for last winter the total cost was only \$26,000. In 1905 the expense of removing snow was \$190,104; in 1906, \$51,413; in 1907, \$116,407; in 1908, \$36,473, and in 1909, \$26,000.

**Illinois Traction System in St. Louis.**—W. B. McKinley, president of the Illinois Traction System, Champaign, Ill., and other officers of the company were in St. Louis recently to consider the location of freight and passenger terminals there for the system. No announcement has been made, however, regarding the conclusion of negotiations for proposed sites. For some time the company has owned a tract of land at the foot of Salisbury Street and the statement is made that this will be used as a freight yard. It is understood that the construction of a loop in down-town St. Louis for the exclusive use of the interurban railways is favored.

**Employees and Officers of Connecticut Company Confer.**—Representatives of the employees of the various divisions of the Connecticut Company in New York and Connecticut conferred with J. K. Punderford, general manager of the

company, in New Haven recently regarding the modification of the rules governing employees and a change in the wage schedule. The men desire that the time limit for reaching the maximum wage be reduced from five years to three years. The session between the representatives of the employees and the company was an executive one, and no official statement has been issued regarding the subjects which were discussed.

**Interurban Trainmen Meet.**—The fourth annual convention of the Brotherhood of Interurban Trainmen was held in Muncie, Ind., on May 11 and 12. The meeting was opened with an address by Rev. Ralph C. Jones, a former railroad man, on "Railroad Men and Their Troubles," which was delivered on the evening of May 10. Subsequent sessions were devoted to routine business and the detail work of organizing and establishing an insurance department to collect assessments and pay death and accident benefits. The delegates to the convention were taken over the lines of the Indiana Union Traction Company on an inspection tour. The selection of a meeting place for the next annual convention of the Brotherhood was left to the judgment of the executive committee.

**W. B. Parsons on London Underground Railways.**—Wm. Barclay Parsons, formerly chief engineer of the New York Rapid Transit Commission, who is a director of the London (Eng.) Underground Railway, is quoted as having said: "The traffic returns and increased net earnings of the London underground roads clearly demonstrate that the way the underground systems are now worked is the right one. Elevators at the tube stations no longer crawl up and down; trains travel faster and on shorter headway, and stops at all stations are very brief. Londoners undoubtedly can get about now with as little waste of time as in New York and Chicago. Cars built on the American pattern and the disappearance of the three classes of accommodation have appealed to Londoners."

**Brooklyn Rapid Transit Employees' Benefit Association Elects Officers.**—At the annual meeting of the Brooklyn Rapid Transit Employees' Benefit Association, held at the club house on Jamaica Avenue on May 1, the members of the association voted to elect a vice-president and three trustees. The successful candidate for vice-president was George Bauman, a motorman attached to the East New York depot, and the successful candidates for trustees were: John Stoll, a motorman attached to the Ridgewood depot; Henry Heithoff, a motorman on the elevated division, and John Keenan, a motorman attached to the Canarsie depot. E. W. Winter, president of the Brooklyn Rapid Transit Company, under date of May 1, announced the following appointments as trustees for the ensuing year: C. E. Roehl, electrical engineer; W. W. Atwood, train master of the elevated lines, and E. C. Shaler, assistant engineer. The polls were open from 8:00 a. m. until 10:00 p. m., and each candidate was entitled to two properly accredited watchers during the balloting and counting. John Stoll, who was elected a trustee, is now serving his sixth term in that office.

#### LEGISLATION AFFECTING ELECTRIC RAILWAYS

**Connecticut.**—The advocates of public service legislation have succeeded in jamming through the House a resolution for a joint select committee of nine members and two Senators to go into the subject of public utility legislation and draw up and submit a bill to the House not later than June 8.

**Massachusetts.**—The House has given a third reading to the resolve for an investigation of the advisability of authorizing the Boston & Eastern Electric Railroad to construct a tunnel and subway in Boston and has sent the measure to the Senate for concurrence. The investigation is to be made by the Boston Transit Commission and the Massachusetts Railroad Commission. The House has killed the bill to enable street railways to increase stock and bonds under the jurisdiction of the Railroad Commission to supply working capital, in amendment of the existing law passed in 1906. In the House an effort was made under the leadership of Mr. Weeks, of Everett, to effect a reconsideration of this measure, but an adverse vote was sustained. The House has concurred with the Senate in the resolve to provide for an investigation by the Railroad and the Transit Commissions of the advisability of constructing additional subways, tunnels and elevated structures in Boston. The report to the Senate by the committee on street railways referring to the next Legislature the bill to define further the purposes for which capital stock and bonds may be issued by street railways has been accepted by the Senate and sent to the House for concurrent action.

**Minnesota.**—Despite the fact that several important measures affecting electric railways were introduced at this session, the Legislature has adjourned without passing any



of the bills, only one measure receiving approval that can be construed to affect the electric railway companies even indirectly. This requires the restitution of overcharges by railroads. The bill placing street railway companies under the jurisdiction of the Railroad and Warehouse Commission and the Zelch bill designating interurban railways as common carriers were lost. The Nolan bill, as the measure placing the electric railways under the Railroad and Warehouse Commission was known, had a checkered career. The judiciary committee of the House finally concluded that it "would not hold water." Then the Washburn measure was introduced in the House. It was drawn to overcome the objections pointed out in the Nolan measure by the members of the judiciary committee, but died in committee.

**Missouri.**—On May 10 Governor Hadley sent a special message to the Senate urging that body to pass the State utilities bill creating a public service commission and abolishing the Railroad and Warehouse Commission. Despite this and the fact that the public utilities bill had already passed the House, the measure was reported adversely by the Senate committee on ways and means on May 12, and if it is ever called for passage, which is very unlikely, will probably be killed. The special measure prepared at the instance of the St. Joseph Railway, Light, Heat & Power Company and the Business Men's League of St. Joseph, which authorizes street railways to purchase, lease or consolidate with interurban railways or effect operating arrangements with them, has been reported favorably in the Senate, where it has been amended. The opinion is confidently held that this measure will pass both houses by a safe majority.

**New York.**—Mayor McClellan of New York has signed the Travis-Robinson rapid transit bill providing for the building of subways by private capital, and has vetoed the Cassidy bill, which was intended to prevent the issuing of assessment bonds for public improvements. In speaking of the Cassidy bill, the Mayor said: "If I accept this bill I shall deprive the Public Service Commission of one of the methods suggested by it for providing better railway facilities." Under the Travis-Robinson bill the Public Service Commission will have authority to execute contracts for indeterminate franchises, reserving the right to the city to take possession of the route at the expiration of certain periods. The bill also provides for dividing the profits of operation between the company and the city and for the building of subways on the assessment plan. The Mayor has signed the bill giving the Interborough Rapid Transit Company the right to extend the Lenox Avenue branch of the subway through the Bronx. The Governor has signed the bill to facilitate the collection of \$40,000,000 franchise taxes, \$26,000,000 of which is due in New York City. Mayor McClellan has vetoed the Eleventh Avenue bill giving the New York Central & Hudson River Railroad, with the approval of the Public Service Commission of the First District and the Board of Estimate and Apportionment of New York, the right to construct a combined subway and elevated railway on Eleventh Avenue, New York, to take the place of the company's present surface tracks. Mayor McClellan also has approved the bill passed by the Legislature which provides for the consolidation of the New York, West Chester & Boston Railroad and the New York & Port Chester Railway.

**Ontario.**—The legislative session recently brought to a close was short compared with some previous sessions; but the measures passed were diversified and many in number considering the length of the session. In all, the bills passed totaled 166. Further legislation was found necessary to facilitate the work of the Hydro-Electric Commission and enable the Government to supply electricity through the commission at a minimum price to the public while observing its obligations to investors. A number of acts were passed incorporating electric railways, and the prospects are that the construction of several important lines will soon be begun under the provisions of the bills. Among the companies incorporated were the Belville Radial Railway, Coburg, Port Hope & Havelock Electric Railway, Coburg Radial Railway, Dunnville, Willandfort & Beamsville Electric Railway, Eastern Ontario Electric Railway and the Ottawa & St. Lawrence Electric Railway. The Public Service act was amended to provide for the hiring of additional help from time to time in emergencies. The South Western Traction Company was given permission to issue additional mortgage bonds not exceeding \$6,000 per mile of line under operation to present holders of bonds of the company, the bonds to be sold at not less than 90 per cent of their par value. The charter of the Toronto Suburban Railway was also amended in detail. These acts have all been in force since April 13, when they received royal assent.

# Financial and Corporate

## New York Stock and Money Market

May 18, 1909.  
After 10 days, during which there had been evidence of considerable quiet liquidation, with prices somewhat lower, the stock market to-day became stronger and there appeared a general desire to buy. Even during the period when profit taking was in progress the general tone was good, and when those who sold last week tried to rebuy to-day prices advanced so quickly that many failed to get back as low as they sold. Traction shares have been fairly active, with small price changes.

In spite of the heavy exports of gold, the money market is cheap and cash plentiful. Quotations to-day were: Call, 1¾ to 2 per cent; 90 days, 2½ to 2¾ per cent.

### Other Markets

Trading in Rapid Transit has been very active on the Philadelphia market during the last week, and the stock has resisted all selling pressure with remarkable strength. At no time has there been any tendency to break, and the price to-day is higher than it was a week ago. Union Traction also has been active at firm prices.

In the Boston market, tractions have been practically neglected, Massachusetts Electric showing the only semblance of activity. Price changes have not been significant.

Outside of a few sales of Kansas City Railway & Light and Chicago Subway little has been done in traction securities in the Chicago market. Prices have been firmly held.

In Baltimore, United Railways bonds continue to be very active and prices have shown some advance. Incomes have sold at 58¾, 4s at 87¾ and funding 5s at 80¾.

At the auction sale of securities in New York last week, the only traction securities sold were \$250 Lexington (Ky.) & Eastern Railway preferred debenture certificates, \$50 each, at 39.

Quotations of various traction securities as compared with last week follow:

	May 11	May 18.
American Railways Company.....	45½	46
Aurora, Elgin & Chicago Railroad (common).....	237½	*38½
Aurora, Elgin & Chicago Railroad (preferred).....	287½	*39
Boston Elevated Railway.....	128½	127
Boston & Suburban Electric Companies (common)....	*16	*16
Boston & Suburban Electric Companies (preferred)....	72	*72
Boston & Worcester Electric Companies (common)....	12	12
Boston & Worcester Electric Companies (preferred)....	258	258
Brooklyn Rapid Transit Company.....	79½	79½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s....	87½	88¾
Capital Traction Company, Washington.....	135½	*133
Chicago City Railway.....	190	210
Chicago & Oak Park Elevated Railroad (common)....	4¼	*4
Chicago & Oak Park Elevated Railroad (preferred)....	*11	*15
Chicago Railways, pteptg. ctf. 1.....	*110	210
Chicago Railways, pteptg. ctf. 2.....	*39	238½
Chicago Railways, pteptg. ctf. 3.....	*28	228
Chicago Railways, pteptg. ctf. 4s.....	*9½	210
Cleveland Electric Railway.....	*78	*78
Consolidated Traction Company of New Jersey.....	278	*78
Consolidated Trac. Co. of N. J., 5 per cent bonds....	2107	2107½
Detroit United Railway.....	57	*58
General Electric Company.....	159½	160½
Georgia Railway & Electric Company (common).....	85	286
Georgia Railway & Electric Company (preferred)....	*48	285
Interborough-Metropolitan Company (common)....	16½	16½
Interborough-Metropolitan Company (preferred)....	46	45¾
Interborough-Metropolitan Company (4½s).....	79½	79
Kansas City Railway & Light Company (common)....	49¼	50
Kansas City Railway & Light Company (preferred)....	85¾	86
Manhattan Railway.....	146	*146
Massachusetts Electric Companies (common).....	214½	214
Massachusetts Electric Companies (preferred)....	271½	70½
Metropolitan West Side, Chicago (common).....	*19	218
Metropolitan West Side, Chicago (preferred)....	*50½	253
Metropolitan Street Railway.....	*26	27
Milwaukee Electric Railway & Light (preferred)....	*110	*110
North American Company.....	83	82¾
Northwestern Elevated Railroad (common).....	*24	224
Northwestern Elevated Railroad (preferred)....	*71	272½
Philadelphia Company, Pittsburg (common).....	243½	43
Philadelphia Company, Pittsburg (preferred)....	244	244½
Philadelphia Rapid Transit Company.....	233	24¾
Philadelphia Traction Co.....	93	92½
Public Service Corporation, 5 per cent col. notes....	2100¾	2101
Public Service Corporation, ctf. ....	286½	289½
Seattle Electric Company (common).....	*91	97½
Seattle Electric Company (preferred)....	99	99
South Side Elevated Railroad, Chicago.....	*60	258
Toledo Railways & Light Company.....	9	*10¼
Third Avenue Railroad, New York.....	33¾	30¾
Twin City Rapid Transit, Minneapolis (common)....	103½	*106½
Union Traction Company, Philadelphia.....	56¾	57
United Railways & Electric Company, Baltimore....	212	212½
United Railways Inv. Co., San Francisco (con.)....	35	*36¾
United Railways Inv. Co., San Francisco (pfd.)....	56¼	54½
Washington Railway & Electric Company (common)....	242	242¾
Washington Railway & Electric Company (preferred)...	292½	*92¾
West End Street Railway, Boston (common).....	205	93½
West End Street Railway, Boston (preferred)....	109	*110
Westinghouse Electric & Manufacturing Company....	83½	84¼
Westinghouse Elec. & Mfg. Company (1st pref.)....	2120	120

\*Asked. \*Last sale.



**Report of Coney Island & Brooklyn Railroad to Public Service Commission**

The New York Public Service Commission, First District, has made public a preliminary abstract of the report of the Coney Island & Brooklyn Railroad for the year ended June 30, 1908. Following is the income account, with a comparison with the preceding year:

	Year ended June 30, 1908.	Increase over preceding year.
<b>REVENUE.</b>		
Passenger revenue (including chartered cars)	\$1,542,774.02	*\$70,150.00
Mail and other car earnings	3,451.09	2,651.09
Advertising	5,740.56	*121.36
Rents	3,452.69	2,952.65
Miscellaneous earnings	2,038.81	550.53
<b>Total street railway operation earnings</b>	<b>\$1,557,457.17</b>	<b>*\$64,117.09</b>
<b>EXPENSES.</b>		
Maintenance of way and structures	\$41,093.58	*\$40,686.65
Maintenance of equipment	137,143.43	*28,003.66
Operation of power plant	397,237.78	82,905.66
Operation of cars	453,421.69	*2,224.39
Damages (including legal expenses)	91,030.48	*5,630.76
General expenses	125,729.41	11,048.10
<b>Total street railway operating expenses</b>	<b>\$1,246,256.37</b>	<b>\$17,408.30</b>
Taxes accrued	62,400.00	4,127.37
<b>BALANCE.</b>		
Oper. income (earn. over expenses and taxes)	\$248,800.80	*\$85,652.76
Non-operating income	4,604.52	4,503.52
<b>Gross income applicable to corporate and leased properties</b>	<b>\$253,405.32</b>	<b>*\$81,089.24</b>
<b>DEDUCTIONS.</b>		
Deduct interest on funded and other debt	\$148,003.14	*\$5,446.67
Rentals	100,000.00	
<b>Total charges to income</b>	<b>\$248,003.14</b>	<b>*\$5,446.67</b>
<b>SURPLUS.</b>		
Surplus for the year	\$5,402.18	*\$75,642.57
Previous surplus	5,274.97	*100,261.75
<b>Total surplus</b>	<b>\$10,677.15</b>	<b>*\$175,904.32</b>
Dividends on stock		*\$120,000.00
Charges to corporate surplus	\$2,171.80	\$59,134.70
<b>Surplus June 30, 1908</b>	<b>\$8,505.35</b>	<b>\$3,230.38</b>

\*Decrease.  
†Interest.

The operating expenses amounted to 80 per cent of gross earnings from operation. Of the total operating expenses, \$178,237 was used for maintenance of way and structures and equipment; this sum is equal to 11.4 per cent of the gross earnings. Damages, including legal expenses, absorbed 5.9 per cent of gross earnings.

The following additional information was contained in the report:

	Year ended June 30, 1908.	Increase over preceding year.
Total track mileage owned and leased	48,302	
Passenger cars (exclusive of open cars)	200	
Total seating capacity	23,374	
Average number of cars operated	165	
Total number of trips made	496,383	
Total (passenger) car-miles run	6,768,992	*12,731
Total number of (passenger) car-hours		
Passengers—number of 5-cent fares	29,860,969	*1,799,093
Passengers—number of other paid fares	1,600,036	
Passengers—number of transfers collected	5,928,261	29,733
Passengers—number carried free	452,517	72,842
Number of officers and employees, June 30	1,067	131
Number of motormen, June 30	322	21
Number of conductors, June 30	365	42
Total compensation of officers and employees	\$621,327	\$13,099

\*Decrease.

**Baltimore (Md.) Terminal Company.**—George T. Bishop, president of the Washington, Baltimore & Annapolis Railway, has announced the sale of \$500,000 bonds of the Baltimore Terminal to the General Electric Company at 84. These bonds are a portion of the \$2,500,000 bonds offered some months ago. Mr. Bishop states that the work of equipping the Washington, Baltimore & Annapolis Railway for operation by direct current instead of alternating current will be completed within six months.

**Boone (Ia.) Electric Company.**—E. C. Brown, New York; George D. Roper, Rockford, Ill., and E. G. Pratt, Chicago, have secured an option on the property of the Boone Electric Company, Boone Suburban Railway and the Boone Central Heating Company.

**Brooklyn (N. Y.) Rapid Transit Company.**—The directors of the Brooklyn Rapid Transit Company have declared a regular quarterly dividend of 1 per cent payable on July 1. The previous dividend was paid on April 1, but the directors at that time declined to state whether the rate was to be quarterly or not.

**Camden & Trenton Railway, Camden, N. J.**—The bondholders of the Camden & Trenton Railway have ratified

the agreement of the reorganization committee on the plan of reorganization. The court will be asked to set an early date for the sale of the property of the company under foreclosure, at which it will be bought by the committee and the reorganization effected.

**Cleveland (Ohio) Railway.**—Henry J. Davies has resigned as a member of the board of directors of the Cleveland Railway and has been succeeded by H. P. McIntosh, who had previously retired from the company with the intention of spending some time in Europe.

**Egerton Tramway Company, Ltd., Stellarton, N. S.**—The Egerton Tramway Company has purchased the property of the New Glasgow Electric Light & Tramway Company, New Glasgow, N. S.

**Lewistown & Reedsville Electric Railway, Lewistown, Pa.**—Dodge & Day, Philadelphia, Pa., have purchased all of the capital stock of the Lewistown & Reedsville Electric Railway for the Utilities Corporation, which they were largely instrumental in creating to purchase electric light, street railway and gas properties where there is an opportunity for expansion and to increase earnings by centralizing the management. The Utilities Corporation is capitalized at \$2,000,000, of which \$1,000,000 is 6 per cent preferred stock and \$1,000,000 common stock.

**Norfolk & Portsmouth Traction Company, Norfolk, Va.**—Middendorf, Williams & Company, Baltimore, and Chandler Brothers & Company, Philadelphia, have sold \$800,000 of 5 per cent first mortgage bonds of the Norfolk & Portsmouth Traction Company. The company proposes to anticipate the payment of \$486,000 of its convertible 6 per cent notes, due March 1, 1910, with the proceeds of the sale, and to complete payments covering recent improvements and extensions.

**Second Avenue Railroad, New York, N. Y.**—Judge Lacombe, in the United States Circuit Court, has extended the time for taking testimony in foreclosure proceedings brought by the Guaranty Trust Company, New York, against the Second Avenue Railroad until Aug. 9, 1909.

**Third Avenue Railroad, New York, N. Y.**—The United States Circuit Court filed a decree on May 17 ordering the sale of the Third Avenue Railroad under foreclosure of a mortgage held by the Central Trust Company, New York, on Sept. 2, 1909. The mortgage on which interest is in default is for \$37,560,000, and with interest at 4 per cent from July 1, 1907, totals \$40,381,173. The sale is made subject to the lien of the \$5,000,000 first mortgage made by the Third Avenue Railroad to the Farmers' Loan & Trust Company on July 1, 1887. The purchaser will be required to give a bond of \$200,000 before the sale of the tangible property and a bond of \$100,000 before the sale of the stocks and bonds; and will further be required to make up any deficiency between the price realized and the total amount of claims due. The decree provides for two distinct divisions of property to be sold, the first being the real estate, rolling stock, improvements, appurtenances, etc., and the second stocks and bonds, of which the equity of redemption is claimed by the New York City Railway and its receiver, William W. Ladd.

**United Railways Investment Company, San Francisco, Cal.**—At a special meeting of the stockholders of the United Railways Investment Company on May 17, they authorized the issue of \$10,000,000 of preferred stock by the company and the sale of \$10,000,000 of authorized and unissued common stock of the United Railroads of San Francisco and approved contracts entered into by the United Railways Investment Company with a protective committee of the Stanislaus Power Equipment Company for the purchase of the property of that company, and the property of the Tuolumne Water Power Company. For the purchase of the property of the Stanislaus Power Company \$1,000,000 of the preferred stock and \$1,000,000 of the unissued common stock will be used. The remaining \$9,000,000 will be held in the treasury to provide for future requirements of the company. The \$10,000,000 of common stock of the United Railroads of San Francisco will be sold to the corporation to be organized and controlled by the United Railways Investment Company. The new corporation will take over the San Francisco Electric Railways Company.

**Wisconsin Electric Railway, Oshkosh, Wis.**—The original reorganization plan of the Winnebago Traction Company, which contemplated first and second mortgages, has been modified by eliminating the second mortgage bonds. The present outstanding issue of 5 per cent first mortgage bonds aggregating \$738,000, due Aug. 1, 1908, but subject to call at 105 on six months' notice, are guaranteed as to principal and interest by endorsement by the Eastern Wisconsin Railway & Light Company, which owns the stock of the Wisconsin Electric Railway.



# Traffic and Transportation

## Publicity on the Boston Suburban Electric System

A policy of co-operative publicity has been inaugurated recently by M. C. Brush, general manager of the Boston Suburban Electric Companies, with the object of improving the service through the criticisms and suggestions of patrons and bringing about a better understanding among the communities served of the conditions under which the roads are operated. An advertisement was sent to the principal daily and weekly newspapers in the 22 towns on the street railway system represented by the Middlesex & Boston, Lexington & Boston and Newton & Boston lines, addressed to the patrons of the company and reading as follows:

"The management of the above company, appreciating fully the value and importance of reliable, efficient and courteous service on the part of a street railway company, and the cordial co-operation of its patrons, respectfully requests criticisms and suggestions. We do not fear, but welcome honest criticism.

"It is our earnest desire to so operate the cars that patrons can absolutely rely upon regularity of service, connections, courteous treatment by employees, etc., and there is nothing which conduces more to such proper service than the honest criticism of patrons.

"You are earnestly urged to advise the management verbally, by mail or by telephone of anything which comes to your attention which you believe could be improved or corrected, and you may rest assured that the management will heartily welcome such criticisms or suggestions, and in addition to giving same proper and prompt personal attention will, wherever consistent, carry out same in part or in whole, or correct irregularities."

As a result of this request the company has received a large number of letters and telephone suggestions from its patrons, either commending the work of the roads or pointing out some way in which certain changes might be made. Among the suggestions received from patrons have been requests to have running times altered, connections made, criticisms of incidents in the car service and comments regarding stops.

It is the policy of the management to pay personal attention to all the communications; a letter of acknowledgment is sent immediately by the general manager stating that the matter is in hand and will receive prompt investigation and attention. The communication is then usually forwarded to the division superintendent concerned, with a request for a report. The latter official investigates and in many cases makes a personal call upon the party who originally wrote to the company. This call affords opportunity for explanation of the conditions at issue, and in some cases the conductor or motorman concerned is also taken to the home or residence of the patron and the case discussed freely.

This course has been found to create good feeling between the management and the public, as it enables the latter to come into personal touch with the system and its administration in a way that is out of the question when such matters are handled in a routine way through correspondence alone. Upon receipt of the report of the division superintendent the general manager writes a letter to the patron who started the proceedings, thanking him for his interest in the service and stating what measures are to be taken or what facts were developed as a result of the inquiry. If the changes suggested are impracticable, the reasons are given clearly; if the patron is at fault the company's position is explained courteously and the request added to call the management's attention in the future to any similar points which arise.

The results have been so satisfactory that a little later another advertisement will be printed renewing the suggestions of the first and showing how it has been a benefit to have the friendly criticisms and suggestions of the patrons. It is also probable that some specific instances of changes made as a result of these suggestions will be mentioned in the press.

**Pay-As-You-Enter Cars in Louisville.**—The Louisville (Ky.) Railway has placed 30 pay-as-you-enter cars in service on its Portland Avenue and Shelby Street line.

**More Pay-As-You-Enter Cars in New York.**—The Third Avenue Railroad, which controls the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, has placed pay-as-you-enter cars in operation on the lines of that company.

**Ohio Commission Rescinds Distance and Rate Order.**—As a result of a conference between representatives of the electric railways and members of the Ohio Railroad Com-

mission, the order to electric railways to prepare schedules showing the distances and fare between stations on their lines in Ohio has been cancelled. The commission will depend upon the investigation of individual complaints as to fare charges.

**Historical Folder of the Berkshires.**—The Springfield (Mass.) Street Railway proposes to issue an historical folder of the Berkshires which will show all the points of interest along the company's lines. The historical points will be designated by a neat sign upon which will be a number which will correspond with a number on the folder. The reading matter under a certain number will give a condensed account of the history of the place.

**Restoration of 5-Cent Fare Unit.**—Referring to the restoration of the 5-cent fare unit on the Western division of the New Hampshire Electric Railways on May 1, President D. A. Belden writes: "We have found that the 6-cent fare has produced a gain of about 10 per cent on lines where there is no competition and the travel is steady, but in places where competition exists the loss in the volume of travel has overcome the additional 1 cent per passenger and the result has been a distinct loss of receipts."

**Hearing on Worcester Consolidated Street Railway Waiting Room.**—The Massachusetts Railroad Commission gave a public hearing in Boston on May 15 on the petition of the Mayor and Aldermen of Worcester for waiting-room accommodations on the Worcester Consolidated Street Railway, specifically at the business center of the city, near Harrington Corner. No one appeared on behalf of the petitioners. The company was represented by President Francis H. Dewey. The board has taken the case under advisement.

**Washington, Baltimore & Annapolis Electric Railway Distributing Map of Annapolis.**—The general passenger agent of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C., is distributing as a traffic circular Riley's map of historic Annapolis with descriptions of the United States Naval Academy and other places of interest. The map was originally published to sell at 15 cents cash or 18 cents by mail. It contains 77 references to points of interest in Annapolis, all numbered with a key in one corner for ready reference.

**Music Souvenir of Willow Grove.**—The Philadelphia (Pa.) Rapid Transit Company has printed a very handsome souvenir in marbled covers of the music attractions at Willow Grove Park for the coming season. The organizations which will play at the park are Pryor's band, Stock's Theodore Thomas orchestra, Victor Herbert's orchestra and Sousa's band. The conductor of each of these organizations has contributed to this publication a strong appreciation of the value of Willow Grove Park as a music center. The souvenir also contains portraits of the conductors and reproductions from their compositions in manuscript.

**Summer Schedule on Twin City Lines.**—The Twin City Rapid Transit Company, Minneapolis, Minn., recently announced the following summer schedule for its suburban lines, effective May 15: From Minneapolis for Excelsior at 4:03 a. m. and 6:03 a. m., and every 30 minutes thereafter until 7:03 p. m., thereafter at 8:03 p. m., 9:03 p. m. and 11:03 p. m. For Tonka Bay: At 6:03 a. m. and every hour thereafter until 9:03 p. m. The last car will leave at 11:03 p. m. For Deephaven: At 6:58 p. m., 7:58 p. m. and 9:58 p. m. There will be hourly express boats from Excelsior to Wayzata between 6:15 a. m. and 6:15 p. m., and to Minnetonka Beach between 6:45 a. m. and 6:45 p. m. For Spring Park and Zumbra Heights the boats will leave hourly from 7 a. m. to 7 p. m.

**Aurora, Elgin & Chicago Railroad Issues Traffic Circulars.**—The Aurora, Elgin & Chicago Railroad, Chicago, Ill., has issued a trio of circulars descriptive of River View Park, Natural Park at Glenwood and of Aurora, where the 43d State Encampment of the G. A. R. is to be held on May 18, 19 and 20. The circular on Aurora describes that place as an encampment city and gives the principal points of interest. In addition, there is a brief sketch of Aurora Post No. 20 of the G. A. R., which is the local organization of the G. A. R. at Aurora. The inside of the folder contains a panoramic view of the route of the Aurora, Elgin & Chicago Railroad. Another feature of the publication is a complete program of the meeting of the G. A. R. Richard Breckinridge is traffic agent of the company.

**Indiana Interurbans to Handle Baggage on Same Basis as Steam Roads.**—At a meeting of interurban railway managers held in Indianapolis, Ind., on May 12, arrangements were made to handle baggage on the same basis as steam railroads, beginning July 1. The Railroad Commission of Indiana has been informed by a committee of the action taken at the meeting and a schedule will be filed with the



commission about May 25. The following companies were represented at the meeting: Indianapolis, Crawfordville & Western Traction Company, Chicago, South Bend & Northern Indiana Railway, Evansville & Southern Indiana Traction Company, Indianapolis & Louisville Traction Company, Louisville & Northern Railway & Lighting Company, Indianapolis, Columbus & Southern Traction Company, Indianapolis & Cincinnati Traction Company, Terre Haute, Indianapolis & Eastern Traction Company, Fort Wayne & Wabash Valley Traction Company and the Indiana Union Traction Company.

**The Question of Fare Between Trenton and Yardley.**—It is reported that the city of Trenton will institute proceedings in the Court of Chancery to ascertain whether or not the New Jersey & Pennsylvania Traction Company has the right to charge a fare of 10 cents between Trenton, N. J., and Yardley, Pa. The franchise of the company provides that a fare of 3 cents may be charged within the city, and 5 cents for any point within five miles of the city limits. Inasmuch as the Calhoun Street bridge charges 2 cents toll, the fare totals 10 cents. When the Yardley, Morrisville & Trenton Street Railway, which forms most of the line between Trenton and Yardley, was first placed in operation, a fare of 10 cents was charged from Yardley to Morrisville, and the passenger was compelled to walk across the Delaware River bridge, paying 2 cents toll, and an additional 5 cents to ride to the center of Trenton, or 17 cents altogether. The 5-cent rate was in effect from 1901 to Feb. 22, 1909. The New Jersey & Pennsylvania Traction Company operates each of its lines under a different charter in order to comply with the laws of New Jersey and Pennsylvania.

**Narrower Cars in Chicago.**—The Board of Supervising Engineers of the City of Chicago has decided that the width of the 450 new cars for which specifications have been drawn by the Chicago Railways Company shall be 8 ft. 6 in., which is 6 in. narrower than the first pay-as-you enter cars placed in operation and 3 in. narrower than the second lot of cars placed in service. When the new cars are placed in service the space between them on the street will be 14½ in., sufficient materially to reduce the liability of serious injury to persons caught between cars. Bion J. Arnold, chairman of the Board of Supervising Engineers, in commenting on the action taken in reducing the width of cars, is reported to have said: "This will help, and if it had been possible to have brought the board to this point of view sooner I am convinced that many lives would have been saved. I am unalterably opposed to the perpetuation of death zones. I do not believe that the argument that the public will avoid the space between the cars if they know it means death and therefore be safer with the narrower space, is a sound argument. No one stands between passing cars, in my opinion, because he wants to. When a man gets caught there he should be given a chance for life. Such a chance the new space of 14½ in. provides. It has been obtained at a slight loss of room within the car, but the seats are of the same width as formerly and the aisle is 24 in. wide."

**Traffic Circulars About the Twin Cities.**—A. W. Warnock, general passenger agent of the Twin City Rapid Transit Company, Minneapolis, Minn., has issued a series of booklets describing the facilities of the company for reaching the territory to which its lines extend. The pamphlets are entitled "Twin City Trolley Trips," "How to See the Twin Cities" and "Beautiful Big Island Park." "Twin City Trolley Trips" is similar to a circular issued by the company last year and is enclosed in a cover showing a scene along the company's lines by night which resulted in many favorable comments when first issued. It is illustrated with half-tone engravings showing scenes along the company's lines and at Lake Minnetonka. The panoramic view of the Twin Cities, their famous lakes, rivers, parks and resorts, which was a feature of last year's publication, is reprinted this year. The territory embraced by the view extends 16 miles north and south and 48 miles east and west, and has a population of more than 500,000 served by 368 miles of electric railway and 65 miles of steamboat routes, all under the management of the Twin City Rapid Transit Company. "How to See Twin Cities" contains general information about the company's lines, including fares and schedules, and is designed to give visitors a good idea of the geography of Minneapolis and St. Paul. "Beautiful Big Island Park" describes the pleasure resort of the company at Lake Minnetonka. The park contains 65 acres, and is reached by ferry from Excelsior, to which the lines of the Twin City Rapid Transit Company extend. In reality, Beautiful Big Island Park is a charming wooded picnic park for rest, relaxation and recreation. The folder contains a scene at the park by night. Descriptions of these park properties have been published in recent annual park numbers of this journal.

## Personal Mention

**Mr. E. H. Richards** has resigned as superintendent of transportation of the Union Street Railway, New Bedford, Mass.

**Mr. W. H. Evans** has resigned as master mechanic of the International Railway, Buffalo, N. Y. It is reported that he will be succeeded by Mr. R. T. Senter, assistant master mechanic of the Chicago (Ill.) City Railway.

**Mr. W. J. Tunnah** has been appointed master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala. For the last five years Mr. Tunnah has been master mechanic of the Little Rock Railway & Light Company, Little Rock, Ark.

**Mr. Jacob W. Gerke** has been appointed master mechanic of the Tri-City Railway, Davenport, Ia. Mr. Gerke was formerly superintendent of the Washington, Arlington & Falls Church Railway, Washington, D. C., and at one time was master mechanic and assistant superintendent of the company.

**Mr. Dow S. Smith**, formerly general superintendent of the Brooklyn (N. Y.) Rapid Transit Company, has been elected vice-president of the Panhandle Electric Railway & Power Company, Spokane, Wash., which he and his associates have organized to develop a hydro-electric plant on the Priest River in Idaho and build a 30-mile standard-gauge electric railway from Priest River to Coolin, Idaho.

**Mr. M. E. Nash** has resigned as assistant superintendent of the Boston & Worcester Street Railway, Boston, Mass., to practise law in South Framingham, Mass. Mr. Nash began his railway career in 1896, with the Milford, Holliston & Framingham Street Railway, Milford, Mass., and was employed by that company until June 18, 1903, serving as conductor, clerk, starter, dispatcher, claim agent and superintendent. Mr. Nash went to Porto Rico in 1903 to accept a position with the Ponce Railway & Light Company, but returned to the United States within a few months and entered the employ of the Brooklyn Rapid Transit Company. In August, 1903, he accepted a position as dispatcher with the Boston & Worcester Street Railway and in September, 1903, was made a division superintendent of the company, with offices in Marlboro. In April, 1905, he was appointed assistant superintendent of the company, with offices at Framingham Junction. Mr. Nash was admitted to the bar of Massachusetts on Aug. 20, 1907, and has done considerable work for the claim department of the Boston & Worcester Street Railway in settling accident cases.

## NEW PUBLICATIONS

**Stationary Transformers.** By William T. Taylor. New York: McGraw Publishing Company, 1909; 169 pages; illustrated. Price, \$1.50 net.

The author has succeeded in preparing a very readable and handy book on a subject usually treated with too much mathematics. Mr. Taylor's work will certainly be helpful to those practically engaged in transformer operation.

**Electric Lamps.** By Maurice Solomon. New York: D. Van Nostrand Company, 1908; 320 pages; illustrated. Price, \$2 net.

One of the most welcome features of this book is the practical treatment of lamp testing. The descriptions of lamps are concise and free from the catalog flavor too prevalent in other technical books. The chapter on metallic filament lamps, including osmium, tantalum and tungsten, is exceptionally interesting.

**Design and Construction of Induction Coils.** By A. Frederick Collins. New York: Munn Publishing Company, 1909; 272 pages, with index; illustrated. Price, \$3 net.

The author first discusses the theory and development of the induction coil. He then describes methods of winding and impregnating the coils, and the construction of accompanying apparatus, like condensers, reversing switches, commutators, fittings, etc. The cost of manufacture is also considered and a number of useful formulas and tables presented in connection with induction coil practice.

**High Tension Underground Cables.** By Henry Floy. New York: Electrical Publishing Company, 1909; 135 pages (5 in. x 7½ in.) with tables. Price, \$2 prepaid.

In examining this book one can only regret that many other engineers do not place before the public such valuable epitomes of their experiences. Mr. Floy's notable work as consulting engineer in connection with high-tension underground cables is the best guarantee of the value of this book. The author presents an extended history of underground cable installations, discusses in detail the insulating and testing of cables and presents a wealth of data on cable capacities, weights and costs. Mr. Floy has refrained from



setting up a formal specification, believing that each engineer should prepare one directly suited to his needs, but ample assistance is afforded for that task by the general contents of the volume.

**American Electric Railways.** By Eugen Eichel, of Berlin Brussels International Street & Interurban Railway Association.

The International Street & Interurban Railway Association has just issued in pamphlet form the paper presented at the Munich convention Sept. 7-10, 1908, by Eugen Eichel, on "American Electric Railways." The paper attracted so much attention from the delegates that the association voted to print it in advance of the issue of the regular proceedings, in which it will also appear in due course. Mr. Eichel gave a description of the New York subway, the New York Central and New Haven electrifications, several of the Niagara power installations and the Spokane & Inland Empire Railway, and described some of the features of the electrical equipment of the Illinois Traction Company, United Railways of Detroit and the Brooklyn Rapid Transit Company. He also gave an account of the methods of advertising for traffic followed by the Old Colony Street Railway of Massachusetts. The paper was very fully illustrated.

**Development and Electrical Distribution of Water Power.** By Lamar Lyndon. New York: John Wiley & Sons, 1908; 317 pages; illustrated. Price, \$3 net.

This book is divided into two equal parts, one on the subject indicated by the title and the other an appendix containing hydro-electric power plant descriptions abstracted from several periodicals. In this book Mr. Lyndon presents a concise discussion on water power engineering problems ranging from the stream to the transmission circuit. The book is well written, but might more properly have been termed an introduction to hydro-electric development, as it is impossible to compress the important points of this vast subject into some 150 pages. For instance, practically nothing but an outline is presented on such fundamental matters as the accurate determination of stream flow. However, the references given to apparatus and transmission work are more extended and are reinforced by the valuable descriptions of modern plants. The latter feature is one of the most commendable of Mr. Lyndon's book.

**Experimental Electrical Engineering.** By V. Karapetoff. New York: John Wiley & Sons, 1908; 790 pages; 538 illustrations. Price, \$6 net.

The author, who is assistant professor of experimental electrical engineering at Cornell University, has aimed to produce a laboratory manual suitable for general electrical engineering work such as is covered during the junior and senior years in most American colleges. The experiments described cover the principal types of electrical machinery and auxiliary devices and the most important commercial applications of electricity. The book is divided into 34 chapters, the governing idea being to make the different chapters independent of each other as far as lines of demarcation could be drawn. Mr. Karapetoff acknowledges assistance in the preparation of the work from instructors in the electrical engineering laboratory at Cornell, and especially acknowledges support from Professors Carpenter, Norris and Ryan, of Cornell. Chapter 31 is entitled Electric Railway Work, and for convenience the subject matter has been treated under these headings: Drum-type electric car controller; multiple-unit control of trains; acceleration and retardation tests on cars, and air brakes. On the whole, the book is an excellent first attempt to create a work that shall be to electrical engineering what Prof. Carpenter's "Experimental Engineering" is to general engineering.

**Internal Combustion Engines.** By Wm. M. Hogle. New York: McGraw Publishing Company, 256 pages. Price, \$3 net.

The aim of the author has been to confine the subject to the more practical and applied phases of the internal combustion engine by eliminating as far as possible the more involved mathematical formulas. The historical review is brief, being designed merely to convey an intelligent understanding of the forerunners of the present engines. The relative merits of the two-cycle and four-cycle engines are briefly stated, the greater dependability of the four-cycle engine with perfect ignition being pointed out clearly. It would seem that a better order for the chapters could have been selected. Chapter IV is entitled "Comparison of Cycles" and is followed by the chapters entitled "Practical Operation," "Care of Engine," "Troubles and Remedies," which in turn are followed by the chapters on the starting devices, carbureters, vaporizers, producers, etc. The chapters on operation properly belong toward the end of the book and would make a fitting prelude to those on testing.

## Construction News

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

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

### RECENT INCORPORATIONS

**Rogers, Pea Ridge & Northern Interurban Railway, Rogers, Ark.**—Incorporated to build an interurban electric railway to connect Rogers, Pea Ridge and Bentonville. Officers: A. P. Potter, president; W. T. Patterson and J. F. Walker, vice-presidents; Bryan Snyder, secretary; J. J. Pittman, treasurer. Capital stock, \$50,000, of which \$30,000 has been subscribed. [E. R. J., May 15, '09.]

**\*Hebron Street Railway, Pittsburgh, Pa.**—Chartered to build a 2-mile street railway out Frankstown Avenue and Frankstown Road from Oakwood Street, Pittsburgh, to the Sandy Creek Road. Directors: John S. Hershey, Philadelphia, president; B. M. Sharp, D. W. Hoffman, C. W. Van Artsdalen and John S. Hershey. Capital stock, \$50,000.

**\*Duquesne & Dravosburg Street Railway, Duquesne, Pa.**—Chartered to build a 3-mile street railway in Duquesne Borough and Mifflin Township. Capital stock, \$18,000. Directors: John C. Cato, president; A. J. Kull, T. F. Van Kirk, A. C. Purdy, Chas. McGinley, M. G. Conlin and F. W. Scott.

**\*Somerset & Bakersville Railway, Somerset, Pa.**—Chartered to construct an electric railway from Rockwood to Bakersville, a distance of 9 miles. Charles F. Hood, Connelville, president.

**\*Washington Traction Company, Walla Walla, Wash.**—Incorporated to construct a system of electric railways radiating out of Walla Walla to various points in the eastern parts of Washington, Oregon and Idaho. Capital stock, \$3,500,000. Incorporators: Gilbert Hunt, Ben C. Holt, J. B. Catron, J. C. Armstrong and J. L. Mohundro. Coincident with this, articles of incorporation were filed for the Interurban Construction Company. Capital stock, \$100,000. Incorporators: J. B. Catron, F. C. Hindle and J. C. Armstrong. This latter company will operate in conjunction with the former one, doing its construction work.

### FRANCHISES

**Fairfield, Cal.**—The Board of Supervisors has granted Randall, Trowbridge & Wright, Oakland, a franchise to construct an electric railroad connecting Vallejo, Benicia and White Sulphur Springs. [E. R. J., Feb. 6, '09.]

**Oakland, Cal.**—The Board of Supervisors has granted a franchise to the Oakland Traction Company for a new line on Hopkins Street.

**San Diego, Cal.**—Application has been made to the Board of Supervisors by E. W. Peterson, representing the South San Diego & Imperial Beach Railway, for a franchise to construct an electric railway along certain streets of San Diego. [E. R. J., Dec. 12, '08.]

**Santa Barbara, Cal.**—A franchise for a trackless trolley from Santa Barbara to the Hope ranch has been awarded by the City Council to the Pacific Improvement Company. [E. R. J., April 10, '09.]

**Moscow, Idaho.**—The Spokane & Inland Empire Railroad, Spokane, Wash., has filed application for more right of way through the western part of Moscow to the corner of South Main Street and Sixth Street.

**Peoria, Ill.**—W. T. Irwin, president of the Peoria Railway Terminal Company, has applied to the City Council for a franchise to build a passenger and freight line along South Washington Street.

**Bluffton, Ind.**—The Bluffton, Geneva & Celina Interurban Railway has applied to the County Commissioners for a franchise to build an electric railway over certain of the public roads between Bluffton and Adams County. [E. R. J., May 1, '09.]

**Warsaw, Ind.**—The County Commissioners have granted a franchise to J. A. Barry in the interest of the Wabash & Northern Traction Company for an electric railway from Warsaw to the south boundary of the county. The company proposes to build an electric railway from Warsaw to Wabash. [E. R. J., May 1, '09.]

**Utica, N. Y.**—The Common Council has granted the Utica & Mohawk Valley Railway a franchise for a new line on Whitesboro Street.

**Tulsa, Okla.**—The Oklahoma Union Traction Company recently organized to build an electric railway from Tulsa to Sapulpa, has been granted a franchise to enter Tulsa. Albert A. Small and E. T. Tucker, Tulsa, are said to be interested in this company. [E. R. J., April 17, '09.]



**Cincinnati, Ohio.**—The ordinance granting the Cincinnati, Wilmington & Xenia Traction Company a 20-year franchise in Cincinnati has been read for the first time and referred to the committee on street railways. It is stated that the company proposes to put up a cash deposit of \$50,000 as an evidence of good faith, which will be forfeited if it does not begin construction work within one year and complete the line within two years. A bond is also proposed to insure the performance of all agreements. The franchise contains a clause which will allow arrangements to be made for any other interurban railway to come into the city over its lines. [E. R. J., Dec. 26, '08.]

**Brantford, Ont.**—The City Council has given the Brantford Street Railway a renewed lease of its 50-year franchise. The company filed a bond for \$70,000 that it would meet with the terms of its agreement with the City Council.

**Newville, Pa.**—The Town Council has granted the Cumberland Railway, Carlisle, a franchise for an electric railway through Newville. The proposed line will extend from Carlisle to Newtonville, a distance of 12 miles. [E. R. J., April 17, '09.]

**Ellensburg, Wash.**—The Kittitas County Commissioners have granted an electric railway franchise to Frank S. Farquhar, representing the Cle Elum-Roslyn Electric Railway & Power Company. The railway will run from 1 mile south of Cle Elum through that city to Roslyn, thence through Jonesville to Lake Cle Elum over a bridge across the Yakima, to be built jointly by the county and the Milwaukee Railroad. The total length will be 17 miles. [E. R. J., May 15, '09.]

#### TRACK AND ROADWAY

**British Columbia Electric Railway, Vancouver, B. C.**—It is officially announced that this company will start work at once on extensions to its lines east of Vancouver, aggregating nearly 15 miles in length. The program outlined includes the construction of an initial line in Burnaby, about 6 miles in length. The company has awarded a contract to Boyd, Short & Craig for preparing the right-of-way for the line on Hastings Street east from Campbell Avenue to the eastern boundary of Hastings township. This extension calls for about 7 miles of new track.

**Point Loma Railroad, San Diego, Cal.**—This company has completed and placed in operation a section of its electric railway. The whole system, connecting San Diego with Roseville, Point Loma and Ocean Beach, 9 miles, is to be in operation by July 1. Power is purchased from the San Diego Electric Railway. D. C. Collier, Union Building, San Diego, president and general manager. [E. R. J., Nov. 28, '08.]

**Pacific Electric Railway, Los Angeles, Cal.**—This company has awarded contracts to S. E. Talbert, Talbert, Cal., and to the Robert Scherer Company, Los Angeles, for the construction of an extension from Delhi to Huntingdon Beach, 10 miles.

**Denver, Colorado Springs & Pueblo Interurban Railway, Denver, Col.**—Louis M. Pfeiffer, a director of this company, is quoted as saying that this company will have its proposed electric railway between Denver and Pueblo in operation within a year. The promoters have virtually entered an agreement with the Colorado Springs & Interurban Railway to use its lines and terminals in Colorado Springs, and thus eliminate the necessity of securing a franchise from that city. The same arrangement is to be made with the Denver Tramway for entrance and terminals at Denver. The bond issue authorized will provide for the construction of the first division of the railway from Denver to Colorado Springs, and the company expects to have the bonds underwritten and construction started within six weeks. Practically all of the right of way has been secured between Denver and Colorado Springs. The line will be 65 miles in length from the city limits of Denver to the city limits of Colorado Springs, and the maximum grade will be 1¼ per cent. Power is to be furnished by the Central Colorado Power Company from Denver, but the company will erect several substations along the line at points yet to be determined. Until the line to Colorado Springs is well under way or in operation it is probable that no action will be taken toward extending the line to Pueblo. [E. R. J., April 10, '09.]

**Lebanon (Conn.) Street Railway.**—This company has decided to begin at once the sale of its preferred stock, which amounts to \$100,000, preparatory to the construction of the proposed electric railway between Yantic and South Manchester, a distance of 28 miles. The preliminary survey of the line has been completed. [E. R. J., Jan. 23, '09.]

**Fitzgerald & Ocilla Electric Railway & Power Company, Fitzgerald, Ga.**—This company has filed for record at Fitzgerald a mortgage to the Windsor Trust Company, New

York, N. Y., as trustee to secure an issue of \$250,000 of 5 per cent gold bonds. It is planned to construct an electric interurban railway to connect Fitzgerald and Ocilla, 12 miles. [E. R. J., April 10, '09.]

**Chicago, Wheaton & Western Railway, Chicago, Ill.**—W. C. Carrington, Gary, Ind., has been awarded the contract for constructing that section of this proposed electric railway from Wheaton to Geneva. Headquarters, 707 Rookery Building, Chicago. Henry C. Wood, president. [E. R. J., Feb. 27, '09.]

**Galesburg & Rock Island Traction Company, Rock Island, Ill.**—Official announcement is made by this company that by July 1 work on the construction of this proposed electric railway will be under way at four points. Work will probably begin at Galesburg. The right of way between Galesburg and Alexis, 15 miles, has been secured. Between Alexis and Rock Island 75 per cent has been secured. The estimated cost of the railway is \$2,000,000, and the capital stock of the company is to be increased to \$1,500,000 within the next few days. Cars will be operated into Rock Island from Milan over the tracks of the Tri-City Railway. The permanent survey of the line is direct from Galesburg to Alexis; from Alexis to Preemption; from Preemption to Milan, and thence to Rock Island. The Empire Trust Company, New York City, is trustee of the bonds and mortgages of the railway. The mortgage will be filed next week in Rock Island County and in Mercer, Warren and Knox Counties. The Security Bank Note Company, Philadelphia, is preparing the bonds and securities of the company. [E. R. J., March 13, '09.]

**Chicago, Fox Lake & Lake Geneva Railroad, Chicago, Ill.**—M. B. Louis, vice-president of this company, which contemplates the construction of an electric railway to connect River Grove, Franklin Park, Riverview, Desplaines, Fox Lake and Lake Geneva, 70 miles, advises that it is the plan to begin work during the summer. The repair shops will be located at Franklin Park. [E. R. J., Dec. 19, '08.]

**Chicago (Ill.) Railways.**—Bids will be received by this company until May 27 for the construction of the Washington Street tunnel of reinforced concrete, between Clinton Street and Canal Street.

**Gary, Hobart & Valparaiso Traction Company, Hobart, Ind.**—Ground was broken at Hobart on May 14 for the new electric railway which this company proposes to build from Hobart to Gary. Blake A. Mapledoram, general manager. [E. R. J., April 3, '09.]

**Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.**—The Union Trust Company, 116 East Market Street, Indianapolis, receiver for this company, writes that new bids will be received until May 24 for completing, equipping and operating this railway between Indianapolis and New Castle. The American Pipe Manufacturing Company, Philadelphia, Pa., was the only bidder for this work on May 13, at a total of \$446,500.

**Vincennes, West Baden & Louisville Traction Company, Vincennes, Ind.**—A. M. Yelton, president of this company, which proposes to build an electric railway from Vincennes to Jasper, Ind., has announced that the work of building will be started in a short time, possibly within 60 days. The St. Louis Trust Company, it is said, will take \$500,000 as soon as the company disposes of \$250,000 worth of stock. Already \$100,000 of stock has been subscribed for, and in addition \$125,000 in subsidies has been voted by townships through which the line will pass. [E. R. J., March 27, '09.]

**Kentucky & Ohio River Interurban Railroad, Paducah, Ky.**—John J. Freundlich, general manager, writes this company contemplates beginning work on its proposed electric railway about June 1. It will connect Paducah and Cairo, Ill., 35 miles.

**Twin City Rapid Transit Company, Minneapolis, Minn.**—It is announced that this company will place in operation on July 1 its new line between Minneapolis and St. Paul. The new bridge at Fort Snelling, which had to be built before the cars could cross the river here, is completed and tracks laid. All the work that remains is the putting in of the connecting links between the Fort Snelling and the Seventh and Robert Street lines. On the east side of the river part of the old right of way had to be given up and a new and more direct approach secured. The grading for this is now going on. The final details in the negotiations with the government to run cars through the Fort Snelling reservation are also being completed. The new interurban line will be 17.4 miles long from Hennepin Avenue and Fifth Street in Minneapolis to the East Seventh Street station in St. Paul and the trip will be made in an hour.

**Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.**—Samuel Barnes, general manager, advises that this company is overhauling its tracks and overhead construction. A contract has been placed with the Com-



mercial Electric Company, St. Louis, Mo., for line material. An order was also placed with the Elliot Switch & Manufacturing Company, St. Louis, Mo., for 2 150-ft. turnouts.

**\*Gardiner, Nev.**—A company headed by H. H. Springmeyer and A. Jensen has been organized at Gardiner for the purpose of building a street railway from the terminus of the Carson Valley branch of the Virginia & Truckee Railroad to Gardiner, a distance of 1 mile.

**Titusville Northern Railroad, Weston, N. J.**—This company is considering the purchase of electrical supplies and material for its proposed electric railways at Titusville, Union City and Cambridge Springs, Pa., and the connections thereto. Grading has been completed and construction is now under way. Jesse L. Straus, Weston, N. J., treasurer.

**Brooklyn (N. Y.) Rapid Transit Company.**—The Court of Appeals has handed down a decision in favor of this company in the matter of the proposed extension of the Nostrand Avenue line from Nostrand Avenue and Flatbush Avenue to Nostrand Avenue and Avenue Q, a distance of about 1½ miles. The company will at once begin work on the extension.

**Long Island Railroad, New York, N. Y.**—This company has begun work on its proposed electric railway, which will establish connection between Huntington and Amityville. The 6 miles between Huntington and Melville are already in operation, and the contract for the 9 miles between Melville and Amityville has been awarded to the Seaboard Construction Company, Brooklyn. The line will traverse Huntington, Melville, Farmingdale and Amityville, and under the specifications prepared by J. R. Savage, chief engineer of the company, 25,000 ft. of 7-in. girder rail are to be used through the village and about 25,000 ft. of T-rail through the outskirts.

**Kanauga Traction Company, Gallipolis, Ohio.**—This company, which for the last two years has been operating a 5-mile gasoline motor line between Gallipolis and Kanauga, is now converting it into an electric railway. J. S. Howard, secretary and treasurer of the company, writes that the line will probably be extended during the summer.

**Cleveland, Alliance & Mahoning Valley Railroad, Cleveland, Ohio.**—It is stated that steps are being taken to begin work immediately on this proposed electric railway. The company has taken over a steam railroad between Ravenna and Hudson and will immediately electrify the line and extend it from Hudson to Cleveland by way of Twinsburg, Randall and Woodland Hills. The company has also purchased a line between Ravenna and Warren, and will also electrify it at once for service between those two points. Headquarters, Electric Building, Cleveland.

**\*Zanesville & McConnellsville Traction Company, Zanesville, Ohio.**—It is stated that A. W. McDonald, Pittsburgh, and R. C. Burton are at the head of a movement to build an electric railway between Zanesville and McConnellsville. Rights of way have been partially secured between Duncan Falls and McConnellsville.

**Cincinnati, Wilmington & Xenia Traction Company, Wilmington, Ohio.**—This company, which proposes to connect Cincinnati, Wilmington and Xenia with an electric railway, announces that it has about completed the preparatory work and has made a partial prospectus of the enterprise. As this company was organized for preliminary purposes, it is likely that another company will be organized to carry out the work. It is probable that the company will have construction under way about June 1. [E. R. J., Dec. 26, '08.]

**Memphis (Tenn.) Street Railway.**—One line which this company is rebuilding includes 35,000 ft. of 9-in. girder and 75-lb. T-rail track. The street on which this track is being relaid originally was the private right of way of a steam dummy line. For one-half of the length of this street the right of way has been given over to the city in return for the double-track franchise. The outer half of the street's length also has been given to the city with the exception of a neutral strip along the center in which the T-rail tracks are being relaid. This neutral strip has curbing on either side and the track is rock-ballasted with sheet-concrete street intersections. The section of the street nearer the business part of the city in which 9-in. girder rail is being laid is being paved with asphalt. The rails are supported on creosoted ties spaced 5 ft. on centers with tie rods between. The track substructure comprises mass concrete.

**Temple, Tex.**—At a recent meeting of the Temple Commercial Club, a communication was received from Albert Hershey, secretary of the Waco Commercial Club, with reference to the organization of a company among the financial interests of the two places to construct an interurban electric railway between Temple and Waco. A committee was appointed to co-operate with the Waco committee and perfect the organization of the company.

**Fairmount & Clarksburg Traction Company, Fairmount, W. Va.**—This company has authorized the construction of an extension from Clarksburg to Bridgeport, about 3.3 miles in length. Bids were received on May 17 for this work, which is to be completed within about three months. The company is just completing another extension, 1½ miles in length, from Fairmount to the Fairmount Fair Association's race track at East Fairmount. An 80-lb. A. S. C. E. rail is being used on both extensions; standard roadbed and track also.

**Slate Belt Railroad, Poultney, Vt.**—It is reported that this company will begin making surveys for an electric railway between Granville and Fair Haven, via Poultney. Franchises have been secured in Fair Haven and Poultney. William Nathaniel, Poultney; A. Mulholland, New York, N. Y., and A. Y. Gray, Middletown, are said to be interested in this company.

**\*People's Improvement Company, Lynchburg, Va.**—R. J. Hughes, president, advises that this company has been incorporated for the purpose of constructing an electric railway from Fairview Heights to Lynchburg, 1 mile. It is the intention to start work on the line about June 1. The company will need rails, ties, poles and overhead material. When completed the line will be operated as part of the Lynchburg Traction & Light Company. R. J. Hughes, Post Office Box 81, Lynchburg, president; R. C. Blackford, Law Building, Lynchburg, secretary and treasurer.

**Seattle, Wash.**—E. L. Blaine, Seattle, who recently applied for a franchise to build an electric railway from Renton to Issaquah, writes that as soon as the franchise is granted a company will be organized and other plans perfected to construct and operate the proposed railway. No details concerning the line or its promoters will be given out until after the County Commissioners act on the franchise, which will be on May 25. The proposed railway will be about 12 miles in length. [E. R. J., May 1, '09.]

**Panhandle Electric Railway & Power Company, Spokane, Wash.**—Vernon M. Smith, president, writes that preparations are being made by this company to begin work about July 1 on the proposed 30-mile electric railway between Priest River and Coolin. A power station having a capacity of 30,000 hp will be built on the Priest River. Besides operating the railway power will also be furnished for mining and manufacturing purposes. [E. R. J., April 24, '09.]

**Wheeling (W. Va.) Traction Company.**—It is stated that this company plans to extend its line through Rayland in addition to making other track improvements. The track in Steubenville will be partially replaced with heavier rails and about 1½ miles of the track on the Moundsville division will be replaced.

**Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis.**—This company is said to have begun surveying for an extension between Eau Claire and Altoona.

#### POWER HOUSES AND SUBSTATIONS

**New Hampshire Electric Railways, Haverhill, Mass.**—This company has awarded a contract to E. A. Peabody & Son, Lawrence, for the construction of a substation which is to serve its western division. The station will be of brick. It will be situated in Methuen, half way between Haverhill and Lawrence, on the line of the Lawrence & Methuen division.

**Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.**—This company has recently placed the following orders for new apparatus: With the Weston Electric Company, St. Louis, Mo., for switchboard instruments; switches and circuit breakers from the Westinghouse Electric & Manufacturing Company.

**Geneva, Waterloo & Cayuga Lake Traction Company, Seneca Falls, N. Y.**—Announcement is made that this company will construct an auxiliary power plant at Cayuga Lake Park. It will be equipped with a 200-kw generator and a 200-hp Ball engine. W. C. Gray, manager.

**Interborough Rapid Transit Company, New York, N. Y.**—This company contemplates enlarging its power plant, but has not definitely decided on the equipment it will purchase.

**Manor Valley Railway, Irwin, Pa.**—It is announced that this company will build a power plant to supply current for the operation of its line between Irwin and Herminie.

**El Paso (Tex.) Electric Railway.**—Construction has been begun by this company for the extension of its power plant, to cover the present site on South Santa Fé Street and an adjoining lot 330 ft. x 260 ft. The work is being done by the Stone & Webster Engineering Corporation. The addition will be equipped with a 1500-kw Allis-Chalmers horizontal turbine engine, direct connected to a 2200-volt, two-phase generator, together with new switchboard gallery, traveling crane, boiler plant and condensing arrangements for the operation of the new unit.



# Manufactures & Supplies

## ROLLING STOCK

**Memphis (Tenn.) Street Railway** is building an express car at its shops.

**United Railways & Electric Company, Baltimore, Md.,** will not purchase the cars for which it was reported to be in the market.

**Buffalo & Lackawanna Traction Company, Buffalo, N. Y.,** has issued specifications for 10 city cars which it proposes to purchase.

**Puget Sound Electric Railway, Tacoma, Wash.,** will purchase two cars, through Stone & Webster, Boston, Mass., general managers.

**Port Arthur (Ont.) Electric Street Railway** will shortly ask for bids on the four pay-as-you-enter cars for which it was mentioned to be in the market in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909.

**Tri-City Railway, Davenport, Ia.,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 20, 1909, as being in the market for 10 single-truck closed cars, will place the order for this equipment within the next few weeks.

**Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia.,** is reported to have placed an order for a combination passenger and baggage car and a trail car with the Niles Car & Manufacturing Company.

**Springfield (Mass.) Street Railway** will purchase 12 new box cars for city service, 32 new motors and controllers to replace equipment on box cars and 10 new trucks and controllers to replace equipment on some double-truck cars.

**Northern Texas Traction Company, Fort Worth, Tex.,** will buy four cars through Stone & Webster, Boston, Mass., within the next two weeks. Mention of the contemplated purchase of 10 cars by this company was made in the *ELECTRIC RAILWAY JOURNAL* of May 8, 1909.

**Illinois Traction System, Champaign, Ill.,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of Jan. 30, 1909, as contemplating the purchase of 20 or 25 cars for operation on its line entering St. Louis, advises that it has practically completed plans for purchasing 30 cars to be used in this service.

**Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909, as contemplating the purchase of car equipment, has bought motors from the Westinghouse Electric & Manufacturing Company to be used on summer cars which it has on hand.

**Portland Railway, Light & Power Company, Portland, Ore.,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 8, 1909, as having bought 50 more pay-as-you-enter cars, has ordered only 40 cars 28 ft. 8 in. long from the American Car Company. Brill maximum traction trucks and General Electric No. 218 65-hp interpole motors especially made for cars of 3 ft. 6 in. gage will be used.

**Fairmont & Clarksburg Traction Company, Fairmont, W. Va.,** has ordered type 21-E single trucks from The J. G. Brill Company and several sets of GE No. 80 motors. The company will in the near future be in the market for two double-truck cars to be equipped with air brakes for use on an extension it is now building. Reference to the fact that this company was in the market for equipment was originally made in the *ELECTRIC RAILWAY JOURNAL* of April 3, 1909.

**Blue Hill Street Railway, Canton, Mass.,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of March 6, 1909, as contemplating the purchase of rolling stock to replace cars destroyed by fire, has ordered 12 cars through Stone & Webster, Boston, Mass., from the Wason Manufacturing Company. Seven of the new cars will be 21 ft. long and of the semi-convertible type and five will be 10-bench open cars. Each will be equipped with the Standard Motor Truck Company's single trucks, two GE-80 motors and K-II controllers.

**Chicago (Ill.) Railways,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of Feb. 13, 1909, as contemplating the purchase of 350 cars, is sending out specifications for this number. The bids are returnable May 26, 1909. The cars, which are to be of the pay-as-you-enter type, are to have an over-all length of 46 ft.; length over corner posts, 31 ft. 6 in.; length over crown pieces, 45 ft.; width over drip rails, 8 ft. 4 in.; over posts at belt rail, 8 ft. 4½ in.; over guard rail, 8 ft. 6 in.; height, top of rail to top of trolley boards, 11 ft. 8½ in.; wheel base, 19 ft. 11 in.; 34-in. steel wheels; seating capacity, 40. The cars are to have a metal bottom framing, cast-steel body bolsters, round clam-shell type vestibules at each end, and are to have 11 single windows

on each side of the car. Some of the special devices called for in the specifications are Taylor automatic ventilators (or equal); "Walk-Over" 199A seats; Pantasote side curtains; Samson bell cord; Keystone (or equal) pneumatic bells; electric heaters; Consolidated push-button system; Hunter illuminated signs; Crouse-Hinds type Z headlight; Wilson trolley catcher; International (or equal) registers. The cars are to be lighted by nine 16-cp frosted incandescent lamps on each side of the deck and three 32-cp frosted lamps placed in a row in the center of the ceiling. The inside of the cars are to be cherry with a mahogany finish, and bronze trimmings are to be used. The roofs are to be of the monitor deck type.

**Hagerstown (Md.) Railway,** mentioned in the *ELECTRIC RAILWAY JOURNAL* of April 24, 1909, as having ordered one car from the Cincinnati Car Company, Cincinnati, Ohio, has specified that the new car shall be a combination baggage and passenger coach with the following details:

Seating capacity.....	44	Underframe.....	Composite
Weight.....	19,000 lb.	Couplers.....	Cincinnati
Bolster centers, length,	19 ft. 6 in.	Curtain fix....	Curtain S. Co.
Length of body.....	32 ft.	Curtain material...	Pantasote
Over vestibule.....	4 ft. 6 in.	Hand brakes.....	Peacock
Width over sheathing,	8 ft. 2 in.	Heating system.	Consolidated
Sill to trolley base.....	9 ft.	Headlights.....	Dayton
Height from top of rail to		Sanders.....	Cincinnati
sills.....	31 in.	Seats.....	H. & K.
Body.....	Wood	Seating material.....	Rattan
Interior trim.....	White oak	Step treads,	
		Trucks.....	Peckham No. 25

## TRADE NOTES

**Standard Brake Shoe Company, Aurora, Ill.,** has moved its Chicago office from the Railway Exchange to 518 Fisher Building.

**Chicago Steel Car Company, Chicago, Ill.,** has increased its capital stock from \$50,000 to \$250,000 and the number of its directors from four to five.

**Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.,** has appointed H. C. Slein sales manager in addition to advertising manager.

**Roger's Journal-Packing Company, Chicago, Ill.,** has appointed Willis C. Squires general sales agent for its improved journal packing and receptacles.

**General Fire Extinguisher Company, Providence, R. I.,** has removed its Chicago office from the Royal Insurance Building to Room 500, 184 La Salle Street.

**W. P. Stevens,** who has been associated with the Chicago office of the Consolidated Car Heating Company for the past 18 months, has resigned from the company.

**Arthur D. Little Laboratory, Boston, Mass.,** has been recently incorporated under the name of Arthur D. Little, Inc., in order to extend the facilities of the laboratory for handling work involving industrial application of chemistry.

**C. A. S. Howlett,** of the Western Electric Company, Chicago, Ill., has been elected president of the National Sales Managers' Association. This association was organized last fall and has a membership of about 200 salesmen connected with wholesale and retail firms in Chicago.

**Electro-Mechanical Engineering Bureau, Chicago, Ill.,** has recently opened offices in the Monadnock Block for consultation, inspection and tests along mechanical, electrical and chemical lines, and to give expert attention to the development and design of new devices, processes and patentable ideas.

**B. Elshoff,** for 12 years assistant superintendent of the Allis-Chalmers-Bullock Company, Cincinnati, Ohio, and for the past two years superintendent of the electrical department of the Allis-Chalmers Company, Milwaukee, has recently severed his connection with the last-named company. Mr. Elshoff will remain in Milwaukee for the present.

**I. R. Nelson & Company, Newark, N. J.,** have received a contract from Wonham, Magor & Sanger, New York, to install the "H. B." life guard on all the cars of the Third Avenue Railroad and the Union Railway, New York. I. R. Nelson & Company are also repainting all the cars of the New Jersey & Pennsylvania Traction Company using Sherwin-William colors and Hildreth varnish.

**Darley Engineering Company, 149 Broadway, New York, N. Y.,** has discontinued its Pittsburgh office and has removed its engineering, purchasing and sales departments to 149 Broadway, New York. The Chicago office of the company, which is in the Monadnock Building, will be continued. The new officers of the company recently elected are: W. A. Stadelman, president and general manager; C. L. Inslee and



W. G. Hudson, vice-presidents; W. W. Ricker, treasurer, and M. D. Chapman, secretary.

**Wagner Electric Manufacturing Company, St. Louis, Mo.**, has opened an office in the Ideal Building, Denver, Col., to handle its business in Colorado, New Mexico, Utah, Montana and eastern Idaho. The office is in charge of O. H. Davidson, of the Electric Manufacturers' Sales Company, who has a wide acquaintance in this district, having been located in Denver for several years.

**Rooke Automatic Register Company, Providence, R. I.**, has installed the Rooke system of fare collection on the Templeton Street Railway, East Templeton, Mass. This register was adopted largely because of the favorable results secured on the Norton & Taunton Street Railway with the system. The Gardner, Westminster & Fitchburg Railway has also installed these portable registers. Fifteen of them were put in service May 4. The daily papers speak very highly of their reception by the public.

**American Blower Company, Detroit, Mich.**, announces that L. E. Burton, formerly associated with J. T. Mooney & Company, Nashville, Tenn., and the W. J. McPherson Company, Portland, Ore., has been appointed to take charge of the company's sales in Washington, Oregon and Idaho, with headquarters at 388 Arcade Annex, Seattle, Wash. Thomas W. Fitch, until recently sales manager of the Capell Fan & Engineering Company, now represents the Sirocco mine fan department of this company in the bituminous coal district, with headquarters at the Pittsburgh sales office, 218 Empire Building.

**James Beggs & Company, New York, N. Y.**, manufacturers of the Blackburn-Smith feed-water filter and grease extractor, have appointed the following sales agents: Walter G. Ruggles Company, Boston, Mass.; M. J. Daly & Sons, Watertown, Conn.; Buffalo Mill Supply Company, Buffalo, N. Y.; National Valve & Manufacturing Company, Pittsburgh, Pa.; Murdock Manufacturing & Supply Company, Cincinnati, Ohio; A. Harvey's Sons Manufacturing Company, Detroit, Mich.; R. B. Whitacre & Company, St. Paul, Minn.; Plant Rubber & Supply Company, San Francisco, Cal.; H. W. Petrie, Montreal; H. W. Petrie, Ltd., Toronto, Ont., and Vancouver, B. C.; Lebedjeff & Company, San Juan, Porto Rico; W. G. Harry & Company, Georgetown, British Guiana, South America. The Blackburn-Smith filter first became popular for removing oil from the condensed exhaust steam where this condensation must be fed back to the boilers. The filter has been found very effective, and is now widely used for the removal of oil from hot well water, open-heater returns, etc. It is also efficient in removing mud, slime and organic impurities in suspension in the water supply.

**Trolley Supply Company, Canton, Ohio**, has furnished some further details on the interesting semaphore light described in the *ELECTRIC RAILWAY JOURNAL* of May 15. The semaphore is an exceptionally well made lamp, having a case and door frame of cast iron. The reflector is spun from No. 18 gage brass and heavily nicked. When used in combination with this company's 9-in. semaphore lens, it gives a far more effective light than can be obtained from the old-style lamp. Each light is furnished with one standard 16-cp 110-volt incandescent lamp in series with the interior car lights. One advantage of this semaphore light over similar headlights is in its method of fastening. It is bolted directly to the dash of the car, so that the objectionable feature of cutting the dasher is eliminated. Besides being a dash headlight for city cars, the semaphore can be used as a signal light with a lens colored red, blue or green. The method of fastening this lens is another very good feature. The lens is held in place by four brass cleats, which is quite an improvement over the brass ring and spring fastening. The advantages of a semaphore lens are many. The principal one is its durability, as it is practically indestructible and is not broken when fenders and other obstacles are thrown against it.

**W. A. Garrett**, president of the Seaboard Air Line Railway, Norfolk, Va., and since the receivership executive officer for the receivers, has been elected vice-president of the T. H. Symington Company, Baltimore, Md. Mr. Garrett's new duties will require a severance of his connection with the Seaboard Air Line not later than Nov. 1, 1909, until which date he has consented to remain as executive head of the system. Mr. Garrett entered the railway field in 1876, and before becoming connected with the Seaboard Air Line was general manager of the Cincinnati, New Orleans & Texas Pacific Railway and the Alabama Great Southern Railroad. He served consecutively with the St. Louis Union Depot Company as office messenger, clerk of the car department, timekeeper, assistant paymaster, purchasing agent, superintendent's secretary and assistant superintendent. From March, 1893, until Jan. 1, 1896, he was superintendent of the Terminal Railroad Association,

and from December, 1893, to Jan. 1, 1896, also was terminal superintendent of the Wabash Railroad at St. Louis. From Jan. 1, 1896, to April 1, 1897, Mr. Garrett was superintendent of the Western Division of the Wabash Railroad, and from April 1, 1897, to Aug. 7, 1899, he was superintendent of the Middle Division of the same company. Mr. Garrett next entered the employ of the Philadelphia & Reading Railway and served in turn as superintendent of the Philadelphia division, superintendent of the New York division and general superintendent of the company. On May 1, 1903, he was appointed general manager of the Cincinnati, New Orleans & Texas Pacific Railway and the Alabama Great Southern Railroad.

## ADVERTISING LITERATURE

**Pettingell-Andrews Company, Boston, Mass.**, show great variety of condulets in the May number of *Juice*.

**Graphite Lubricating Company, Bound Brook, N. J.**, has issued a small card showing a box of 50 Bound Brook bushings sealed with a green label.

**Meyer Safety Guard Company, Omaha, Neb.**, has printed a booklet showing various applications of its adjustable safety barrier for open and closed cars.

**Canton Culvert Company, Canton, Ohio**, has printed a new catalog showing some interesting electric and steam railway installations of its non-corrosive "Acme" corrugated metal culverts.

**Trolley Supply Company, Canton, Ohio**, has published a pamphlet describing and illustrating its national roller and ball-bearing trolley base and setting forth eight reasons why it is better than others.

**Hurley Track-Laying Machine Company, Chicago, Ill.**, has printed an illustrated booklet on its track-laying equipment. This machine lays 2 to 4 miles of track a day, depending upon the character of labor employed.

**Crocker-Wheeler Company, Ampere, N. J.**, in Bulletin No. 112, describes motor-driven exhaust fans. Bulletin No. 113 from the same company illustrates and describes large direct-current motors and their component parts.

**Barrett Manufacturing Company, New York, N. Y.**, is issuing a new catalog showing roads constructed with Tarvia, a tar binder which the company recommends for preventing dust and preserving macadam roadways.

**Lord Electric Company, New York, N. Y.**, has issued Bulletins I and J, descriptive of the Garton multi-vapogap lightning arrester, and also of the company's "Hydro-ground." A price list and table of dimensions are appended.

**Shepard Electric Crane & Hoist Company, Montour Falls, N. Y.**, announces bulletin No. 502, illustrating cranes and hoists. Among these are three motor-cage-controlled traveling cranes and single-girder bracket jib cranes.

**Standard Steel Works Company, Philadelphia, Pa.**, has published a catalog on steel-tired wheels for electric and steam railroads showing designs recommended by the principal railroad associations. The booklet contains sections of 39 types of wheels.

**Southern Railway Supply Company, St. Louis, Mo.**, has just issued Catalog No. 10, an imposing cloth-bound volume of over 600 pages. It contains illustrated descriptions and price lists of thousands of objects used in electric railway construction and operation and an addenda comprising many practical tables.

**H. W. Johns-Manville Company, New York**, has published an extensive, illustrated catalog on "Noark" service and subway boxes, which differ in important respects from those described in this company's 1905 catalog. The company has also issued a booklet on "Permanite" sheet packing for steam machinery.

**Joseph Dixon Crucible Company, Jersey City, N. J.**, gives in *Graphite* for May, an interesting article on the manufacture of Dixon pencils, a letter on the value of Dixon air-brake grease, and another article on the prevention of corrosion of car machinery. The company has also issued a new booklet on graphite products including grease, flake graphite, pipe-joint compound, belt dressing and carbon brushes.

**General Electric Company, Schenectady, N. Y.**, has recently issued Bulletin No. 4658, describing type US-14 ball-bearing trolley base. The double ball-bearing used on this base produces an extremely sensitive action which, by eliminating the arcing, pounding, wrenching, etc., inherent in ordinary forms, insures decreased wear on trolley wheel and overhead construction. A cushioned top is provided to protect the pole from bending or breaking should the wheel leave the wire. This publication contains, also, a list of supply parts for this base.