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THE MENACE OF THE BUS

Mayor Rose's message of Dec. 23, 1914, on the "jitney" (5-cent) bus to the Los Angeles City Council is a sane presentation of the danger and money loss that confront electric railway and municipality alike if the bus is allowed to engage in city transportation without making the same relative compensation to the municipality as does the electric railway. The figures presented by the Mayor, showing a possible loss to the railway of $750,000 a year, of which 80 per cent would return to the city in various ways, are startling. It is not often that a public official sees so clearly what the electric railway means to the people as a taxpayer, employer, purchaser and purveyor of a large amount of transportation at low cost. As in other cities where a similar service has been begun, the buses compete only for the cream of the traffic. They do not transfer to other routes for the same fare, and they change their courses at pleasure. They are practically irresponsible in regard to accidents, and they pay no taxes, either in the form of cash or pavement maintenance. The experience in Los Angeles is but a repetition of what has occurred in many foreign cities. In almost every case abroad the tramways suffered heavy losses before the law had caught up to the novel conditions introduced by the power bus. In many foreign cities the situation remains unameliorated. We hope that the American electric railways will not have to wait too long for city councils and state legislatures to protect them against such unfair competition, for in the end, as Mayor Rose, says, the people will be compelled to depend upon the street railways for the greater part of their transportation.

ENGINEERS AND ENGLISH

Style in writing has been compared to a window. The best window is one which is so clear that the light passes through it as through an opening. When the window begins to attract attention, there is something wrong with it. It is the same with style. It should be so clear as not to obstruct the flow of thought from the printed page to the mind of the reader. When the reader begins to notice the style, and his attention is distracted from the thought which the words are intended to transmit, the writing is at fault. Unfortunately, most of our engineering schools do not give sufficient attention to instruction in rhetoric, or the art of expression. The science of engineering in its various phases has developed so rapidly that the courses of study in the technical schools have had to be confined very closely to engineering studies, and that of English has been neglected. Again, after he leaves college, the average engineer does not have much opportunity to acquire ease in writing clear and concise English, and the work which he has to do in preparing contracts and specifications certainly does not help him in this respect. Yet an ability to write clearly is necessary if he is to impress his ideas upon a large number of other persons. In this issue we take pleasure in publishing a well-written letter on the subject of the use of English, by a professor who tries to teach engineering students how to write. Every reader of this paper who has letters, shop orders, reports, technical papers, addresses or anything else to write can profitably give this subject careful attention.

CRYSTALLIZING THE SAFETY MOVEMENT

Whether the safety movement is to be treated merely as an ephemeral incident or is to be an established factor in the electric railway industry is a question which those who have undertaken a comprehensive safety campaign should decide. Many roads have treated the safety crusade as a temporary proposition extending over a period of six weeks or more during which a most extensive canvass of the situation is made, but little or no effort is put forth to place the movement on a permanent footing. The real value of a safety campaign is to be had only by making it continuous and, to a certain extent, automatic. Of course, a permanent safety organization is a long step in this direction, but even with it interest will lag. It appears to us that the most enduring influence is to be had not only by providing mechanical remedies for the prevention of accidents that have occurred, but by compiling a permanent record of instructions for the benefit of the new employees. The new men are unacquainted with the conditions surrounding the causes of accidents in the past or the cures that were adopted for their elimination. The safety rule book recently issued by the Chicago Elevated Railways and mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1914, is an example of what may be termed the crystallization of a safety movement. Manifestly as the equipment and methods change, this book of rules will have to be amended so that it will form a record of past experience at all times which will be of benefit to the new employee. Further, it should become the duty of the employee in any of the departments to familiarize himself with the rules pertaining to the particular work he is to do and thereby profit by the experience of those who have gone before. In conclusion, we merely wish to warn against the ever-present tendency to join in these various crusades because they are popular. If any movement is worth while it should be undertaken only with a view of maintaining continued interest.

PROGRESS IN ELECTROLYSIS MITIGATION

During the past year the subject of electrolytic corrosion of underground pipes has had unusual publicity. This does not indicate necessarily more attention on the part of the interests involved, but it shows a desire to permit the experience of one to be available to all. The subject is taking on a more scientific aspect, always associated with the comprehensive solution of problems. As one surveys the past of the electrolysis controversy he is led to conclude that some of the reasons for the existence of a new epoch in this field are these: First, most of the more pressing technical electric railway problems have been solved and attention is available for those less urgent; second, the streets have become so filled, above and below ground, with tracks, pipes, conduits, etc., all of which form complicated return paths for railway return currents, that some understanding regarding the rights of all parties concerned must be reached; third, it is generally recognized that such an understanding must be based on the possession of full information. There has been, no doubt, an attitude of suspicion and distrust on the part of owners of pipes and conduits on the one hand and on that of railway managements on the other, based largely on lack of such information. Corrective measures involve expenditure, and neither side desires to make these unless convinced of responsibility and even then the methods proposed for relief must not be open to suspicion as to their effectiveness, reasonableness and permanence. Experts have differed in their plans for mitigating the trouble, hence their propositions have been considered experimental in character.

An unfortunate, but natural, temporary element at the present stage of development is a seeming division of opinion as to the merits of two remedial methods, the insulated return feeder system and the pipe drainage system. There is, however, a growing recognition of the fact that there is no one universal panacea. Conditions of soil resistivity and chemical composition, underground pipe layout, track and feeder distribution, etc., differ so widely that a plan successful and economical in one city might be quite the reverse elsewhere. Some cities are so fortunate as to be built upon soil which inherently prevents electrolysis, whereas other soils invite it. In order to seem up to date and progressive, however, it is quite possible that the governing boards in the electrolysis-proof city might be induced to prescribe regulations suited and necessary only elsewhere. Hence again, the need for full information.

That all pipe corrosion is not caused by stray currents would be generally admitted, but it is very difficult to prove that it was not so caused in any particular case. Conclusive statements, based on experiment, such as that printed in the issue of the Electric Railway Journal for Nov. 14, 1914, will do much to clarify this important phase of the question.

There is no doubt that the formation of the national joint committee on electrolysis, with its representation of most of the important involved interests, is the best omen of progress which has appeared in recent years. A report of this committee is now in preliminary form and will be issued shortly. If this report commands the respect which the standing of the members of the committee would lead us to expect, a potent influence for reasonableness and fairness will be exerted by it. A second factor, not distinct from the other, is the National Bureau of Standards, in its participation in electrolysis experiments on a commercial scale. The purpose of the bureau in these investigations is to secure data for the general welfare, and it enters upon them only when they promise scientific interest and data. Obviously the bureau advocates no particular method of return conductors. This great national institution can contribute materially to progress by occupying an influential, non-partisan position, furnishing accurate data upon the basis of which the several utilities can get together. With these co-operating agencies, the joint committee and the national bureau, at work, with the vast store of information heretofore locked up in the archives of railway, water, gas, telephone and other companies made available, and with the scientific, progressive spirit which is beginning to be manifest in full action, there is hope, not for a solution of the problem but for a normal attitude toward it.

ENGINEERING CHEMISTRY AND RAILWAYS

During the past decade the relations of the subject of engineering chemistry to the electric railway have broadened far beyond early conceptions of their scope. Operating men have become more interested in the qualities of material and supplies, and the keen search for more economical methods has opened new avenues of investigation in connection with the purchase of equipment and products used in quantity in various departments of company service. It is this varied usefulness of modern chemistry which is emphasized in the article printed elsewhere in this issue on the practice of the Bay State Street Railway. Whether a large system elects to maintain its own personal chemical staff or to retain an outside firm in a consulting capacity, as is done in this case, it is evident that the old conception of the chemist's duties must be widened before the full benefits of the policy can be reaped.

There are still many well-informed people whose conception of chemical engineering is limited to a vision of a narrow-chested, sallow-complexioned recluse whose only joy in life is to peer into beakers of malodorous, bubbling compounds in search of their contents, up in some dark cubbyhole under the roof where no one else will consent to work. It is a long stride from the attic to the conference room where the counsel of the chemical specialist is given in conjunction with the advice of the operating engineer and the invited criticism of the manufacturer, but the safeguarding of materials and of the company pocketbook which are the results of this work indicate that the resources of modern science are sure to be called upon more and more in public utility operation as time passes.

THE SUBWAY ACCIDENT

On the morning of Jan. 6 travel was interrupted in the New York subway and a number of passengers were injured, one fatally, as the indirect result of a cable blow-out. Smoke from a short-circuit in a splicing chamber forming part of the power distribution system and separated from the subway by asbestos-lined steel doors, found access to the subway and added to the excitement of passengers alarmed by the tying up of traffic. Undoubtedly a rigid inquiry will be instituted by the Public Service Commission and by the company to determine the best means of preventing a recurrence of a similar condition. Until this study has been made of the possibilities of the use of insulation other than that employed, methods of preventing the entrance of smoke or other noxious gases into the subway and their prompt removal when present, etc., it would be idle to give offhand opinions on the subject.

The occurrence of an accident of this sort naturally raises a query in the minds of some, not only in New York but in other cities, as to the safety of subway travel. No one can investigate the statistics on this subject without being impressed with the notable immunity from accidents enjoyed by these lines and the great degree of safety with which they are transporting vast numbers of people. For example, during each day the Interborough Rapid Transit Company on its subway and elevated lines hauls a very much larger number of passengers than all of the steam railroads in the United States haul during a year. For the year ended June 30, 1914, the Interstate Commerce Commission reported that as a result of train operation on the steam railroads, 265 passengers were killed and 15,121 were injured. During the previous year the figures were 403 and 16,539 respectively. On the other hand, during the same year, with 400 times as many passengers, the Interborough killed no one and had no serious accidents to passengers on its trains. We are stating these facts, not as an excuse for any possible neglect of the company to adopt precautions which will prevent accidents in the future, but because the public as a whole does not realize the small likelihood of accident to any individual passenger. Even a great many railroad men do not appreciate the remarkable extent of the safety precautions which have been thrown around rapid transit service in cities. It is true that the average steam railroad passenger travels a very much longer distance and is subject to a number of perils which are not present in urban operation. But, as opposed to this, passengers on rapid transit lines are subject to crowded conditions of cars and station platforms which are absent in steam railroad operation and underground transit is, of course, exposed to the peculiar dangers of this class of operation.

The subway cars in New York are equipped with emergency lighting circuits fed from storage batteries for use in case of accidents involving interruption of service, and the accident in question indicates the great value of lights of this kind as an element of insurance against the panic and the importance not only of sufficiency in their design but also of their frequent inspection and periodical tests. This is the most important lesson to be drawn from the information at present in hand. Only second in importance to the emergency car lighting is the lighting of the subway from a source of power independent of the main power supply.

TEACHERS AND THE INDUSTRY

Perhaps enough has already been said on the issues raised by the publication which criticised editorially the effort recommended by the public policy committee of the American Electric Railway Association to cooperate in sound public education on matters related to electric railways. From one point of view all that need be said was expressed in the editorial of the ELECTRIC RAILWAY JOURNAL of Dec. 5. Since then prominent representatives of five institutions of learning have expressed their approval of the plan of the committee and of the JOURNAL'S exposition and defense of this plan. None of these professors has evinced the slightest fear of contaminating influences on the part of railway men. On the contrary, they substantially agree in the statement of Professor Rood of LaFayette College, that "certainly no one can deny that there is needed closer and better understanding between the electric railways and the public they serve. Any movement that makes for this should in every way be helped and not hindered."

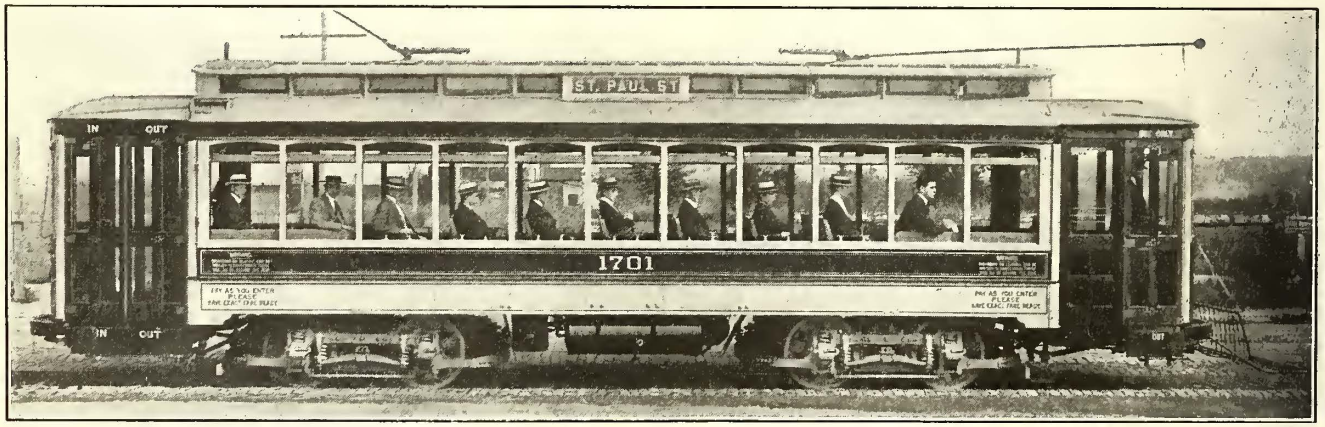
Professor Rood has also written at some length, and in the same vein, to the critic of the *New Republic* who, as though to prove that a correct statement of this matter cannot be secured in his columns, states that "it appears to be a fair inference that the association proposes that courses of instruction dealing with such matters as capitalism, rates and franchises should be turned over to men who are in the employ of the companies or, at least, have given much of their lives to such employment." No one has ever made such a proposition as this, so far as our knowledge goes. No courses of instruction were to be turned over to anybody outside of members of a faculty. It was simply proposed that as a part of courses of instruction there might be lectures which would frankly state the railways' point of view. Later on our critic announces that educational institutions must maintain "a strictly neutral position." Of course they must; so also must judges in our courts —yet we have never heard of a judge announcing that he wished to hear but one side of a case.

All of the above is fairly obvious, and as was stated at the beginning, from one point of view this whole matter might have been closed with our original editorial on the subject. This point of view, however, would ignore one of the most important principles of educational effort, and that is that no injurious charge or statement should remain unanswered, however unreasonable it may be nor how oft repeated after it has once been refuted. If this policy had been systematically followed by electric railways there would not now be so much misinformation to counteract.

Inclosed Prepayment Cars for Baltimore

The United Railways & Electric Company of Baltimore Has Placed in Operation Eighty-five Prepayment Cars Which Differ from Earlier Prepayment Designs Chiefly in the Change to the Fully Inclosed Platform

On Aug. 1, 1914, the United Railways & Electric Company of Baltimore began to place in service on the St. Paul Street, Linden Avenue, West Arlington, and Pikesville and Emory Grove lines a consignment of eighty-five prepayment semi-convertible cars received from The J. G. Brill Company and built under license of the Prepayment Car Sales Company. The general dimensions of the new car are as follows: Length of platform, 5 ft. 8½ in.; length over the corner posts, 30 ft. 8 in.; length over all, 43 ft. 9 in.; maximum width, 8 ft. 5 in. These cars, although similar in a great many respects to the large number of pay-as-you-enter cars now in operation in Baltimore, have several new features, among them fully inclosed platforms with mechanically-operated doors and folding steps, the operating mechanism of which works in conjunction with the doors. Furthermore, the end wall of the bulkhead, which in other types of prepayment cars now in use in Baltimore contains both the main entrance and emergency exit doors, has been supplanted by a large open archway extending from side to side of the car. This archway is finished off in cherry and adds greatly to the interior appearance of the car.



BALTIMORE INCLOSED CARS—SIDE VIEW OF CAR FULLY EQUIPPED AND WITH DOORS CLOSED

Folding Doors and Steps, Seats and General Finish

Entrance to the car is obtained by a set of folding doors of four sections which, when in a closed and locked position, fit against the side of the car platform and a casing located just beneath the edge of the platform hood extending from the car corner post to the vestibule. This main doorway, which serves the double purpose of entrance and emergency exit, affords a 47½-in. opening when the doors are thrown to open position. Each of the four sections comprising the door has two panes of clear wired plate glass secured in place with wooden beading. At the corner post and near the vestibule there is a 1-in. round steel rod extending from the top door casing to about 8 in. below the platform, where both rods connect with the door-operating mechanism. The four door sections are divided into two hinged pairs. About one-half the thickness of the rod is imbedded in one edge of each pair of door sections and is securely held at regular intervals by U-shaped plates about 2 in. wide. In other words, two door sections are literally hung on each of the rods. When the doors are opened the rods turn about 90 deg., causing the door sections to part in the middle, one pair moving close to the corner post and the other pair moving to the vestibule. The door sections fold outward instead of inward in order to obtain the maximum platform space.

The edges of the door sections, which are hinged together, have an interlocking joint similar to a tongue and groove which keeps out the weather when the doors are closed. Where both pairs of doors meet, the edges of the same are fitted with heavy rubber tubing which acts as a resilient medium when the doors are closed. Each of the two door sections which meet on closing the doors is fitted at the top with a small case-hardened steel roller which passes between guide plates in the upper casing and plays an important part in the easy manipulation of the doors.

On the platform, securely bolted to the end sill and 4 in. off of the car floor center, is the conductor's combination door control stand and fare-box support. This stand consists of a piece of 2-in. pipe having a special casting on top and the lower end passing through the car platform. Through the center of this pipe passes a 1-in. round steel shaft with a system of bell cranks on the lower end to connect by means of rods to the door mechanism just described and to a large folding step. To the upper end of this shaft is fitted a handle similar in many respects to a controller handle and having a radius of 9 in. Near the top of the stand are two brackets upon which the fare box is hung. A folding step 12 in. wide and 4 ft. long works in unison with the doors at the main entrance. This step for about 4 in. back from the front edge is covered with abrasive material for its entire length. The door-operating handle, which moves in an arc of about 180 deg., is arranged to throw the cranks over dead center, thereby acting as a positive lock against anyone trying to open or close the doors without the aid of the proper handle.

On the opposite side of the platform (motorman's right hand) are arranged a pair of folding door sections, similar to those above described but affording a doorway 23½ in. wide when open. This is the regular exit door placed quite close to the vestibule and mechanically controlled by the motorman. The remaining distance to the car corner post is taken up by a stationary panel having clear glass in the upper half and four

small beveled wood panels in the lower. The door when opened folds outward and back toward the car body. About 12 in. to the right of the motorman's air-brake valve and at about the level of the vestibule belt rail is located the motorman's door-operating handle. This handle fits the end of a vertical 1-in. round steel shaft which passes through the crown piece and is equipped on its lower end with a crank and rods to operate the exit door and folding step. The folding step just mentioned is 12 in. wide by 25 in. long. It is made of wood and has a step tread about 4 in. wide and 25 in. long. Both the motorman's and conductor's operating handles are removed to the opposite end of the car on changing the direction of running.

The vestibule from the belt rail to the floor is lined in natural cherry and has six large removable panels. The removable panel feature aids in repairing headlights or anything which is apt to fall out of adjustment between the dasher and vestibule lining. At the transverse center of the hood is located a motorman's curtain of pantasote 20 in. in width which can be drawn down and which hangs 3 ft. 6 in. above the car platform.

The seating of the car is an arrangement of four longitudinal seats extending the length of the first two windows at each corner, the rest of the car being furnished with fourteen transverse reversible spring rattan seats 36 in. wide. The aisle space between these rattan seats is 21¾ in. Out on the platform to the motorman's left a seat has been arranged capable of holding three passengers. This seat is 8 in. wide and 3 ft. 9 in. long. When not in use it folds off to the left of the controller and against the vestibule post where it is held by a retaining hook. When in use (which is only possible on the front platform) it drops down to a height of about 19 in. above the car platform, parallel to and within about 4 in. of the main entrance doors. A lug on the end of the seat fits into a casting on the car corner post, and the middle of the seat is in turn supported by a bracket which unfolds from the underside of the seat and rests on the platform. Unlike the rattan seats in the interior of the car, this platform seat is made up of a number of cherry wood strips heavily reinforced on the underside with ¾-in. channels. The total seating capacity is forty-seven passengers, twenty-eight on the transverse seats, sixteen on the longitudinal seats and three on the platform seat.

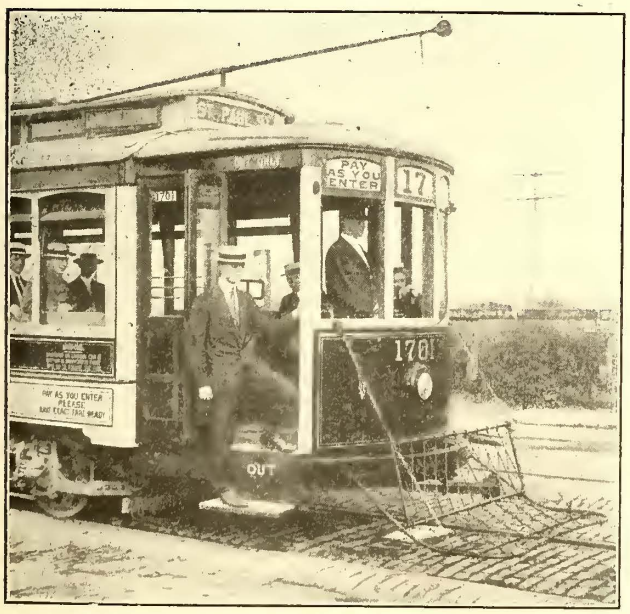
BALTIMORE INCLOSED CARS—INTERIOR SHOWING THE SEATING, ARM RESTS AND ARCHWAY

The use of pressed steel pedestals, wall and aisle plates in the Hale & Kilburn transverse seats represents a saving of approximately 25 lb. per seat over seats of similar dimensions which are made up with malleable iron castings.

The ceilings are covered with agasote, which has been sanded smooth and, after being painted light buff color, has a ½ in. aluminum black-edged stripe. The interior finish is natural cherry. The interior moldings are very plain to require the least work in keeping the car clean.

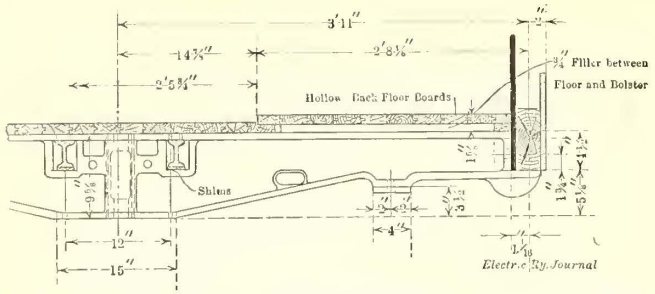
CAR FRAMING

The wooden sills are 2¾ in. x 6⅞ in., and the steel sill plate 5/16 in. x 16½ in. The sill plate by means of a drop-forged corner iron is held by rivets to the end sill which is a 10-in. channel. The center knees are securely riveted to the end sill by means of a gusset plate, thus forming a very substantial and stiff underframe. A pair of 3 in. 5.5 lb. I-beam stringers extend from the intermediate crossing through the bolster to the 10-in. channel at the sill. These are securely riveted by means of angles and Z-shaped plates to a 10-in. channel and gusset plate near the platform. Where the

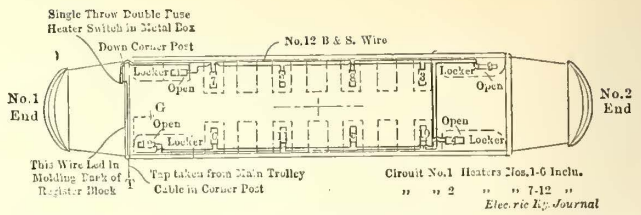


BALTIMORE INCLOSED CARS—FRONT EXIT, SHOWING HOW DOUBLE-SECTION DOOR FOLDS OUTWARD

BALTIMORE INCLOSED CARS—REAR ENTRANCE AND EXIT COMBINED, ALSO POSITION OF FARE BOX



BALTIMORE INCLOSED CARS—SECTION AT CAST-STEEL BOLSTER



BALTIMORE INCLOSED CARS—WIRING DIAGRAM OF HEATERS

I-beam stringers meet the intermediate crossing fastening is made with angles riveted to the I-beams and then bolted to the crossing. The floor boards are all hollow back to reduce the weight.

The car body bolster is made of cast steel in one piece. The bolster was designed by the United Railways & Electric Company to carry a specified center-plate load and with a large factor of safety. Holes in the bolster admit air pipes, I-beam stringers and hand-brake pull rods. The platform supports are made of light channel irons.

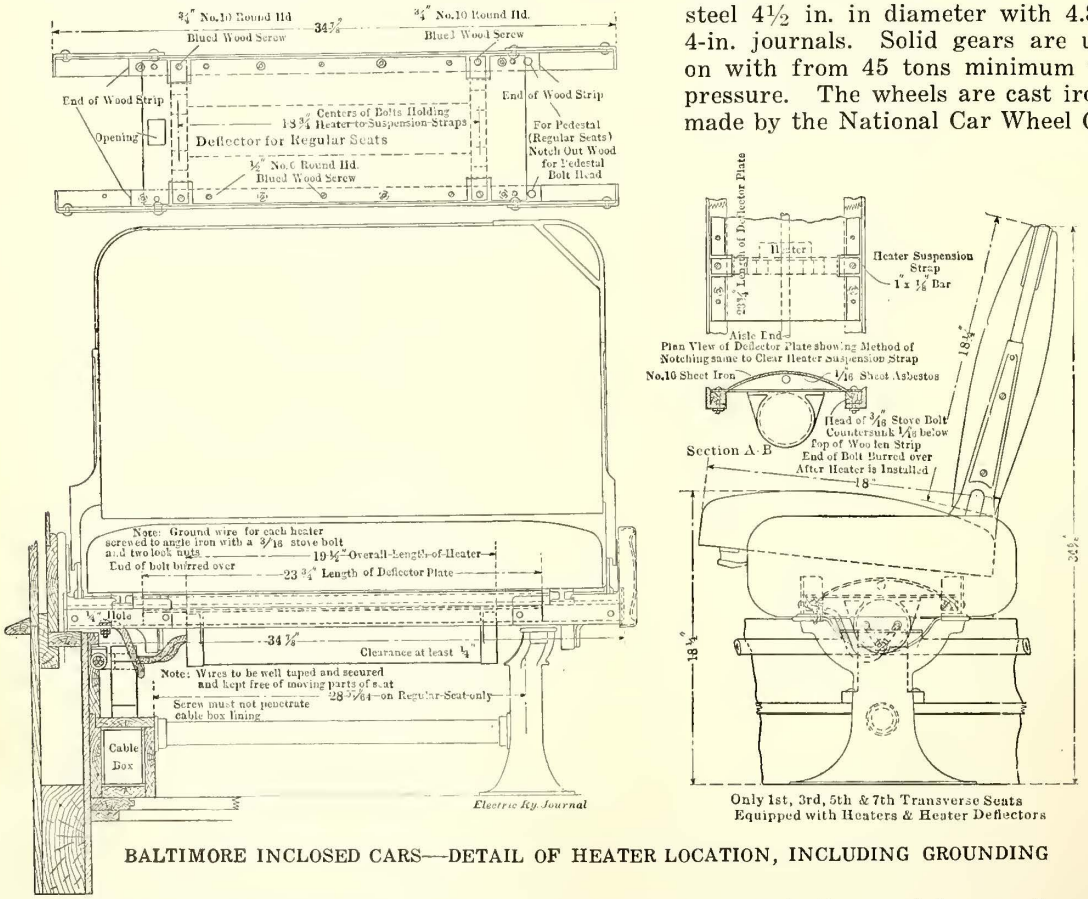
SANDERS, BRAKE RIGGING, BRAKES, TRUCKS, ETC.

The car has four sand boxes of the Dumpit type, two of which are placed beneath the platforms and two in the car under the longitudinal seats. The sand boxes at each end are operated simultaneously by means of a lever connected to a rocker shaft.

The hand-brake rigging is a system of chain sheaves which avoids an elaborate system of levers and produces excellent hand-brake operation with a slight saving in weight. The car body complete with foundation brake rigging, etc., weighs approximately 17,200 lb.

The air brakes are the Westinghouse Traction Brake Company's SM-3 equipment in connection with a type F slack adjuster. This type of slack adjuster has made it feasible to change from daily to weekly inspections. Both the G governor and the D1-F compressor have a number of special details required by the railway's specification. The compressor is suspended from the underframing at three points. Three brackets are bolted to the compressor near the top, two on one side and the other on the side opposite. These in turn fit into supports bolted to the car underframing. The motorman's valve is the three section type SV2, which is very readily disassembled without disturbing the air pipes. This valve has a special guard of home manufacture to prevent grease getting on the clothing of passengers while standing on the rear platform. The brake cylinder is 10 in. in diameter. The total weight of the air-brake equipment, including all of the pipes and fittings, is about 1300 lb.

The cars are mounted on Brill 27-GE-1 trucks. The Symington journal boxes are of a type specially designed for the railway, using its standard check plates and bearings. The back of the box is fitted with an M.C.B. wooden dust guard. The journal box lids are of malleable iron. The axles are Cambria heat-treated steel 4½ in. in diameter with 4.885-in. gear seat and 4-in. journals. Solid gears are used and are pressed on with from 45 tons minimum to 60 tons maximum pressure. The wheels are cast iron 33 in. in diameter, made by the National Car Wheel Company. The brake shoes have separable heads and steel backs of the American Electric Railway Association's standard design. The truck brake rigging is for the United Railways & Electric Company's standard slide brake. The approximate weight of the two trucks is 12,700 lb.



BALTIMORE INCLOSED CARS—DETAIL OF HEATER LOCATION, INCLUDING GROUNDING

ELECTRICAL EQUIPMENT AND LIGHTING

The electrical equipment consists of four GE 200-I motors operated by two K-32-U2 controllers. This motor is lighter in weight compared to those which are in service on other cars of this company's lines and is one of a new line of ventilated commutating pole motors. The motor is rated at 32 hp on 500 volts and 38 hp on 600 volts. Besides the ventilating features, these motors have some additional novelties required by the railway's specifications, the most prominent of which are

the field coil terminals, brush-holder design and improved method of lubrication for the axle bearings. The controllers also include some special features, the most important being the rearrangement of the controller connections to prevent excessive burning of controller fingers and segments. Each controller finger also has a renewable copper tip secured with a hexagonal head slotted set screw and lock washer instead of being riveted. At the base of each controller finger is a casting fitted with set screws which comprises the ground terminal. The resistance as furnished consists of two boxes, one containing twenty-eight grids and the other eighteen grids. Fourteen tooth special grade hardened pinions made by the Tool Steel Gear & Pinion Company were used in connection with hardened sixty-nine tooth solid gears made by the same company. Both gear and pinion are 4½ in. in width of face.

The gear cases are of malleable iron. Two standard GE circuit breakers altered to meet the specifications of the railway are a part of this equipment. There are also one GE form A aluminum cell lightning arrester and one choke coil. The cables within the car are placed in a transit-lined cable box running the length of the car. The leads of the cables running to the controller, motor, resistance and ground are placed in conduit, extending below the platform or floor of the car. The complete electrical equipment, including conduit and fittings, weighs approximately 11,000 lb.

The cars have twenty-four 23-watt, 110-volt tungsten lamps, twenty of which are burning at one time. Each platform has two lights on the transverse center of the hood, arranged to burn simultaneously with the front headlight.

The cars have twelve Consolidated heaters, one under each longitudinal seat and one under every other transverse seat. Wires are run in conduit, having a condulet outlet at each heater. In addition to the two wires running to each heater a third wire running to ground is bolted to the iron work of each seat, so that should the insulation break down in any one heater, and therefore short-circuit it, the main heater circuit fuse will blow. Details relating to the electric heater installation under cross-seats and to the heater wiring are shown in two drawings on page 88. The main single-throw double-fuse heater switch is located out on the platform in a metal box. Each heater is protected on top by a No. 16 iron deflector plate lined on the underside with 1/16-in. sheet asbestos. At each intermediate foot a pearl push button is supplied in connection with a Faraday monitor buzzer at each end of the car for passengers' signals. The circuit is operated by a Patterson battery set model B-R-3 (three cells in series). The battery set, which is inclosed in a metal box and placed under one of the longitudinal seats, is kept locked at all times to prevent the stealing of the cells. All wires which form the lighting circuit are placed in grooved moldings.

Fare Registration, Etc.

Each car is supplied with one International Register Company's automatic coin-counting fare box of a type designed for Baltimore. The registration of fares is supplemented with two International R-7 registers. A register rod, which passes through the car, communicates by a small rod at either end with one of the registers; the standard practice of the railway company is to use the forward register. The fare box is supported near the top of the conductor's door control stand in such a way that when the car is reversed it can readily be lifted off and carried to the control stand on the other platform. The height of this stand above the platform is 4 ft.

The installation of the complete electrical and air-brake equipment was made at the shops of the United Railways & Electric Company. As promptly as the cars were received from the car builder they were turned out fully equipped at the rate of two cars a day. The complete car weighs without passenger load 42,200 lb., or a unit weight of 897.8 lb. per seated passenger. The complete specifications, covering all details in connection with the car body, trucks, electrical and air-brake equipments, were prepared under the direction of A. T. Clark, superintendent rolling stock and shops, subject to the approval of W. A. House, president.

Way Department Rule Book to Promote Standard Practice

In order to put in permanent, ready-reference form rules and instructions for the foremen and promising employees of the way department of the Chicago, Ottawa & Peoria Railway, one of the interurban properties of the McKinley syndicate, W. F. Carr, engineer maintenance of way, has compiled a 200-page illustrated booklet. The scope of the book is rather broad, since the way department supervises track and roadway, bridges and buildings, overhead trolley and transmission lines, as well as the signal system. The foremen and other employees are required to take a written examination every six months to prove their familiarity with the rules applying particularly to their work. After the examination papers have been corrected, the men are drilled on those rules in which they proved weak. Of course, this method of instruction is used on a number of steam railroads, but it has seldom been employed on electric interurban railways.

To give an idea of the scope of this rule book, it may be described as containing definitions of the terms used to designate the work and equipment of the different branches, general rules governing the duties of the department heads and their subordinates, instructions regarding the standards of construction, maintenance and materials for the various parts of the road under the supervision of the several departments. For instance, in the track and roadway division directions are given for maintaining the roadbed, the ditches, bridges and culverts. Specifications for ballast, cross-ties, tie-plates, rails, joints, spikes and the installation of special work are furnished in detail. The rule book also contains instructions for lining, surfacing and gaging track, maintaining and adjusting switch lamps and derails, precautions against the approach of cold weather, interference with signal and interlocking track circuits, fire protection and patrolling the right-of-way. This information is followed by safety precautions regarding hand signals, accident instructions and the proper way to operate hand and push cars.

The data for other branches are of like nature. Standard methods of guy anchoring, cable splicing, tying-in transmission and telephone lines to insulators and overhead line crossings are illustrated. These illustrations are necessarily small but show enough to refresh a man's memory. Full detail drawings to a larger scale also are furnished with the rule book to be retained in the foreman's office.

Although this property has only 106 miles of track, requiring ten track foremen, one bridge and building foreman and one line foreman, it is believed that the rule book represents an economy measure. It assures the engineer of maintenance of way that the foremen have for ready reference rules governing the standards of their work, a practice which has the merit of decreasing correspondence regarding instructions and of holding each foreman to strict account regarding the character of the work.

Chemical Engineering on the Bay State Street Railway

Features of Practice in Connection with the Specification of Materials, Tests and Investigations of the Properties of Supplies—Results of Chemical Analyses Applied to Problems Bearing Upon the Efficiency of Equipment and Proper Use of Materials

Through the courtesy of P. F. Sullivan, president of the Bay State Street Railway, the following account is given of some of the results obtained in turning over the problems of the company in the field of engineering chemistry to an outside organization in which are centralized functions of testing and research outside the scope of the usual transportation company. The relations of the chemist to the electric railway have greatly broadened within the past decade and have been referred to from time to time in these columns. In the Electric Railway Journal of Nov. 29, 1913, the services engineering chemistry is performing in the field of electric traction were described comprehensively in an abstract of a paper read by Carl F. Woods at a meeting of the New England Street Railway Club. Many of the features of the work outlined by the author applied with particular force to the Bay State company, whose principal chemical problems have been cared for since 1906 by Arthur D. Little, Inc., of Boston, a large organization of chemists and engineers devoted to advisory, research and testing work in industrial chemistry. In subsequent paragraphs some of the detailed results of the services performed for the company are given.

Scope of Service Performed

The Little organization consists of a staff of experts specializing in various branches of chemical engineering and familiar with the problems of various electric railway departments, such as power supply, distribution, line work, maintenance of way, construction and operation of equipment, and the purchase of material and supplies of all kinds. Some of these problems include the selection of fuel and the treatment and testing of water for boiler feeding and other purposes; the study of bonding, investigation of electrolysis, choice of wires and cables, study of insulation, rails, structural material, timber preservation, and the purchase of everything from castings and bearing composition to motors, conduit, paint and varnish. Since the relations between this organization and the company began, the field of service has steadily grown larger, both by reason of the development of the staff organization and its increasing familiarity with the requirements of the company. A point has now been reached where the organization is virtually regarded as a company department, and the standardization of equipment and material which has been accomplished and the framing of scientific specifications brought about through co-operative work has placed the purchase and acceptance of material on a most efficient basis. Not only does the company purchase its material fully as cheaply as before these services were inaugurated, but it has the added advantage of getting entirely satisfactory material with a vast saving in time to the company's officers. All new materials and supplies are submitted to the consulting chemists before being passed upon by the officials of the company; samples of materials purchased in insufficient quantities to justify specifications are tested and reported upon before action is taken by the purchasing department; and the service includes the preparation of numerous special reports upon investigations undertaken on behalf of the railway.

Standardization of Specifications

The preparation and maintenance of specifications is one of the most important features of the work. At the beginning of these relations the railway company had practically no standard specifications, but in the past few years a large number of these have been prepared. These cover almost every variety of material used on the system, and they are filed in loose-leaf books. Before they are finally drafted it is customary to consult with representative manufacturers and to receive their suggestions and comments, every effort being made to formulate final specifications of a common-sense character which are sufficiently inclusive to admit general bidding and at the same time be expressive of the latest practice. So far as possible all specifications are drawn to conform to the published standards of the American Electric Railway Engineering Association, the American Society for Testing Materials, and the American Institute of Electrical Engineers, but they are altered freely, when necessary, to conform to scientific advance or other conditions.

An example of the thoroughness with which the specifications are written is given in the title of a set "Preparation of Cross-arms for Painting." These provide for two coats of the company's standard gray paint. The priming coat is required to be mixed in the proportions of 1 gal. standard paint, 3 qts. of the company's standard raw linseed oil, and 1 qt. of the company's standard turpentine. Another representative specification deals with the application of reinforcing sleeves to iron poles that have been weakened by corrosion near the surface of the ground. The sleeve consists of a standard lap-welded iron pipe 36 in. long, 1 in. greater in inside diameter than the pole exterior diameter, cement being grouted into the space between pole and sleeve and the top calked with lead. Cross-arm braces formerly gave the company trouble through breakage, and analysis showed that poor grades of iron or scrap steel were being supplied. Steel or wrought iron is new specified as the proper material, and this is galvanized before going into service. The company now requires that flat braces shall have a tensile strength between 48,000 lb. and 60,000 lb. per square inch, angle braces ranging from 55,000 lb. to 65,000 lb. To prevent the application of brittle material the company prescribes a cold bending test of 180 deg. around a diameter equal to the thickness of the brace without fracture on the outside of the bent portion, bending by pressure or by light blows. Analyses of sample braces, with this simple physical test, now protect the company from inferior material. Also the specifications for eyebolts in line construction provide that the tensile strength shall be at least 48,000 lb. per square inch, including the strength of the eye, nut and thread, and that the bolt shall bend cold 180 deg. around a diameter equal to its own without outside fracture. As a result of these investigations the company is enabled to buy

suitable steel at no greater cost than was charged for the scrap material.

SPECIAL RESEARCHES AND ROUTINE ANALYSES

Examples of the service rendered the company through tests and investigations are indicated by the following points drawn from reports: A certain make of steel track bolt was purchased by the company at an advanced price, with the expectation of improved service. It was found on test that the bolts did not receive proper heat treatment in the mill, and there was a wide variation in physical characteristics. The tensile strength varied as much as 100,000 lb. per square inch for different bolts, with corresponding fluctuations in yield point and elongation. Some of the bolts were so hard that they could hardly be machined. In this case the small tonnage prohibited inspection at the mill and it was essential in this case that each bolt should have satisfactory qualities—not the average of the shipment. In its settlement, the company, on advice of its consulting chemists, paid the price for untreated bolts, of which the new bolts were at least the equal in point of service, and the manufacturer bore the expense of the treatment that had proved unsuccessful.

In another case the chemists recommended the acceptance of rails with a carbon content of from 0.65 per cent to 0.80 per cent instead of from 0.70 per cent to 0.85 per cent as specified by the American Society for Testing Materials, grade B. The reason was that the lower permissible carbon content was offset by nickel and chromium in the steel which was offered.

WIRE AND CABLE TESTS

Two samples of steel binding wire for armatures were tested, the respective diameters being 0.027 in. and 0.045 in. The former had a tensile strength of 268,500 lb. per square inch, and the latter, 314,310 lm., the respective elongation in 10 in. being 1.9 per cent and 1.5 per cent. The laboratory reported that this material did not meet the specifications, as the elongation was less than 2 per cent in 10 in. It pointed out that the determination of elongation on this small wire is difficult, but it was done with great care and in view of the high tensile strength of the wire the chemists were of the opinion that the wire was not of the grade contemplated in the specifications, previous wire having shown an elongation of 3 per cent and 4 per cent, the tensile strength being around 200,000 lb. This was reported a more ductile wire than the former material, and while excessive tensile strength was not objectionable in itself if accompanied by proper ductility, it was very difficult to obtain a wire with great strength which would not tend to be brittle and consequently to cause trouble in use.

A three-conductor, rubber-insulated, armored submarine cable was found to be 1 per cent undersize. This was not serious. The specific gravity of the rubber compound was 1.64 against a requirement of 1.75. This was considered objectionable, not so much in relation to the life of the cable as to the fact that the cable contained less rubber per foot than was specified. Closer adherence to the specifications was recommended. In another case a No. 0000 19-strand, waterproof, rubber-covered cable which was accepted was found to have had but one braid although two were specified. Again, a 13,000-volt paper-insulated cable was found to be 1/32 in. thin in insulation, due to an error in the factory. The discovery of this condition prevented serious trouble.

Some flameproof No. 12 and No. 14 wire was found to have a tensile strength of insulation much below that ordinarily purchased by the railway company, the rubber tearing readily along an apparent seam. The wire was considered capable of giving good service, but acceptance was not advised on competitive bids. An investigation of the deterioration of rubber-covered wire and cable in stock disclosed samples with a marked tendency to open along the seam. The dielectric strength was satisfactory. The investigation confirmed the claims of manufacturers using the strip process in insulation production. In many of the samples the insulation split through at the point of the seam on bending the rubber back upon itself, because the rubber on ageing takes a permanent set, so that any attempt to fold back the rubber on itself brings severe strains on the rubber. The splitting was found to be a condition unlikely to occur in service. The tests showed a reasonable maintenance of electrical qualities in the samples of old cable tested, contradicting the claims of another manufacturer to the effect that a large part of the wire was deteriorating at a dangerous rate in the stock department.

An analysis that was made on resistance wire for car heaters indicated that the material was "Monel" metal, made from a natural alloy of 70 per cent nickel, 1.5 per cent iron and 28.5 per cent copper, well adapted to service as resistance wire, strong and ductile, comparatively free from corrosion. Another test was a comparison of canvas-jacketed wire and weatherproof cable, in the 500,000-circ. mil size. The canvas-jacketed wire resisted abrasion (against an emery wheel at a stated pressure) better than the cable. On account of the tight weave and the hardness of the compound the material wore slowly through but did not rip apart. It was equal to the weatherproof cable on the bending test. The weight per thousand feet was also less with the canvas-jacketed wire. A two-braid canvas jacket was considered equivalent to a three-braid covering of the weatherproof type, but the insulation, like that of weatherproof wire, could not be depended upon after lengthy service, so that a trial installation was advised of the canvas-jacketed wire.

Extended studies of trolley wire have been made for the company, parallel with the investigations of the American Electric Railway Association. It was found that 99 per cent of the breaks occurred at the ear due to stoppage of wave motion at that point. A representative of the consulting chemists rode for many days on the car-top, studying the behavior of the wire in service, and it was found that the breaks could be greatly cut down by purchasing wire under specifications that called for proper strength and ductility. It was found that with frequent feed taps, phosphor bronze trolley wire of 45 per cent conductivity was satisfactory, 60 per cent conductivity wire being used where the feeds were less frequent, and 97 per cent conductivity for country service.

ELECTROLYSIS

In the field of electrolysis an important investigation took place recently which absolved the railway company from responsibility in a neighboring city where an iron gas pipe passing beneath the track developed a leak. The local gas company attributed the leak to stray current from the railway. Surrounding the pipe was found a heavy incrustation, and it developed that the company had made a practice of salting a switch immediately above the pipe. The pipe was found to have a very poor butt-weld. The railway company was called upon to settle for damages. An analysis of the incrustation showed it to be mainly composed of sodium carbonate, the presence of which could only be explained by electrolysis of the salt solution soaking down from the tracks. However, the chem-

ists pointed out that when an electric current passes through a salt solution the chlorine migrates to the positive and the sodium to the negative pole. The chlorine is liberated and corrodes the steel. The sodium when liberated at the negative pole, unites with water to form sodium hydrate, which in turn is finally converted into sodium carbonate. In the case in point the sodium carbonate was found at the pipe or negative pole, which proved at once that current was passing, not from the pipe to the rail, but vice versa, so that the leak had to be attributed to some other cause than to the escape of stray railway currents.

Boiler Compounds

Analyses of boiler compound were made which showed a composition of 97 per cent water and 3 per cent molasses, costing 50 cents per gallon. In another case a boiler compound was found to contain about 50 per cent of soda ash, 30 per cent of tannin and 20 per cent of water. The compound was capable of removing scale, but it sold for 8 cents per pound, whereas the ingredients could have been purchased at not over 2 cents per pound. Another compound turned out to be a mixture of seaweed pulp and caustic soda. As a result of such investigations the proper chemical treatment of feed water has been standardized, and the company now buys suitable chemicals in bulk, samples being regularly tested at the laboratory.

Timber Preservation

Under timber preservation, the chemists have inspected creosoting plants in other states, consulted with the U. S. Forest Service, reported on the large economies offered by the preservation of wood and prepared drawings for a proposed creosoting plant. In a creosote test the oil showed 2.8 per cent more distillation up to 250 deg. Cent. than was specified, and a residue at 360 deg. or about 3.5 per cent in excess of the specifications. The report pointed out that if it had been possible at the time to obtain plenty of oil to meet the exact requirements, it would have been inadvisable to accept the sample offered, but in view of the difficulties existing it was thought best to accept the tender, the oil tested giving fair evidence of its adaptability to the required service.

Paints and Lubricants

The study of paints is another field in which a large amount of work has been done for the railway company. The public demand for clean, well-kept cars necessitated durable colors and long-wearing varnish. Chemical investigations have shown whether the body color is brightened up with an aniline dye which will rapidly fade in service; whether the chrome yellow, supposedly of high grade and imported, is really lead chromate or a mixture of this with clay and barytes; whether the turpentine is produced by steam distillation of gum or is refined kerosene; whether the varnish is composed of pure linseed oil, high-priced gums and turpentine, or is a solution of rosin in cottonseed oil thinned with naphtha. Again, chemical investigation has insured that varnish is not rapidly dulled by washing with cleaning powders that contain free alkali, or by pasting signs on the dasher with paste cut with borax.

As a result of studies of graphite paint under storage, the company was led to specify 15 per cent of graphitic carbon, with an increase of silica, to prevent trouble from the packing down of paint in barrels during extended periods of non-use in which opportunity for settlement occurred. In an analysis of red lead, which contained 67.83 per cent of red lead and 30.1 per cent of litharge, the report pointed out that while the lead was not adulterated with any foreign substance, the large amount of litharge was undesirable. A second sample was sought for analysis before taking final action.

In the same way journal brasses were found to contain 76.85 per cent copper, 11.45 per cent lead, 10.07 per cent tin, 0.75 per cent phosphorus, and 0.3 per cent zinc. Although the brass did not meet the strict requirements, being 0.46 per cent in lead above the specification, acceptance was advised. Another brass analyzed, however, showed 2.6 per cent excess zinc and was rejected for this reason. Wiping solder containing 0.67 per cent antimony, 59.05 per cent lead and 40.28 per cent tin was accepted, as it met the specifications except in impurities, which were 0.17 per cent in excess. A soldering salt containing 0.43 per cent ammonium chloride, 82.61 per cent zinc chloride and 12.70 per cent common salt was rejected on account of the use of common salt instead of ammonium chloride in adequate amount.

Even index cards for office service have been compared at the request of the railway company. The acceptable card was of better stock, containing 80 per cent rag against 20 per cent in the poorer card. The former was very hard, had little flexibility and while no stronger than the poorer card, was better adapted to frequent handling.

The foregoing illustrations represent but a small part of the service rendered the company, but they show how varied the work is and demand a wide range of capacity in the consulting organization. A certain amount of team play is as essential in dealing with the chemical problems of the electric railway as is a staff embracing specialized qualifications. The problems of the railway operator are more and more to be solved by scientific methods, and the increasing interest of public utilities in research and in routine testing and the growing reliance of the storekeeper and the purchasing agent, the executive officer and the engineer upon the findings of the laboratory are evidence of the value of the appeal to physical and chemical analyses, the ultimate object of which is to enable the railway company to give a better service at a reduced cost.

Statistics on Coal and Metal Production in 1914

The United States Geological Survey in the *Press Bulletin* for January, gives interesting statistics covering the production and consumption of coal, lead, copper, zinc, gold and silver in the United States for 1914. The reports covering coal, lead and copper are for the entire country, while those for gold, silver and zinc cover individual states. Thus, in the entire country, there were produced 510,000,000 short tons of coal, which is a decrease of 60,000,000 tons, as compared with 1913. The production of lead was 537,079 short tons, which is nearly 100,000 tons in excess of any previous year. In Arizona, Utah, Montana and Nevada the reports covering gold, silver, copper, lead and zinc showed increases in some and decreases in others, as compared with the 1913 yield.

The Honolulu Rapid Transit & Land Company operates the entire line through the principal streets and suburbs of Honolulu, Hawaii. In the early construction of the line red cedar ties were laid, but since 1903 redwood has been used exclusively after treatment with a preservative, since it was found the redwood decayed quickly unless protected. Red-cedar poles have given satisfaction, a butt preservative treatment being applied. The company also has successfully used Douglas fir paving block in the business district of the city. An extension of the line 4 miles to the United States naval station at Pearl Harbor is contemplated.

COMMUNICATIONS

Teachers and the Industry

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
BOSTON, MASS., Dec. 28, 1914.

To the Editors:

I have been interested in the discussion in your columns, based upon the editorial in your issue of Dec. 5, on "Poisoning the Wells." It seems to me that there can be no just ground for criticism of teachers of engineering and economics making the closest study of the practical difficulties which must be overcome in operating electric railways or other public service plants. Purely theoretical considerations in either engineering or economics are not adequate to enable any man to work out the relationships which should exist between public service companies and the public.

But such relationships can only be worked out by engineers, economists and sociologists who will study the ideal considerations, and who, at the same time, will study the practical limitations under which the ideal considerations must be applied. These practical limitations are mostly determined by the limitations of physical plant but also relate to the limited possibilities of human effort.

I am not sure what the public relations committee of the American Electric Railway Association, to which the editorial refers, may have had in mind, but it may be accepted as an axiom that the study of the operating conditions of actual electric railways by engineers, economists and sociologists who are members of the faculties of our educational institutions will be good for both the public and the companies, but mere social intercourse cannot bring the desired results. That is to say, hard study, performed for the purpose of trying to arrive at all the facts which affect the relations of the public and the public service companies, is the only way to accomplish any desirable result.

DUGALD C. JACKSON,
Professor of Electrical Engineering.

Effects of Incorrect Starting Resistances

BOSTON ELEVATED RAILWAY COMPANY
BOSTON, MASS., Dec. 21, 1914.

To the Editors:

The article by F. Castiglioni in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26, page 1382, recalls to the writer an experience of about seven years ago with car starting resistances. These were mentioned in a discussion at the 1907 convention of the American Electric Railway Association and were referred to in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 2, 1907, page 916.

In the early days, and indeed up to the relatively later years of progress in the means and methods of electric traction, the somewhat retarded state of development of the motor and control equipments, coupled with the rapidly increasing duty required of them, brought on numerous operating troubles that kept the maintenance man in "hot water" continually. Not the least of such troubles were the results of an incorrect adjustment of starting rheostats, magnifying as it did an already overloaded condition of the motors, and overbalancing the relation between etching and polishing of the commutator so necessary, especially in motors of the older types, for operation free from flashing troubles.

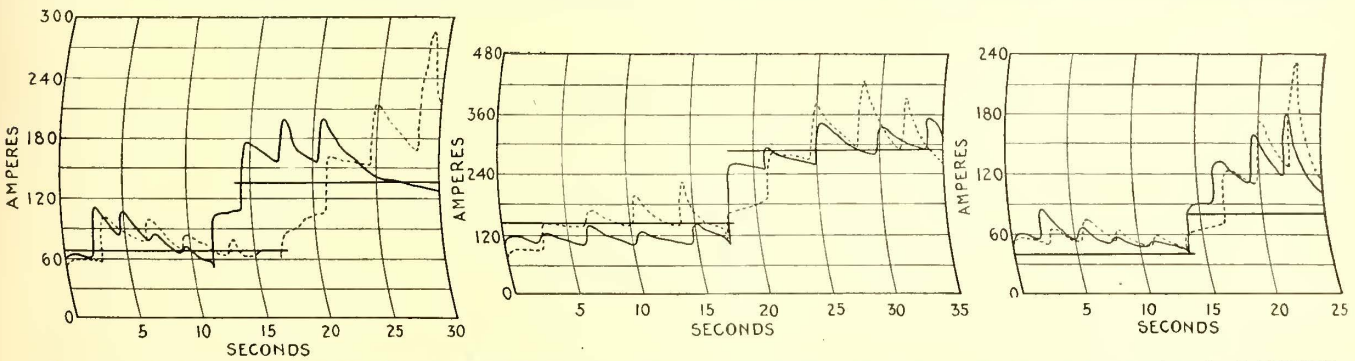
The limitations of the old packed or coiled-ribbon rheostat, after many years of use, were forcibly brought to the attention of the engineers of operating and manufacturing companies, with the result that the present form of cast-grid rheostat was developed and quickly supplanted the older type. The new type, being of the unit form of construction, lent itself most readily to variations in adjustment of steps, and so it came about, especially where the equipment units were divided up and under the charge of a large number of maintenance men, that rather wide divergences from the proper resistance arrangements crept in.

About seven years ago conditions on the surface lines of the Boston Elevated Railway system with respect to motor flashing began to be so severe on the older equipments that, after an investigation, it was decided to inquire thoroughly into the resistance arrangement on each type of equipment, especially as very uneven accelerations were being experienced on some equipment. A graphic ammeter was purchased and used with very interesting results. The corrections which we were able to make in the resistance arrangements through the aid of the records obtained with this device amply repaid the efforts and expense involved, by the great improvement in car acceleration, motor commutation, motor maintenance, etc., that resulted.

Three examples of how we were enabled to smooth out the accelerating current peaks are given by the curves shown herewith. In these the dotted lines show the former current consumption and the solid lines the consumption after revision of the grid connections.

The horizontal heavy lines on these curves in the series and multiple positions refer to the one-hour current ratings of the motors at 500 volts and, taken in connection with the average currents during acceleration, serve in a general way to show the duty on the motor in comparison with its rating.

The first comparison considers a closed car, equipped with two GE-58 motors and K-10 controller, on which the gear ratio had been reduced in order that the car might maintain its place on a route with higher speed motors. It furnishes a marked example of an incorrect resistance arrangement. The current peaks encountered in accelerating on a hill, as this curve shows, were so severe that the rate of acceleration had to be considerably reduced and the time protracted in order to keep the current peaks within the fuse capacity. After the arrangement was changed a reduction on the



EFFECTS OF INCORRECT STARTING RESISTANCES—GRAPHICAL CURRENT RECORDS ON BOSTON ELEVATED RAILWAY

last step in multiple from 285 amp to 200 amp, or 30 per cent, was effected and in addition the current in first multiple position was increased.

The second comparison refers to a closed car with a trailer, the motor car being equipped with four GE-70 motors and K-28-A controller with normal gear ratio of 4.06. In this case the high current peak in multiple appeared on the point next to the last. By the change it was considerably reduced, as were also the peaks on the two points on either side of it. Again in the chart a very material increase will be noticed in the current on the first multiple position.

The third comparison is that of the improper and the proper adjustments of rheostat steps for a nine-bench open car with two WP-50 motors and a K-10 controller. The motors on this car had been geared to a higher speed in order to enable them to keep up with a faster schedule and this, with the poor arrangement of resistance, resulted in extremely high current peaks, especially on hills, which this and the other two curves show. It will be seen that in this case, correcting the resistance arrangement has brought the current peak on the last step in multiple down from 232 amp to 180 amp, a reduction of 22.4 per cent. This was largely accomplished by raising the current on the first position in multiple, which it will be noticed has been raised from about 60 amp to 90 amps, an increase of 50 per cent.

The writer remembers one particular case in which the resistance arrangement in use was such that the commutators of the motors rapidly became so bad that the armatures had to be taken out and the commutators sand-papered every two weeks to keep the motors running. After the resistance arrangement had been corrected the motors continued in service indefinitely and the trouble from this cause was entirely eliminated.

John W. Corning, Electrical Engineer.

Bettering the Use of English

Tufts College Engineering School

Tufts College, Mass., Jan. 1, 1915.

To the Editors:

Although it is no longer difficult to find engineers who write notably well, or whose evident desire at least it is to use good English, there are still many in the profession who, if they were to speak frankly, would confess that they do not think the game worth the candle. The grounds on which such writers justify their attitude are almost always the same. May I have space in your columns for a word about each of what I have found to be the four stock excuses?

1. Words, they tell us, at best are poor means of expressing technical ideas. Inevitably the engineer compare verbal language with the mathematical calculations, tables, drawings and graphs of various sorts that he uses, and in contrast with the directness and accuracy of these forms of expression "English" may seem uncertain, coy and hard to please. In such comparison two things may be overlooked. First, ideas expressed in mathematical or graphical forms, and ideas that should be expressed in English are of distinctly different sorts. Second, while the engineer has spent many hours of hard labor learning to use mathematical language, for instance, he has very likely contented himself with such powers of expression in English as he was "born to." Unquestionably all ideas that can be best expressed in mathematical or graphical form should be so expressed, and not in English. But there are ideas that can be adequately expressed only in verbal language. The writer on technical subjects needs first to select carefully the proper form in which to express each idea, then to treat those to be expressed verbally with the same painstaking respect he shows those given the more peculiarly engineering forms. If he is still troubled by limitations, he will find them in his powers of expression rather than in the English language.

2. Others tell us that technical writing is too difficult for the ordinary engineer. Unquestionably it is no easy matter for one who has special knowledge so to put himself in the place of those who have not as to make himself clear. Neither is it easy to reconcile the amount one feels should be said with the inevitable time or space limitations. Yet the problems that arise in these ways are no more serious for engineers than for others; and aside from these difficulties engineering writing is relatively an easy matter, simple and obvious the moment the problems of expression are squarely faced. One who does not believe this needs but to compare the technique of any form of scientific writing with that of poetry, of the short story, or of the drama. Considering that written language is the means by which the engineer markets his most valuable product, is there any greater necessity for a poet to learn to write poetically than for an engineer to master the art of writing accurately and effectively?

3. Most commonly, perhaps, we are told that "any engineer will understand." Perhaps he will; engineers are accustomed to crack hard nuts. But misunderstandings occur more frequently than we like to admit, for engineers, like the rest of us mortals, at times deceive even themselves into thinking they get the meaning, lest they confess themselves to be dull. Even if the reader gets the meaning fully, that is by no means enough. He should not be asked to go back and reread or otherwise to labor over the subject simply because of the inability of the writer to put it, from the start, accurately and clearly. It is much easier to hit at an idea than to work out exact expression, but generally when a writer has taken the pains to find the best way of saying just what he means, he is fully repaid for his efforts in the increased accuracy of his own understanding. Even if it were not so it would be poor economy, in order to save time in composition, to put an unnecessary burden on each individual one of his readers. The subject on which one is writing may be itself difficult for the reader to understand, just as a complicated piece of machinery may be difficult to learn to operate; but the writer is no more justified than the manufacturer in putting his product on the market in such shape that it has to be reconstructed in order to be mastered.

4. In the last place, a variety of misuses have been allowed to pass current in technical writing for the reason that it has been assumed that engineers do not care for style. Similarly, business men used to fill their letters with unwarranted abbreviations, ellipses of words grammatically necessary, and incomplete or wobbly-constructed sentences, and glory in these things because they thought them to express that distinctly American quality of "snappiness." But what was rugged strength in a frontier country becomes mere boorishness in a more highly-developed community. In these days the best concerns send out letters that bespeak business firmly enough established to do whatever is undertaken in the best form. The rapid advance this country is making is nowhere more notable than in the more perfect finish of the material output of American engineers. Should any engineer be satisfied at present with a shirt-sleeves style of writing?

The general problem of bettering our American use of English is serious. Our schools grasp at the shadow of the latest fads and lose the substance; they have confused work and play till often athletics is the only thing eagerly entered into, the one thing efficiently managed. The literature read by the largest number of our people takes its chief delight in the vulgar and in the abuse of

slang which parades vain repetition to cover absence of thought. Everywhere there is need for a strong stand for good English. The familiar words of Henry of Navarre are to the point: "Go hang yourself, brave Crillon. We have fought at Arles and you of all men were not there!" The fight for accurate thinking, for exact and adequate expression is a strong man's battle. To whom should it be a greater reproach than to an engineer if we could say, "And you of all men were not there!"

SAMUEL C. EARLE,
Professor of English and Modern Languages.

General Crop and Business Conditions

In Spite of the European War a Steady Improvement Is Expected

The committee on statistics and standards of the Chamber of Commerce of the United States of America has just issued a report on "General Crop and Business Conditions, as of Dec. 12, 1914." The report contains a map giving graphic illustration of conditions in the various industries and of the prospects for business during the first three months of 1915. This map is reproduced in the accompanying form, together with a few notes from the report, for the reason that the financial condition of electric railways is so intimately connected with the general prosperity of the communities served.

While acknowledging the widespread and depressing effects of the European war on industrial and commercial conditions, the report is generally reassuring. Conditions in the South, while slowly improving, still present a serious problem. Elsewhere the feeling gathers strength that a steadily improving future is immediately ahead. Crops in general have been good. The entire wheat crop shows an increase of 12½ per cent over that of last year. Some sections are planting winter wheat for the first time, and if the war continues until spring, the acreage planted in grains will exceed that of all former years. The sugar cane crop promises to be a good one and to command remunerative prices. The fruit yield was unusually large, but a large portion is being held in many localities as prices have been low.

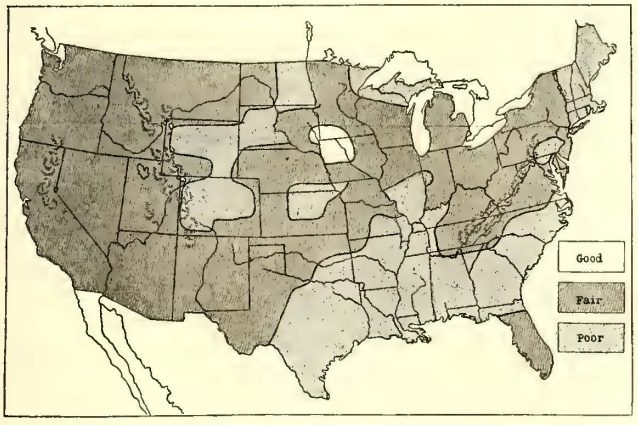


CHART FORECASTING GENERAL UNITED STATES BUSINESS CONDITIONS FOR FIRST THREE MONTHS OF 1915, BASED ON REPORTS OF DEC. 12, 1914

The cattle business is confronted by a serious handicap in the fact that there is great difficulty in obtaining loans on cattle. The industry is further unfavorably affected in the Central West, owing to the quarantine resulting from the foot and mouth disease. The sheep and wool industry is reported as in excellent shape. Large purchases of horses at good prices have been made by European governments.

Many factories which have been idle are preparing to start up and more men are being taken on by factories which have been running with decreased forces. The flour mills have been fortunate in being affected only slightly by the general depression. Some cotton and textile mills are also favored to a lesser extent in this connection, although cotton mills, while fairly busy, are said to be accumulating goods.

General mining conditions are poor. This is especially true of the phospate mines of Florida, which formerly shipped most of their product to Europe. Many mines are closed down and the remainder running from one-quarter to one-half time. Exceptions to this general depression are zinc and lead. The oil business varies from poor to fair because of low prices and the falling off in demand. The lack of building has caused many lumber mills to close down and others to run only two to four days a week, and has likewise closed many of the stone, slate and marble quarries. These conditions, however, are now beginning to mend and orders are showing some increases.

Subway Accident

The most complete tie-up in the history of the New York subway occurred at 8 o'clock on the morning of Jan. 6. It lasted until 4 p. m. when partial service was recommenced, the full service not being restored until the early morning hours of the next day. The accident was caused primarily by a short-circuit in the Interborough Rapid Transit Company's high-tension cables laid along the south side of Fifty-third Street at the point where they cross the subway tracks under Broadway. The dense smoke from the resulting fire in the cable manholes alongside of the tubes made its way into the subway and caused a serious panic, together with many cases of partial suffocation in three south-bound trains which had been stalled through lack of power just north of the blaze. One woman passenger died on the way to the hospital.

Near the point where these trains became stalled is a ventilating opening, and through this most of the trapped passengers were carried to the surface by the city firemen. The latter were called to the scene of the accident one hour and fifteen minutes after the short-circuit occurred.

Power at reduced voltage was supplied to outlying sections of the line for about half an hour after the first short-circuit, and then all power went off. This indicates the gradual progress of the fire in the cable manholes, the latter communicating with the subway tube by means of steel doors which were insufficient to keep the smoke from the burning insulation out of the subway. The final cutting off of all power put out the emergency lights that are mounted on the subway walls, although these are supplied from a circuit separate from that supplying propulsion current. All of the cars in the subway are equipped with emergency lights operated by storage battery. These were thrown in circuit in the cars stalled at Fifty-third Street and assisted the egress of passengers. Investigations into the causes of the accident have been begun both by the District Attorney's office and by the Public Service Commission, First District.

A student branch of the American Institute of Electrical Engineers was inaugurated at the West Virginia University, Morgantown, W. Va., on the evening of Jan. 7. The exercises consisted in a demonstration of the electromechanical equipment of the Engineering Building and an address by V. Karapetoff on "Some Recent Developments in the Field of Electricity." W. E. Dickinson, professor of electrical engineering, is in charge of the branch.

Census Report on Electric Railways

Statistics on the Development of the Industry Are Given—There Was a Decrease of 10 Per Cent in the Number of Railways Generating Their Own Power—Track Statistics

Statistics of the electric railways in the country for the forthcoming census report were obtained by the Census Bureau, Department of Commerce, for 1912. This census was taken in accordance with the policy of the bureau to make a five-year census of the industry, the two preceding counts having been made in 1907 and 1902. Since the last census was taken the bureau has been compiling and analyzing the figures, and its report will soon be published. Through the courtesy of the bureau some advance figures from the forthcoming report are presented, the statistics being subject to some slight changes and corrections by the bureau if found necessary upon revision. The figures represent all railways, other than steam roads in operation, during any portion of 1912 in continental United States. The canvass did not cover Alaska or the insular possessions.

In 1912 there were 21 cable roads, 13 using cable exclusively and 8 cable in conjunction with other powers. Of the 13 exclusively cable roads, 2 were street railway lines in San Francisco; the others were inclined plane roads in different parts of the country. There are only 9 lines using animal power exclusively. The longest has but 3 miles of track.

Statistics of the electrified steam roads are not included in the general statistics for electric railways. The statistics also exclude those of the Chicago Tunnel Company, a narrow-gage electric tunnel mining line at Bingham, and a short electric road owned by the state of North Dakota. The latter is the only line owned by any state. During 1912 the only lines owned by municipalities were one in Monroe, La., and one in San Francisco. The latter went into operation just before the close of 1912.

Where a railway company was engaged in other business and it was possible to separate the results of operation, this plan was followed. A notable case where it was not possible to do this was in the case of the Hudson & Manhattan Railroad, which owns the Hudson Terminal Buildings.

The reports as a rule are for the calendar year. This was the case with 817 of the 975 operating companies; 114 were for the year ended June 30, 1912. It was impossible to draw any sharp line of demarkation between the urban and interurban roads. For this reason while track has been divided into "city and suburban" or "interurban," no attempt has been made to classify the traffic under these divisions.

Development of the Industry

Electric power is used on 99.7 per cent of the total trackage. There has been a large increase in horsepower capacity during the year. In 1907 there was 6,618,011 hp and in 1912 11,903,699 hp, or an increase of 69.1 per cent. In 1912 the horsepower of steam engines and steam turbines was 8,116,086; of gas and oil engines, 135,225; water power, 2,942,388. The kilowatt-hours generated during the year were 17,585,662,014, or an increase of 65.4 per cent over 1907. The miles of track were 41,064 as compared with 34,381 in 1907. The employees were 282,461 as compared with 221,429 in 1907, and the number of passenger cars were 76,162 as compared with 70,016 in 1907. Some other general figures made up from the first report issued by the census were published in the issue of this paper for March 21, 1914.

The bureau reports that the number of revenue passengers carried per mile of track indicates a steady increase in density of traffic, being 232,556 in 1912, 216,522 in 1907 and 212,258 in 1902. The expenditure for power purchased almost doubled, being $24,546,530 in 1912 and $12,342,258 in 1907. The income per pas-

Table 1—Income and Expense per Revenue Passenger

	1912 Cents	1907 Cents	1902 Cents
Gross income	6.14	5.78	5.25
Transportation revenue	5.45	5.25	4.95
Passenger revenue	5.27	5.14	4.90
Other transportation revenue	0.18	0.11	0.05
Nontransportation income	0.69	0.53	0.30
Operating expenses	3.49	3.38	2.98
Gross income less operating expenses	2.65	2.40	2.27
Deductions from income	2.00	1.86	1.63
Net income	0.65	0.54	0.64

Table II—Ten Longest Electric Railway Systems

	Miles of Line	Miles of Track
Bay State Street Railway, Massachusetts	754.73	941.79
Ohio Electric Railway, Ohio	601.00	669.10
The Connecticut Company, Connecticut	592.80	803.09
Pacific Electric Company, California	552.48	970.80
Public Service Railway, New Jersey	484.90	809.50
Philadelphia Rapid Transit Company, Pennsylvania	436.62	649.72
New York State Railways	337.05	576.95
Pittsburgh Railways, Pennsylvania	334.58	594.30
Chicago Railways, Illinois	244.00	515.00
Boston Elevated Railway, Massachusetts	237.78	500.52

Table III—Relation of Traffic to Population, by Geographic Divisions: 1890 to 1912

Division	Census	Average number of revenue passengers per inhabitant: Total Population	Urban Population	Increase since prior census: Total Population	Urban Population
United States	1912	100	252	15	8
	1907	85	244	25	68
	1902	61	176	28	67
	1890	32	109	..	..
Geographic Divisions:					
New England	1912	155	226	16	8
	1907	139	218	28	40
	1902	111	178	67	96
	1890	44	82	..	..
Middle Atlantic	1912	174	271	18	14
	1907	156	257	35	52
	1902	121	205	48	66
	1890	73	139	..	..
East North Central	1912	115	250	24	15
	1907	91	235	31	84
	1902	60	151	33	60
	1890	27	91	..	..
West North Central	1912	66	249	11	10
	1907	55	239	22	84
	1902	33	155	14	58
	1890	19	97	..	..
South Atlantic	1912	49	237	7	5
	1907	42	232	15	73
	1902	27	159	16	88
	1890	11	71	..	..
East South Central	1912	31	215	4	*
	1907	27	233	12	93
	1902	15	140	7	54
	1890	8	86	..	..
West South Central	1912	29	177	5	*
	1907	24	193	11	80
	1902	13	113	3	29
	1890	10	84	..	..
Mountain	1912	54	215	6	*
	1907	48	239	15	82
	1902	33	157	11	51
	1890	22	106	..	..
Pacific	1912	158	309	26	*
	1907	132	320	45	98
	1902	87	222	25	43
	1890	62	179	..	..

*Decrease in average number.

senger has also shows an increase, as indicated in Table I.

The average operating company had 52.12 miles of track and 78 cars. It operated 1,938,202 passenger-car-miles, carried 9,810,436 passengers and employed 290 men. Of 975 operating companies, 406 operated less than 10 miles of track, 421 more than 10 and less than 50 miles of track; 89 more than 50 and less than 100 miles, and 59 companies operated 100 miles or more. Table II shows the ten railway companies reporting the greatest mileage for 1912, ranked according to length of line.

TABLE IV—PER CENT DISTRIBUTION OF INCOME BETWEEN EXPENSES AND INVESTED CAPITAL

	1912	1907	1902	1890
Gross income of operating companies	100.0	100.0	100.0	100.0
Expenses other than interest and rentals	65.1	64.6	62.4	72.5
Operating expense	56.8	58.5	56.8	67.6
Other expenses	8.3	6.1	5.6	4.9
Returns on invested capital	33.1	32.2	31.7	22.7
As interest on funded and floating debt and mortgages	16.7	14.8	15.2	8.8
As rent of leased lines and terminals	7.6	11.2	10.2	2.8
As dividends	8.8	6.2	6.3	11.1
Surplus	1.8	3.2	5.9	4.8

TABLE V—TRACK MILEAGE, CLASSIFIED BY CHARACTER OF MOTIVE POWER, OWNERSHIP, AND LOCATION

	1912	1907	1902	PER CENT OF INCREASE[1] 1907–1912	1902–1907
Kind					
Total	41,064.82	34,493.56	22,572.52	19.1	52.4
Main track	38,333.62	32,485.87	21,681.94	18.0	49.8
Road or first track	30,437.86	25,547.19	16,651.58	19.1	53.4
Second (including third, etc.) tracks	7,895.76	6,938.68	5,030.36	13.8	37.9
Sidings and turnouts, including track in car barns, storage yards, etc	2,731.20	1,917.69	907.53	42.4	111.3
Classification					
By character of motive power:					
Electric	40,808.39	34,059.69	21,901.53	19.8	55.
Electric line transmission	40,704.91	34,034.19	21,899.06	19.6	55.5
Overhead trolley	38,958.06	32,501.71	21,299.09	19.9	52.4
Third rail	1,395.13	1,209.78	342.91	15.3	252.7
Conduit trolley	351.72	322.70	266.06	9.0	21.8
Gas-electric motors	38.81	22.50	.....	72.5	3
Storage batteries	64.67	3.00	2.47	....	....
Cable	56.41	61.71	249.69	−8.6	−74.
Animal	57.52	136.11	259.10	−57.7	−47.4
Steam	76.34	105.06	169.61	−27.3	−38.5
Gasoline motors	66.16	40.99	[2]6.06	61.4	1
By ownership:					
Owned	33,416.86	27,458.97	19,038.98	21.7	44.
Leased[3]	7,647.96	6,922.54	3,534.78	10.5	95.2
					8
Operated under trackage rights	1,284.82	692.28	559.68	85.6	23.
					7
From electric railway companies	1,051.19	692.28	559.68	51.8	23.
From steam roads[4]	233.63	[5]	[5]	.. .	7
By location:					
(a) Surface	40,532.02	33,966.40	22,263.58	19.3	52.
Elevated	420.10	366.59	308.94	14.6	18.6
Subways and tunnels	112.70	70.57	[6]	59.7	7
(b) On public thoroughfares	26,271.10	23,431.72	18,774.92	12.1	24.8
On private right of way	14,793.72	10,971.84	3,802.07	34.8	188.6
(c) City and suburban lines	24,699.02	[7]	[7]	....	....
Interurban lines	16,365.80	[7]	[7]	....	....

[1] A minus sign (−) denotes decrease.
[2] Compressed air.
[3] Includes trackage rights from steam roads.
[4] Included under "Leased track."
[5] Figures not available.
[6] Figures not available; included under "Surface."
[7] Reported in 1907 and 1902 as within and without city limits; figures not comparable.

TABLE VI—PER CENT DISTRIBUTION OF MILES OF TRACK, ACCORDING TO LOCATION

Division	ON PUBLIC THOROUGHFARES 1912	1907	1902	ON PRIVATE RIGHTS OF WAY 1912	1907	1902
United States	64.0	68.1	83.2	36.0	31.9	16.8
New England	83.4	88.3	90.9	16.6	11.7	9.1
Middle Atlantic	66.3	68.9	84.7	33.7	31.1	15.3
East North Central	52.4	55.3	76.6	47.6	44.7	23.4
West North Central	70.0	73.6	86.4	30.0	26.4	13.6
South Atlantic	65.6	67.1	73.1	34.4	32.9	26.9
East South Central	73.1	76.8	84.3	26.9	23.2	15.7
West South Central	73.9	88.3	89.3	26.1	11.7	10.7
Mountain	67.8	81.2	94.5	32.2	18.8	5.5
Pacific	54.0	61.8	84.6	46.0	38.2	15.4

Table III shows the average number of revenue passengers per inhabitant, the urban population being based on the population of cities of 8000 and more, including New England towns.

In the analysis of gross income there has been a notable increase in "operating income other than passenger," due to the growth of freight, mail and express business and the sale of current. In 1907 the passenger business amounted to 91.4 per cent of the total but in 1912 the percentage was only 88.6. Table IV shows the percentage of distribution of the income between expenses and invested capital.

POWER EQUIPMENT

In 1912 50.8 per cent of the railways had their own power plant equipment as compared with 61 per cent in 1907. The average capacity per unit for steam engines increased from 602 hp to 947 hp and of turbines from 2125 hp to 3166 hp between 1907 and 1912. Of the total power capacity of generators those supplying alternating current increased from 45.4 per cent to 69.3 per cent, but those supplying direct current decreased from 54.6 per cent to 30.7 per cent. Statistics based on companies which neither bought nor sold electrical energy show a kilowatt-hour consumption per car-mile in 1912 of 3.80 as compared with 3.26 in 1907, and a cost of generation per kilowatt-hour of 0.55 cent in 1912 as compared with 0.65 cent in 1907.

TRACK

Table V gives statistics of the track classified by character of motive power, ownership and location. Of this track 95.5 per cent was operated by overhead trolley, 3.3 per cent by third-rail, 0.9 per cent by conduit trolley, 0.2 per cent by storage batteries and 0.1 per cent by gas-electric motors.

In addition to the figures given in Table V, 1284 miles were operated by the electrified divisions of the steam railroads. Of these 669 miles were operated by overhead trolley and 515 miles by third-rail. Table VI shows the percentage distribution of miles of track according to location.

Abstracts of other statistics for the census reports will be published in later issues.

Address on Safety Work

In an address before the Louisville Commercial Club recently, Frederick H. Elliott, secretary of the Safety First Society of New York, made some interesting comments regarding the elimination of the accident hazard in street traffic. He described the efforts of the society to secure legislation prohibiting the crossing of streets by pedestrians except at intersections, explaining that most accidents are caused by attempts to cross in the middle of the block. He approved the plan of "safety zones" recently adopted in Louisville and described in the ELECTRIC RAILWAY JOURNAL. He favored the pay-as-you-leave system, saying that the plan which is in use in Cleveland had expedited street railway traffic 20 per cent.

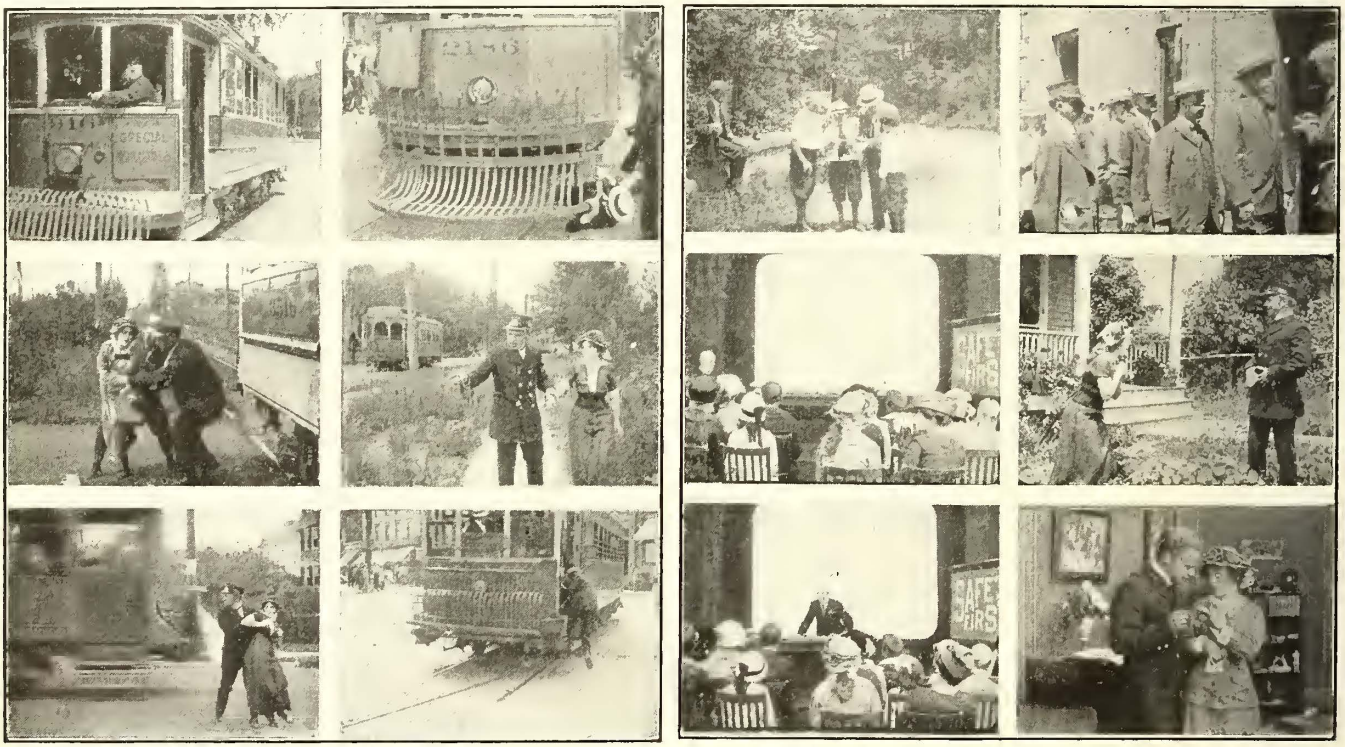
The Commercial Club of Columbia, Mo., received recently a letter from William B. McKinley, president of the Illinois Traction System, as a result of which the members have expressed their purpose to help in the repeal of a Missouri law limiting the ownership by foreign corporations of stock in Missouri concerns. The letter stated that this law was the most effective barrier against the development of interurbans.

Moving Picture Films in Safety Education

The Public Service Railway is Using Original Films in Training Employees and the Public

In the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 19, 1914, on page 523, mention was made of the new reels of moving picture film which have just recently been made by the Edison Company for and in co-operation with the Public Service Company of New Jersey. These films were shown at the close of the first regular meeting for the season of the Public Service Company section of the American Electric Railway Association and at the Atlantic City convention also.

The films were designed for use in an educational campaign which the company has been conducting in connection with the "safety first" movement. The Public Service Company was one of the first, if not the first, of the Eastern street railway companies to take up the "safety first" idea in a comprehensive and systematic manner. For about two years it has maintained a department for the education of its trainmen and of the public at large along lines that tend to the elimination of preventable accidents and the conservation of life and limb.



MOTION PICTURES IN SAFETY EDUCATION—SCENES SELECTED AT RANDOM FROM THE PUBLIC SERVICE RAILWAY FILMS

An effective part of the work accomplished by the company has been through the medium of lecturers who discuss safety measures in the public schools and before civic and church societies. The talks of the lecturers are illustrated with stereopticon views and motion pictures. The latter have been found to be far the more popular, and taking advantage of the possibilities thus opened up the railway people engaged the Edison Company of New York to stage a series of "accidents" and incidents which would bring home the "safety first" idea, in a graphic manner, to young and old alike. The character of the reels may be gleaned from their titles, "The Life of a Motorman" and "How Most Accidents Occur."

The first-named reel is of particular interest to trainmen and also has points of appeal to the public. It portrays the life of a motorman from his application for a job, through the phases of instruction until he is put in charge of a car. The other reel shows boarding and leaving accidents, mishaps due to disregard of traffic regulations, and the price paid by the thoughtless who jump on or off moving cars or cross in front of speeding vehicles without looking where they are going.

The pictures are unusually faithful as to detail and teach a powerful lesson. The Public Service Company controls the films and, as its problems are duplicated on every large railway system, it is ready to co-operate with other companies in arranging for the showing of the pictures wherever they may be of service in the promotion of safety.

Influence of Titanium on Segregation

According to a recent article by F. A. J. FitzGerald in *Metallurgical and Chemical Engineering*, a recent examination of data from reports on 155 heats of rail steel, of which about one-half were titanium-treated, showed that there was comparatively little difference between the carbon contents of the rail-head and of the web in the treated rails. In the untreated rails, however, no less than 64 per cent of the heats showed an excess of carbon in the web amounting to more than 12 per cent over that in the head. This difference of 12 per cent was suggested as a limit above which rails should be rejected on account of segregation, when applied to "A" rails, or those taken from the heads of the ingots after a 9 per cent crop. With seventy-seven heats of titanium-treated rail it was found that 87 per cent would fall within the 12 per cent limit.

A more detailed examination of the seventy-seven heats in which titanium was used clearly showed the influence the amount of titanium added has on the results. According to the advice of the Titanium Alloy Manufacturing Company the amount of ferro-carbon-titanium used should be such that the quantity of metallic titanium added to the steel is 0.10 per cent. This, however, was not followed, as in some heats only 0.075 per cent was added and in some as little as 0.053 per cent. The

following table shows the effect of the amount of titanium added:

Titanium added, Per cent	Total heats	Heats within 12 per cent limit Number	Per cent
0	78	28	36
0.053	7	3	43
0.077	39	33	84
0.10	31	31	100

This seems to show that in order to get the best results at least 0.10 per cent of metallic titanium should be added to the rail steel.

Boston Elevated Center-Entrance Trailer

This Car Contains Several New Features, and was Designed Specially for Service During Rush Hours

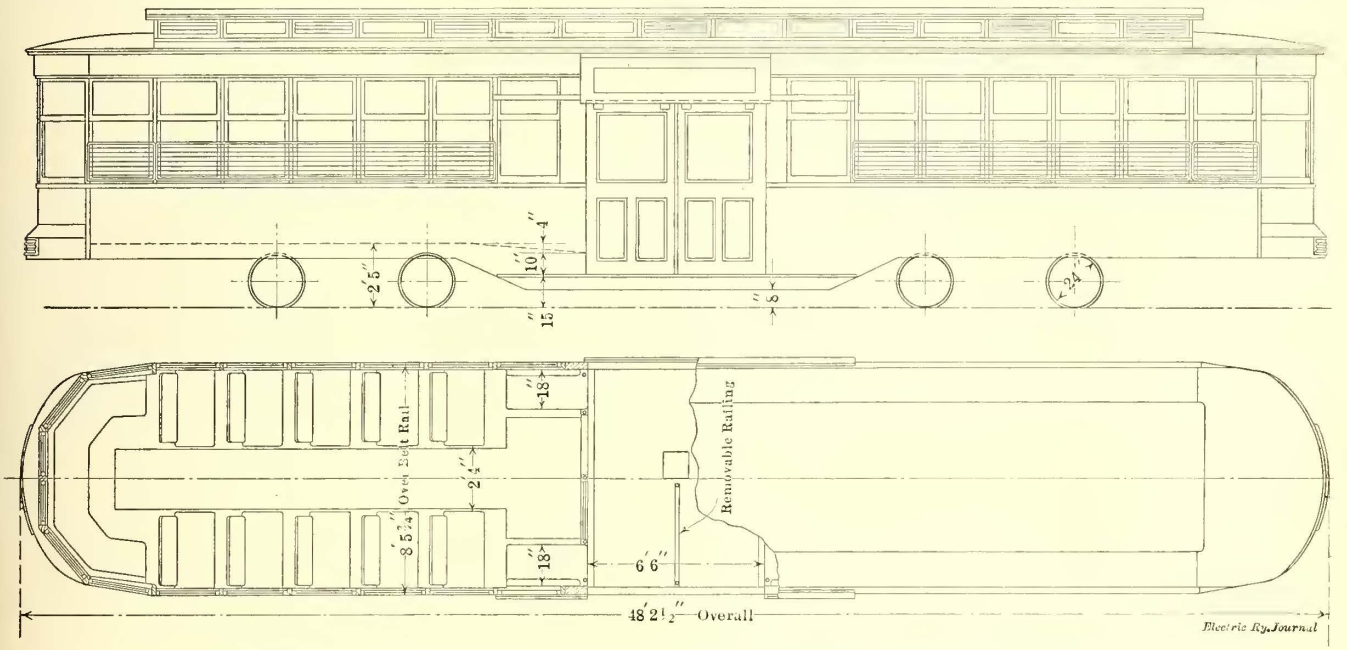
A new type of rolling stock will shortly be placed in service by the Boston Elevated Railway in the shape of 100 center-entrance surface trail cars, largely for use in rush hours. The design of such large trailers for city service is unusual, although the utilization of existing equipment in handling peak-load traffic on the trailer plan is common to many companies and was tried experimentally by the Boston company a number of years ago. The decision to add specially designed trailers to the present motor-car equipment was reached a short time ago, following conferences with the Massachusetts Public Service Commission and after an investigation of the feasibility of utilizing this class of rolling stock in Boston. The board has given its approval to the general design illustrated herewith.

The center-entrance feature will consist of a well extending across the car for the full width of the door openings, the floor being 15 in. above the rail and being connected with the floor of the car body proper by ramps which have a rise of 4 in. in a length of 4 ft. The low-step feature and central compartment will be similar in appearance to the design used in the articulated cars now in service at Boston. No end or vestibule doors are to be provided. The cars will have straight sides from sill to window rail, but the sides will be tapered toward the center of the car from window rail to eaves. The entire underframe will be of steel, the posts and siding being of composite construction. The roof is to be of wood supported at the well by stanchions and at the ends of the monitor by headers, with a steel truss between stanchions and headers. The end construction is to be reinforced to resist crushing in case of collision.

The general dimensions of the cars are given in the following table:

Length over bumpers	48 ft. 2½ in.
Length over end posts	46 ft. 10 in.
Distance center to center of bolsters	24 ft. 0 in.
Width over eaves, lower deck	8 ft. 0½ in.
Width over eaves, upper deck	5 ft. 5¾ in.
Width over window rails	8 ft. 5¾ in.
Width inside at seats	8 ft. 2¼ in.
Width of aisle	2 ft. 4 in.
Height from rail to top of roof	10 ft. 11⅜ in.
Height from rail to car eaves	9 ft. 5⅞ in.
Height from rail to top of floor	2 ft. 5 in.
Height from rail to floor of well	15 in.

Safety treads are to be provided between stanchions on the car floor and they will extend the full width of the door opening, 6 ft. 6 in. The cars will be equipped with air brakes, and double sliding doors pneumatically operated, and two illuminated signs, one over each side door, will be provided. The interior finish will be of mahogany and each car will be equipped with fourteen Perry ventilators. There are to be ten cross-seats and two longitudinal seats on each side of the car, stationary end seats also being planned as shown. There are to be twenty-eight cross-seat heaters and four panel heaters per car, the latter being placed in risers from the well to the main floor of the car. A removable railing of white enameled wrought-iron pipe is to extend from the permanent stanchion at the center of the door opening toward the center of the car. Wiring will be in conduit, with heater switch cabinets under the longitudinal seats. The Consolidated push-button signal system will be installed. The upper deck will have no headlining, but the lower deck will be lined with 3/16 in. agasote.



BOSTON TRAILERS—PLAN AND ELEVATION OF NEW CENTER-ENTRANCE CARS

Out of the 1000 or more employees of the Insull traction lines of the Middle West Public Utilities who competed in the contest to suggest the best "safety first" design for use in the company's campaign to reduce accidents, Herbert Hobsom, of Jeffersonville, motorman on the city line of the Louisville & Southern Indiana Traction Company, has won the second prize, which is $15. His design was in the form of a circle, in the outer ring of which appears the words, "In Time of Safety Prepare for Accidents." In the center was a design fashioned like the dial of a clock with the letters in "Safety First" being distributed around the edge of the dial as on the face of a watch.

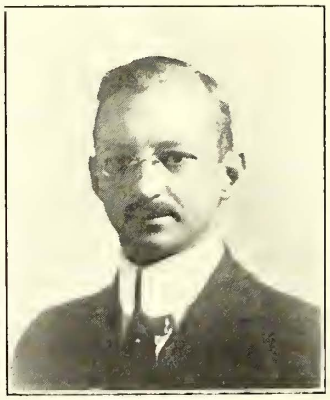
American Association News

Biographical Sketches of the Officers of Two Company Sections Are Given—Program for Mid-Winter Meeting Is Being Completed—Activities of Various Committees—Coming Committee Meetings

PUBLIC SERVICE RAILWAY COMPANY SECTION OFFICERS

P. F. Maguire, who was recently elected president of company section No. 2, has been active in company section work for several years, having served on a number of important committees. He has had a varied experience in electric railway work, having entered the employ of the Plainfield (N. J.) Street Railway as conductor in December, 1896. After three years' service he was appointed an inspector and four years later was made assistant division superintendent of the E. T. & C. J. Division. One year later he was promoted to the position of division superintendent. In April, 1906, Mr. Maguire entered the employ of the maintenance of way department of the Public Service Railway Company, Newark, N. J., where, after three years' service, he was appointed executive clerk, which position he still holds. Mr. Maguire has taken up his duties with energy and enthusiasm, and he had the encouraging and record-breaking attendance of 418 persons at his first meeting. In addition to his electric railway association interests Mr. Maguire is a member of the New York Railroad Club.

P. F. MAGUIRE
President Public Service Company Section



A. T. WARNER
Secretary Public Service Company Section

The secretary of the Public Service Railway Company Section is A. T. Warner, who is also secretary of the Public Service Railway Athletic Association. Mr. Warner graduated from Lafayette College in June, 1910, as an electrical engineer and immediately thereafter entered the employ of the Public Service Railway as a cadet engineer. He completed the two-year course which is laid out by the company for the purpose of training young men for service in the department for which they are best fitted, and was in due course assigned to work as traffic investigator in the transportation department in 1912 and still holds that position.

OFFICERS OF THE MILWAUKEE COMPANY SECTION

W. W. Cook, who was recently elected president of The Milwaukee Electric Railway & Light Company Section, is thirty-three years of age. He was a Connecticut boy, but began his electric railway career at the age of twenty-three with the Manhattan Elevated Railway Company in New York City, serving in various capacities until he resigned in 1906 to become instructor of motormen for the Long Island Railroad. He did this at the time of the installation of the third-rail system on that company's branch operating between Brooklyn and Jamaica and Rockaway Beach, L. I. In 1907 Mr. Cook was promoted to the position of foreman of repair shop of the same company, being located at Morris Park, L. I. He resigned this position in 1909 preparatory to becoming master mechanic of the Eastern Division of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., operating an interurban line between Indianapolis and Dayton and the street railway lines in Richmond and Newcastle, Ind. He severed his connection with this company in 1912 to become general foreman of shops and production with The Milwaukee Electric Railway & Light Company.

The secretary of The Milwaukee Electric Railway & Light Company section, H. G. Abendroth, achieved fame last year by winning the medal for the best paper delivered before a company section during the association year 1913-1914. As will be remembered the title of this paper was "Overhead Charges in Valuation." Mr. Abendroth was a Milwaukee boy, receiving his primary education in schools of that city. He graduated from the University of Wisconsin with the degree of Bachelor of Arts in 1911. Like many graduates of the university he secured practical experience with the Railroad Commission of Wisconsin, serving in the statistical department from September, 1911, to June, 1913. At the latter time he joined the accounting force of The Milwaukee Electric Railway & Light Company and has since been a member of the valuation staff.

W. W. COOK
President Milwaukee Company Section

H. G. ABENDROTH
Secretary Milwaukee Company Section

MID-WINTER CONFERENCE AND ANNUAL ASSOCIATION DINNER IN WASHINGTON

The program is rapidly assuming its final form. President Woodrow Wilson has agreed to take part in the program and Andrew J. Montague, representing the third district of Virginia and formerly governor of that state, will address the associations. As previously announced, Timothy S. Williams, president Brooklyn Rapid Transit Company will speak upon the Code of Principles.

As this issue of the Electric Railway Journal goes

to press the details of President Wilson's participation in the program have not been definitely settled, but he has agreed to speak either at the conference or at the dinner. At least one other prominent government official will also speak. It is expected that this will be determined on Monday.

An important feature of the dinner will be the announcement of the names of the company and individual winners of the Brady medals. While the detailed announcements and the distribution of the committee report will be deferred until a short time later it has been considered fitting that the first statement should be made to the Railway Association at this time. The announcement of the winners will be made by a prominent representative of the American Museum of Safety.

President E. H. Baker of the Manufacturers' Association, has sent letters to all members urging the attendance of executives and other representatives of member companies. Secretary H. G. McConnaughy has sent out application forms for use in making dinner reservations. The dinner will be held in the grand ballroom of the New Willard Hotel, at 7 p. m., Friday, Jan. 29. The tables will seat eight each. The price of the dinner will be $10 per plate.

MEETING OF AMERICAN ASSOCIATION EDUCATIONAL COMMITTEE

This committee met on Jan. 4 in New York with the following in attendance: H. A. Bullock, secretary New York Municipal Railway Corporation; A. M. Buck, railway electrical engineering department University of Illinois; V. Karapetoff, electrical engineering department Cornell University, and H. H. Norris, associate editor, ELECTRIC RAILWAY JOURNAL, chairman. A representative of the International Correspondence Schools was also in attendance by invitation. The committee went over plans for co-operating with the schools in carrying on the courses of instruction outlined in the committee's Atlantic City report. The schools reported that students are already enrolling in the new courses. The committee particularly discussed plans for familiarizing the students with parts of the engineering manual of the association. A study was also made of the ways in which the American Association committee can cooperate with the corresponding committees of the affiliated associations.

JOINT COMMITTEE ON BLOCK SIGNALS

In the list of appointments to sub-committees of the joint committee on block signals for electric railways, printed in the issue for Dec. 12, the names of G. N. Brown and C. H. Morrison were given as those of the sub-committee to consider the A. I. E. E. standardization rules. The sub-committee consists of G. N. Brown and J. M. Waldron.

SPECIAL COMMITTEE ON LIGHTNING PROTECTION

President L. P. Crecelius of the Engineering Association has appointed the following to serve on the committee on lightning protection: D. E. Crouse, representing the committee on power distribution, Maryland Electric Railways, chairman; F. R. Phillips, representing the committee on equipment, Pittsburgh Railways; E. J. Blair, representing the committee on electrolysis, Metropolitan West Side Elevated Railway, and J. Leisenring, representing the joint committee on block signals for electric railways, Illinois Traction System.

NATIONAL JOINT COMMITTEE ON LINE CONSTRUCTION

The national joint committee on overhead and underground line construction has just announced its plans, which were formulated at the last meeting, mentioned in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 19, page 1350. The committee plans to prepare specifications, suggest lines of practice or recommend modifications of existing regulations relating to: (1) Underground and undergrade crossings; (2) crossings of electric wires over electric railway tracks; (3) crossings of trolley contact wires; (4) overhead crossings of wires or cables of telegraph, telephone, signal and other circuits of similar character over steam railroad rights-of-way, track, or lines of wire of the same classes; (5) overhead crossings of electric light and power lines, and (6) parallel lines.

Specifications covering subject No. 4, already prepared by an earlier joint committee representing various interests, are now being considered for adoption by the national joint committee. Subject No. 5 has been covered by the present standard specifications, the edition adopted and published by the American Electric Railway Engineering Association being the latest revision. The other subjects are new, and specifications relating thereto will have to be prepared by the committee.

Both the American and the Engineering Associations are represented in the joint committee, of which G. W. Palmer, Jr., Bay State Street Railway, is vice-chairman. The chairman is Farley Osgood, Public Service Electric Company, and the secretary is R. D. Coombs, 30 Church Street, New York.

MEETING OF AMERICAN ASSOCIATION COMMITTEE ON VALUATION

The new committee on valuation met for organization, as announced, on Jan. 7 in New York. Committeee members present were: H. H. Crowell, Grand Rapids, Mich.; Gerhard Dahl, New York; J. G. Mortimer, Milwaukee, Wis.; C. S. Sergeant, Boston, Mass.; Martin Schreiber, Newark, N. J.; J. N. Shannahan, Hampton, Va.; B. E. Tilton, Syracuse, N. Y., and C. G. Young, New York.

Messrs. Allen, Doolittle and Clark, representing the Association, were also present.

After discussion of the scope and plans of work before the committee two sub-committees were appointed as follows: On scope, Messrs. Dahl, Crowell and Young, with Mr. Mortimer as adviser; to consider a bibliography of the subject of valuation, Messrs. Shannahan, Schreiber and Tilton.

COMING COMMITTEE MEETINGS

Jan. 11, Chicago (Congress Hotel), 10 a. m., subcommittees of the joint committee on block signals for electric railways will hold meetings as outlined in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 2, page 61. J. M. Waldron, Interborough Rapid Transit Company, and J. W. Brown, Public Service Railway, are co-chairmen of this committee.

Jan. 26, 27, New York, 10 a. m., meetings of the subcommittees of the block signal committee, postponed from Jan. 4 and 5, as outlined on page 1393 of the issue of this paper for Dec. 26, 1914, will be held at association headquarters.

Jan. 27, New York, 10 a. m., Engineering Association committee on equipment, W. G. Gove, Brooklyn Rapid Transit Company, chairman. (See outline of work, ELECTRIC RAILWAY JOURNAL, issue of Dec. 26, 1914, page 1393.)

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Equipment Defects—Hand-Operated Controllers—Contacts, Fingers, Springs and Bases—I

BY C. W. SQUIER, E.E.

In the writer's seven articles on control connections, only different arrangements of resistance and various schemes of control have been considered, and an effort has been made to show how different operating requirements have necessitated the great variety of control connections.

The equipments on cars as operated to-day have developed from the single motor to two and four-motor equipments, and from single car to train operation. This has necessitated changing from hand-operated to power-operated controllers and from non-automatic to automatic types. The connections previously discussed may apply to any of these manually-operated or automatic types. In the discussion of the diagrams the terms switch or contacts were used to designate the apparatus necessary for carrying and breaking the required current, and these may be either a contact finger rubbing against a segment or a power-operated switch as conditions may require.

The next consideration will be the apparatus itself together with a discussion of some of the troubles that have come to the writer's attention. This apparatus falls into two classes—hand or manually-operated and automatic. Automatic acceleration is a desirable thing to have. In some cases it is a necessity while in others the complication which it involves is not warranted. It should be understood that manually-operated apparatus cannot produce automatic acceleration although such apparatus may be either remote or locally controlled. After it has once been set in operation automatic acceleration can be produced only by apparatus over which the operator has no further control other than the ability to shut it off entirely.

Manually-Operated Controllers

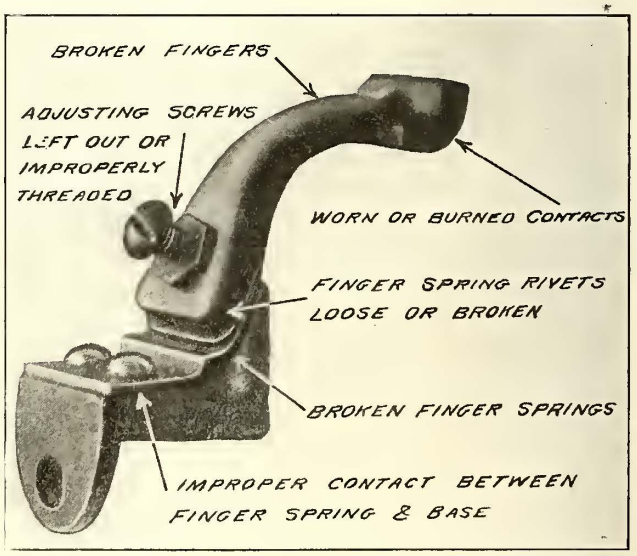
The most common form of hand-operated controller is that which is generally known as the drum controller. This has been built in many different forms and sizes, has given good results and has done wonderful work when the abuse to which it is continually subjected is considered. The different connections are made by fingers which come in contact with copper segments on a drum as it is rotated by the controller handle. The segments are connected together in the various combinations necessary to close the circuit from one finger to the next.

As the fingers and contact segments make and break all the connections, they are the foundations about which all the other controller parts are built. Thus the operating mechanism is for the proper operation of the drum, the star wheels and pawls insure the stoppage of the drum in the definite positions necessary for the proper combinations, the blow-out coils and arc shields prevent excessive arcing at the fingers and contacts, the interlocking mechanism prevents improper combinations and the connection boards and terminals facilitate making the outside connections to the fingers.

To insure proper contact between the fingers and the contact segments, it is necessary that the fingers be pressed firmly against the contacts. For this end the finger springs provide the necessary pressure as well as the required flexibility for making and breaking the circuit. The accompanying halftone shows a contact finger with spring, shunt and base such as is most commonly used with "K" and "L" controllers. The principal troubles experienced consist of excessive wear or burning on the ball of the finger, broken fingers, weak tension in the finger springs, broken or cracked finger springs, loosening or bad threading of adjusting screws, poor contact between the finger springs and base and broken or loose finger bases.

Finger Adjustment

The burning of the fingers may be caused by lack of sufficient contact pressure or by improper adjustment.



CONTACT FINGER, SPRING AND BASE

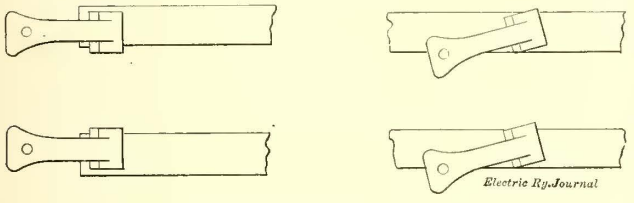
Fingers should be adjusted so that they will have about 3/32-in. lift as they come in contact with the segments, and care should be taken to see that uniform pressure and contact is maintained throughout the complete rotation of the drum. The contact tips take the arcing caused by opening the circuit when the drum is thrown to the "off" position and these require more frequent renewal than the remaining contact segments. Hence it sometimes occurs that after new tips have been installed, the fingers if adjusted to give the proper lift and tension on the tips will be found to have improper contact on the remainder of the segments, due to their being worn thinner than the new tip.

The practice of tapping the ends of the contacts with a hammer to bend them down should never be resorted to as this is liable to start cracks in the contacts which later will cause them to break at the weakened points.

The tapping also is liable to strip the threads on the segment screws or those in the casting to which the contacts are fastened. Where it is found that proper contact pressure on the worn part of the segment cannot be obtained with ⅛-in. lift of the finger on the tip, it is better to replace the segments also, as these are worn beyond their useful life. If this cannot be done due to lack of material, the segments may be shimmed up by using thin soft copper strips such as those employed for finger shunts.

Fingers should also be adjusted so that they will line up vertically with each other. In most hand controllers there are at least four fingers, and sometimes more, that should make and break the circuit at the same time on the first point. In order to secure this condition as the contacts burn away, the controller man frequently changes the adjustment of the fingers so that some will have scarcely any lift and give too light contact pressure, while others may have from 5/16-in. to ⅜-in. lift and as a result may be liable to stub and break or tear off. This practice should be discouraged, and the contacts should be fitted to make contact uniformly with all fingers having approximately the same lift.

Fingers should also be adjusted to line up horizontally with their respective contacts, and not project either above or below the contact surfaces, as indicated in one of the accompanying drawings, nor make contact across the contacts as shown in the sketch alongside. They



IMPROPER ALIGNMENT OF FINGERS

should also make contact across their entire width and not, as sometimes happens, rest simply on one edge.

Care should be taken that the fingers make and break contact in their proper order, and that they register properly on each notch. Fingers or springs which do not extend far enough, or which extend too far, do not permit proper clearance between the finger tip and the end of the contact segment immediately preceding or following this finger.

For ordinary hand controllers the pressure of the fingers against the contacts should be not less than 5 lb. nor more than 9 lb. A small spring balance should form a part of every controllerman's outfit, but a man soon becomes accustomed to testing the contact pressure with his fingers and will not need to use the spring balance except when there is some doubt as to the necessary pressure. Emery cloth should never be used for cleaning burned contacts or blistered fingers. Sandpaper is far better, because the emery if not carefully removed is liable to cause short-circuits and burn-outs.

In replacing controller contact tips care must be used to make sure that the tips fit the ends of the contact segments properly and do not leave a wide crack, as this causes excessive wear and burning at such points.

Contact segments on both main and reverse drums should be lightly lubricated on each inspection with vaseline or compressor oil applied with a felt pad. In one special method of keeping the contacts lubricated, as used on some controllers, use is made of a felt pad which is saturated with oil, the contact segments rubbing against the pad as the drum is operated. One of the principal objections to this method is that dirt and copper dust from the contacts accumulate on the pad, thus making it a partial conductor of current and a promoter of short-circuits and grounds.

Broken Fingers

Fingers are broken, in most cases, when their contact surfaces become pitted and fused so that they stub when making contact. A few operations of the controller drum then bend the finger or spring so that it catches under the contacts and is broken. Cracks are sometimes started by straightening fingers in order to lengthen them. The controllerman, for example, finds a finger that does not make contact quite soon enough because the end of the contact tip is burned away. Instead of putting on a new tip, he finds it much easier to rotate the drum until the finger rests on the contact. Then by striking the finger a sharp blow on the curved portion, it is lengthened by straightening it slightly. This practice is bad even though it is accomplished without cracking the finger, because the next time a contact tip is installed, the finger will be found too long to make contact properly.

A Study of Car-Heating Requirements

BY AN EQUIPMENT ENGINEER

Very few data on the heating of street railways cars electrically are available in technical literature. The following facts obtained from tests made on the heating equipment of a modern city car may, therefore, be of interest. The car tested was of the monitor-roof, pay-as-you-enter type, having in addition to the heaters in the car body, one in each vestibule attached to the center bulkhead between the body end doors. The platform heaters were so connected that they were in service when the car-body heaters were taking the maximum current. All heating was by direct radiation. The following are the essential data with respect to the car tested:

Cubical contents of car body	1930 cu. ft.
Total exposed surface, body only	1125 sq. ft.
Total capacity heaters in body at 500 volts	7200 watts
Platform heater capacity, each at 500 volts	800 watts
Percentage of glass area to total exposed surface	18.5 per cent

During the tests the body end doors were closed, and the platform doors were arranged as during the operation of the car on the street, that is to say, one platform was closed completely and the other had its folding doors open. The outside walls of the car were of wooden sheathing and the inside finish of cherry with an air space between. The roof was of ⅜-in. poplar boards with a painted canvas outer covering. The upper and lower deck ceilings were of a prepared headlining material. The floor in the aisle was of a single layer of ⅞-in. pine, and on each side of the aisle was a double floor of ⅞-in. material with building felt between.

Two tests were made, one with and one without double windows. An ammeter and voltmeter were in circuit during both tests to measure the energy consumption of the heaters. The average of both tests was substantially 7430 watts which varied only with the fluctuation of the line voltage. Both tests were made with the car at rest and no passengers. In the first test, made without the double windows on the car, the following results were obtained:

Temperature rise heaters working continuously at maximum capacity, 33 deg. Fahr.

Time to reach maximum temperature, about two hours.

In the second test made with double windows on the car, the following were the results:

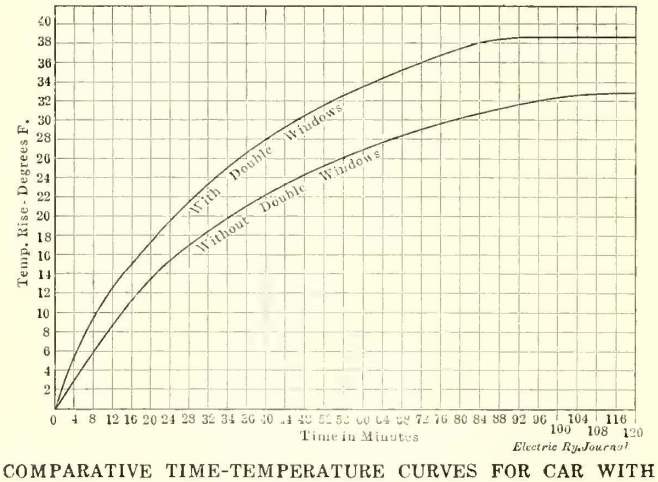
Temperature rise heaters working continuously at maximum capacity, 39 deg. Fahr.

Time to reach maximum temperature, about one hour and thirty-eight minutes.

All temperature readings were taken with accurate thermometers. In both tests the car was placed with the long axes north and south. The wind velocity during the tests ranged from 10 m.p.h. to 14 m.p.h.

During the first test the direction of the wind at the beginning was from the southwest, shifting after one hour from the west and at the end of the test it was from the northwest. During all of the second test the wind was from the north. The average barometer reading was 29.26 in. during both tests. The wind and barometer data were obtained from the local government weather bureau. The wind data were important since observations have shown that the velocity and direction of the wind have a very material effect on the temperature rise possible with any given heating equipment. The effect of the wind was greatest when blowing at right angles to the car and least when blowing in the direction of the car movement.

The graphs shown in the accompanying illlustration give the general shape of the time-temperature rise curves. The loss of heat from a car occurs by reason of conduction, radiation and direct loss, as when the warm air escapes through open doors or the cracks around sashes and floor trap doors. The graphs show



COMPARATIVE TIME-TEMPERATURE CURVES FOR CAR WITH AND WITHOUT DOUBLE WINDOWS

that the temperature in the car rises rapidly at first, then the rate of rise decreases until the maximum is reached. At this point the heat losses are equal to the heat input and the temperature of the car remains relatively constant. The amount of heat loss depends to a large extent upon the "temperature head" or the difference in temperature between the inside of the car and the outside air. The rate of temperature increases with constant energy input and is affected by the conductivity of the walls, floor, roof and windows of the car. The conductivity in turn depends upon the composition and thickness of the materials employed and the amount of air space between them.

Referring to the graphs further, it is believed that the temperature difference increases rapidly at first, because the "temperature head" is small and therefore practically all of the heat units are available for heating the inclosed air, the temperature of which quickly rises. As the "temperature head" becomes larger, the amount of heat available for heating the inclosed air, and thereby raising its temperature, decreases, because of the increasing loss through the walls of the car. Thus the rate of rise in air temperature falls off till the point is reached where the "temperature head" is sufficient to force through the walls of the car all of the additional heat generated. At this point the temperature of the air in the car becomes practically constant and the maximum temperature rise possible with the heating equipment is obtained.

From the results of the tests the following data are secured:

	Without Double Windows	With Double Windows
Watts per cubic foot of car body	3.85	3.85
Watts per square foot of exposed surface	6.60	6.60
Degrees rise per kilowatt of total heater capacity as per test	4.44	5.25
Heat loss factor, standing test	0.68	0.58

These data can, of course, be applied only to cars having substantially the same volume and exposed area as the one tested. By heat loss factor is meant the B.t.u. loss per square foot of exposed surface per 1 deg. Fahr. temperature difference per hour.

It will also be observed that under the conditions of the tests, it is possible for the heating equipment to maintain a temperature difference 6 deg. Fahr. greater with double windows than without them. Moreover, the maximum temperature difference is reached sooner in the car with double windows. While these data are correct only for the conditions under which the tests were made, they are, however, useful in indicating what, in a general way, may be expected of electric car heating equipment (direct radiation) with particular reference to the possible temperature rise.

As an example, suppose it is desired to equip a car with direct radiation of the electric type, sufficient in capacity to maintain a temperature in the car of 45 deg. Fahr. when the lowest outside temperature to be expected is 10 deg. Fahr. and moderate winds prevail. In the example the car selected is generally similar in construction to the one tested and has an exposed car-body surface of 1000 sq. ft.; a percentage of glass area to total area of 18.5 and double windows. From this statement of the problem the temperature difference is 35 deg. Fahr. Applying the heat loss factor in the foregoing table for a car with double windows, the total B.t.u. loss per hour is as follows: $35 \times 1000 \times 0.58 = 20{,}300$ B.t.u. Dividing by 3412, the equivalent of 1 kw-hr., it is found that 5.92 kw of electric heater capacity is required to maintain 35 deg. Fahr. temperature difference under the conditions set forth.

Since this result is based on the heat losses obtained from a standing test, it would not be quite correct for a car in regular service. Observations indicate, however, that the effect of the ordinary opening of doors on the car temperature is practically offset by the heat units given off by the average passenger load. If this is true very little additional capacity should be required to take care of this factor, and to this should be added enough to make the total capacity necessary an even multiple of standard heat units. In this example 6.4 kw may be selected. To utilize this capacity sixteen heaters of the ordinary 400-watt, 500-volt rating would be required.

As previously stated, however, care must be taken in applying the data derived herein to the solution of any car heating problem. If the conductivity of the walls, floors and roof, the percentage of glass area to total exposed area and wind velocity are materially different from those in the tests described, the heat loss factor and other derived data will have to be modified accordingly. It should also be noted that observations show that cars constructed with the arch roof are capable of being kept warmer with a given amount of heater capacity than cars of substantially the same volume but with the monitor roof. This is accounted for by the reduction in the area of exposed glass and the elimination of the cracks around deck sash which cause a direct loss of heat.

Location of Trolley Wire on Curves—II

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

Elevation of Outer Rail—The trolley wire on curves where the outer rail has been elevated for safety at high speeds should be moved in from the center further than the height of the trolley wire and the dimensions of the car and trolley pole alone require. The reason for this will be clear from an inspection of Fig. 5, where

r, r = the rails normally at the same level
r' = the outer rail elevated
g = the gage of the track
T = the trolley wheel when the outer rail has no elevation
T' = the trolley wheel when the outer rail is elevated.

By lifting one side of the car by the elevation of the outer rail the trolley wheel tends to be thrown over toward a point above the inside rail of the track curve. If it is prevented from following this tendency its sides will assume an angle to the trolley wire and scrape it as the car proceeds around the curve. If the trolley wire is moved the same amount as the elevation of the side of the car tends to move the trolley wheel, the sides of the wheel will still remain parallel to the trolley wire and the wheel will roll along the curved wire with the same friction as it did before the elevation of the side of the car.

In Fig. 6 in the similar triangles ABC and abc let AB be the amount that the trolley wheel will be moved away from the center of the track by elevating the outer rail and which the trolley should be moved for least friction. Then

BC = the height—h—of the trolley wire above the rail in feet
ab = the elevation of the outer rail, e, in inches
bc = the track gage, g, in feet,

and we get

$$AB : ab = BC : bc$$

or

$$AB = \frac{eh}{g} \text{ in inches.}$$

To reduce this expression to feet it must be divided by 12, giving $\frac{eh}{12g}$.

The accompanying table has been calculated on the assumption that 4 ft. 8½ in. is the track gage.

ADDITIONAL DISTANCE IN INCHES NECESSARY TO MOVE THE TROLLEY WIRE ON CURVES ON ACCOUNT OF THE ELEVATION OF THE OUTER RAIL

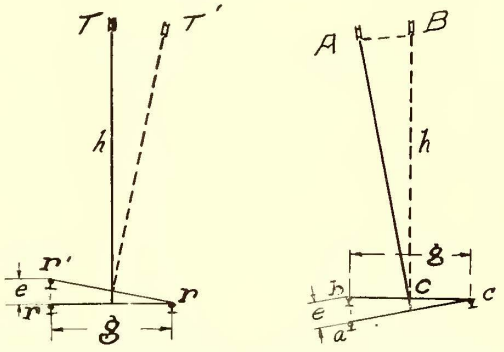
Elevation of Outer Rail in In.	Height of Trolley Wire Above Rail					
	18 Ft.	18.5 Ft.	19 Ft.	19.5 Ft.	20 Ft.	20.5 Ft.
1	4	4	4	4	4	4½
1½	6	6	6	6	6½	6½
2	7½	8	8	8½	8½	8½
2½	9½	10	10	10½	10½	11
3	11½	12	12	12½	12½	13
3½	13½	14	14	14½	15	15
4	15½	16	16	16½	17	17½
4½	17	18	18	18½	19	19½
5	19	20	20	20½	21	22
5½	21	21½	22	23	23½	24
6	23	23½	24	25	25½	26
Constant	3.82	3.93	4.03	4.14	4.25	4.35

The constant given at the bottom of each column and which is equal to the height of the trolley wire above the rail divided by the gage of the track, is the factor by which the elevation of the outer rail must be multiplied in each case in order to get the table figure. Where the conditions are uniform throughout a line or system the proper constant can be given the lineman with a 5-ft. level, and he can readily determine the necessary additional movement of the trolley wire required on account of the elevation of the outer rail.

The full distance that the trolley wire should be moved from the center of the track on a curve in which the outer rail is elevated is thus:

$$R - \sqrt{R^2 - \left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 + C^2 - l^2 + (h - i)^2} + \frac{eh}{12g} \qquad (11)$$

The quantity under the radical except R^2 is peculiar to the conditions that will probably be general on all



FIGS. 5 AND 6—EFFECT OF ELEVATION OF OUTER RAIL; SHIFT OF TROLLEY WHEEL POSITION DUE TO RAIL ELEVATION

curves in all parts of the city system involved and can be calculated once for all and called K or constant. The formula then becomes,

$$R - \sqrt{R^2 - K} + \frac{eh}{12g} \qquad (12)$$

or in city work where there is usually no elevation of the outer rails on curves,

$$R - \sqrt{R^2 - K}. \qquad (13)$$

Where

$$K = \left[\left(\frac{b}{2}\right)^2 - \left(\frac{B}{2}\right)^2 - C^2 + l^2 - (h - i)^2\right]$$

Example: Take a double-truck car in which

b	(wheelbase of each truck)	=	4.0 ft.
B	(center to center of trucks)	=	23.0 ft.
C	(trolley base to center of car roof)	=	5.6 ft.
l	(length of the trolley pole)	=	13.6 ft.
h	(height of trolley wire above the rail)	=	19.0 ft.
i	(height of trolley base above the rail)	=	12.0 ft.
g	(gage of the track)	=	4.71 ft.
R	(radius of the center line of track)	=	150.0 ft.
e	(elevation of the outer rail)	=	5.0 in.

Thus

$$K = \left(\frac{b}{2}\right)^2 + \left(\frac{B}{2}\right)^2 - C^2 + l^2 - (h - i)^2$$

$$= 4 + 132.25 - 31.36 + 184.96 - 49 = 240.85.$$

It should be noted here that the items in the formula by whose change the most rapid variation in the total can be brought about are C and l, these factors varying as their squares.

The distance the trolley wire should be inside the center of the track $\left(R - \sqrt{R^2 - K} + \frac{eh}{12g}\right)$ is

$$150 - \sqrt{(150)^2 - 240.85} + \frac{5 \times 19}{12 \times 4.71}$$

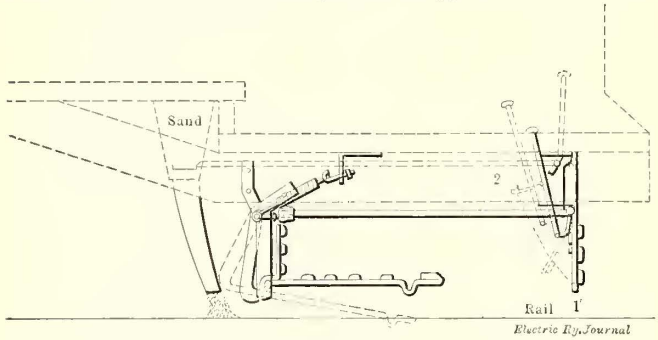
or $0.81 + 1.68 = 2.49$ ft. or 2 ft. 6 in.

It should also be noted at this point how important the elevation is. In this case it was the basis for moving the trolley wire three times as far in as would have been the case had there been no elevation of the outer rail.

Sandbox Opened By Fender Trip

BY A. R. JOHNSON, ASSISTANT TO SUPERINTENDENT OF EQUIPMENT, THIRD AVENUE RAILWAY, NEW YORK

As a practical contribution to safe operation, the Third Avenue Railway, New York, has installed on its cars a simple mechanism which automatically opens the sandbox when the fender gate is tripped. This device



SKETCH SHOWING TRIPPING LEVERS FROM FENDER TO SANDBOX

calls for a ¼-in. x 1½-in. strap, clamped to the gate bar and hung close to the gate, as shown at "1" on the accompanying sketch, and a second strap attached to the sand plunger bar as shown at "2." When the fender gate is tripped strap "1" springs up, striking strap "2" and thereby forces the sandbox rod forward to release sand. The sand continues to flow until the fender is reset, which operation also closes the sandbox.

Use of Metallic Salts for Pyrometric Purposes

A new method for measuring temperatures wherever heat is applied has just been developed by the Carl Nehls Alloy Company, Detroit, Mich. This consists in the use of different metallic salts which are made into molecular mixtures that will melt down at different temperatures throughout the range between 200 deg. and 1330 deg. Cent. They may be used in place of the more costly pyrometers and also to check pyrometers. Then a cylinder is placed at the end of the thermo-couple and when it melts the pyrometer should read the same as the temperature marked on the "Sentinel."

One way is to cast the salts into solid cylinders, 7/16 in. in diameter and ¾ in. long. Each one is wrapped in a paper on which is printed its correct melting temperatures in degrees Centigrade. For all temperatures below 932 deg. Fahr. these "Sentinel" pyrometers can be used in an airtight glass tube. The salts can be used over and over again, as they melt each time the temperature rises above the one marked on the cylinder and become solid again the moment the temperature falls below this degree.

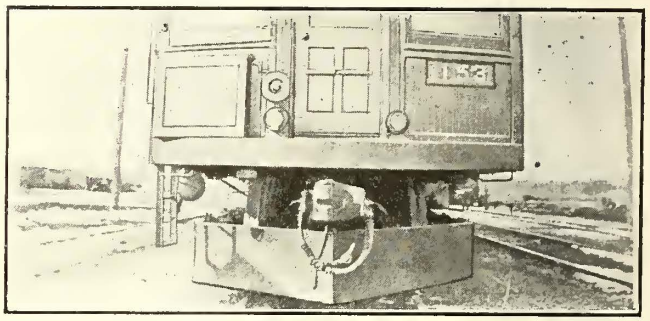
The salts are also canned in the form of a paste. Pastes with various melting temperatures can be daubed along a steel bar and inserted into furnaces, ovens, retorts, flues, steam pipes, etc., to find the temperature at which they are operating. The salts that melt down and those that remain solid will indicate the temperature, which will be between the two. By using a long bar one can determine whether the temperature is uniform in the front and back, top and bottom, or corners of a furnace, ovens, kiln, etc.

This is asserted to be the only method that will give the exact temperature of tools heated in a forge fire. A paste is selected that represents the correct hardening temperature for the tool, daubed on the tool and when the latter is heated to this temperature the salt will melt and the tool can be taken out of the fire for quenching. This work is made easier if the tool is surrounded by a piece of sheet steel or is inserted in gas pipe, as that keeps the paste from coming in contact with the fuel.

A handy way of using the cylinders is to plug one end of a tube or rod and drop in a cylinder. A small rod can then be lowered into the tube and made to rest on the salt. When the salt melts down the rod will lower and thus indicate that the melting temperature of the salt has been reached. This is very useful for finding the temperatures of molten metals like babbitt mixtures, etc.

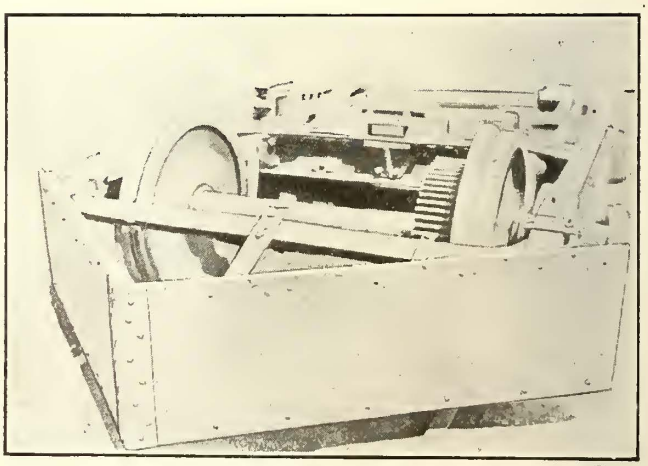
Sheet-Steel Pilot for Interurban Cars

Sheet-steel pilots have been in service for more than seven years on the trucks of the Chicago, Lake Shore & South Bend Railway's cars. During that period not a single pilot has been replaced, although some have been bent slightly out of shape, but were restraightened at small cost. These pilots are made of ¼-in. boiler plate,



SHEET-STEEL PILOT—VIEW OF CAR WITH STEEL PILOT

20 in. wide, mounted on a ¼-in. x 2-in. x 2½-in. T-iron frame. Three strap-iron brackets ⅝ in. x 4 in. in section support the pilot on the front end of the truck frame, connection being made by using the truck pedestal bolts. As the pilot is mounted on the truck it follows the track in a way similar to the life guard on a street car. Its substantial construction causes it to



SHEET-STEEL PILOT—VIEW SHOWING METHOD OF MOUNTING ON TRUCK

resist a heavy impact and deflect the body from the track. Since it is mounted about 4 in. above the top rail, it also serves as a snow plow until the snow has drifted badly. In one of the accompanying illustrations the method of mounting this steel pilot on the truck is shown, and in another illustration the location of the pilot relative to the rail and drawbar is illustrated.

Electric Railway Legal Decisions

CHARTERS, ORDINANCES, FRANCHISES

Arkansas.—"Jim Crow" Cars—Conductors Authorized to Compel Compliance with Rules.

Under the law as given in Kirby's Dig., Sec. 5658-5663, street railway companies are required to operate separate cars for the white and colored races or else to separate the white and colored passengers in cars operated for both by setting apart a portion thereof for each race, and the conductor may "require" any passenger to change his seat when necessary, and a passenger so spoken to must take the seat so assigned, and any person refusing to do so shall leave the car, or, remaining thereon, shall be guility of a misdemeanor, etc. It was held that a street railway company may designate what portion of cars shall be occupied by white passengers, and what portion by colored passengers, and that a conductor may use necessary force to compel a passenger to comply therewith, the word "require" being synonymous with "compel." (Little Rock Ry. & Electric Co. v. Hampton, 165 Southwestern Rep., 290.)

Georgia.—Ejectment—Force Justifiable.

The presiding judge charged that the conductor on an electric car had authority to arrest disorderly persons, according to Sec. 926 and 927 of the Penal Code of 1910, and that then he had a right to strike them or use other such force as was necessary to protect himself from injury; held, that in the light of the pleading and evidence, the giving of this charge furnishes no ground for a reversal. (Georgia Ry. & Electric Co. v. Wheeler., 80 Southeastern Rep., 993.)

Illinois.—Difference Between Elevated and Street Railways So Great that City Cannot Regulate Fares Under Statute.

Corporations organized under the Railroad Law (Hurd's Rev. St. 1912, Chap. 114) to operate elevated railroads for the carriage of passengers only are not street railroads, within the purview of Cities and Villages Act (Hurd's Rev. St. 1912, Chap. 24, Sec. 62) Art. 5, Sec. 1, Cl. 42, authorizing municipalities to regulate hackmen and other carriers using the street, and to fix their compensation. Even though part of the right-of-way of elevated roads is through the city streets, they differ from the other means of transportation mentioned in that they maintain regular stations for the reception and discharge of passengers and do not stop at any point, as is the custom with street railways and hackmen. Hence the municipality cannot, on the theory that the elevated railroads are street railroads, regulate their charges. (Metropolitan West Side Electric Ry. v. City of Chicago, Northwestern Electric R. R. v. Same. South Side Electric R. R. v. Same, 104 Northeastern Rep., 166.)

Indiana.—Power of Street Railway to Condemn Land for Interurban Passenger and Express Terminal.

While one public service corporation may not condemn property for the use of another in the absence of express legislative authority, a street railway company which has been required to permit cars of interurban companies to be transported over its lines, pursuant to Burns' Ann. St. 1908, Sec. 5632, may condemn property for a terminal thereby rendered necessary.

Since it is lawful for an express company to transport property over an interurban railroad company, the latter may condemn property necessary for a terminal to handle such business. (Eckart et al. v. Ft. Wayne & N. Y. Traction Co., 104 Northeastern Rep., 762.)

LIABILITY FOR NEGLIGENCE

Alabama.—Assumption of Risk by Passenger of Jerks.

Passengers on electric street cars assume the risk of injury from ordinary jars and jolts incident to car operation, when conducted with due care and in the usual manner. Where a lady passenger left her seat and stepped into the aisle, while the car was in motion, and then fell down and injured one of her knees, held, that she cannot recover damages from the railway company, where the preponderance of the evidence shows that the motorman operated the car with due care, and that it came to a stop, with no unusual jar or jolt. (Vincent v. New Orleans Ry. & Light Co., 64 Southern Rep., 654.)

Illinois.—Liability for Injuries to Animals When Fences Are Not Installed.

Where a railroad company neglects to fence its road as required by Hurd's Rev. St. 1911, Chap. 114, Sec. 62, it is not contributory negligence defeating a recovery for an owner of adjoining land to permit stock to go upon the land adjacent to the right-of-way. (Hartzell v. Alton, Granite & St. Louis Traction Co., 104 Northeastern Rep., 1080.)

Kansas.—Contributory Negligence of Passenger Not Bar to Recovery in Some Cases.

A finding that the conductor of an electric street car was guilty of such wantonness as to authorize a recovery against the company, regardless of any question of contributory negligence, is authorized by evidence that he ran his car, without stopping, past a station and upon a bridge, knowing that a man was riding outside of the car in such a position that he would necessarily be struck by a beam of the bridge and severely, and probably fatally, injured. (Harbert v. Kansas City Elevated Ry. Co., 138 Pacific Rep., 641.)

Massachusetts.—Termination of Relation of Passenger and Carrier When Passenger Leaves Car.

Defendant elevated railway company maintained an ascending track leading to a station, the incline being bounded by a wall constructed of stone blocks 26 in. wide. The top of the wall was level, but there was no railing on the incline between the track and the edge of the wall. There were steps leading from the station platform to the incline. A preceding car having become disabled on the incline, decedent, a passenger, left the following car and started to walk up the incline to the station platform, and in some way fell or was pushed over the wall and received injuries from which he died. There was evidence that passengers had occasionally so alighted before, but there was nothing to indicate that the steps at the end of the platform or the incline were intended for the use of passengers. Held that, when decedent left his car before it reached the station platform, he ceased to be a passenger, and was at most a bare licensee, and hence no recovery could be had for his death because of alleged simple negligence of the railway company in failing to protect the wall by a barrier. (Hyams v. Boston Elevated Ry. Co., 104 Northeastern Rep., 370.)

Massachusetts.—Injuries from Controller Blow-out.

Plaintiff's decedent, a passenger, was burned by a shower of sparks from the controller box, causing the car to come to a sudden stop and hurling her from her feet against a seat. Plaintiff sued in three counts, for negligence (1) in operating the car, (2) in permitting the use of a defective, unsafe and dangerous mechanism, and (3) for failing to properly inspect the car. Held, that it could not be ruled as a matter of law that such an occurrence was one of the things which might be expected to happen if the mechanism was in proper condition, and that plaintiff was entitled to go to the jury on the second and third counts, but that the evidence did not show negligent operation and that the court, therefore, erred in submitting that count to the jury. (Bresnahan v. Boston Elevated Ry., 103 N. E. Rep., 300.)

Massachusetts.—Negligence Imputed to Boy Six Years Old.

In an action for an injury to a boy six years old, run over by a street car while playing in the street, the evidence was held to sustain a finding that the boy was guilty of contributory negligence. (Godfrey v. Boston Elevated Ry. Co., 102 N. E. Rep., 652.)

Massachusetts.—Contributory Negligence—Act Caused by Fright—"Due Care."

St. 1907, chap. 392, authorizes recovery from a street railway company, whose servants in the conduct of its business negligently caused the death of a person not a passenger or employee who exercised due care. But there could be no recovery for the death of a boy who, without actively exercising care, ran in front of a street car, even though he was at the time suffering from fright, since under the statute the injured person must be actively and actually in the exercise of diligence; "due care" in the statute meaning something more than negative and passive freedom from fault, and requiring reasonably intelligent and energetic attention to safety. (Bothwell v. Boston Elevated Ry. Co., 102 N. E. Rep., 666.)

News of Electric Railways

RAPID TRANSIT PLANS FOR CINCINNATI

Four Plans Presented, All Involving Use of Canal Bed—Comments by Professor Swain and President Schoepf

City Engineer Krug of Cincinnati, on Dec. 31, presented to Mayor F. S. Spiegel four schemes for rapid transit in that city, with the canal bed as an important feature of each.

Scheme No. 1, or the Canal Street Belt Line, suggests that the two-track line start at Canal and Vine Streets and follow the canal in a subway to a point about 1000 ft. north of Ludlow Avenue, with the exception of three short sections which would run in the open because of sharp bends in the canal line. Wherever the line crosses the canal as a result of the deflections it is to be built as a subway in order to allow the passage of the proposed boulevard over it. The length of the line is 15.56 miles, with 6.50 miles in subway, 0.63 mile in tunnels and 8.43 miles in the open. There will be twenty bridges of a total length of 2206 ft. and 6100 ft. of concrete trestle along the Ohio River bluff. Fourteen stations, about 1 mile apart, are specified, of which the Canal Street station is the largest, as it is intended for baggage and small packages.

Scheme No. 2 proposes a two-track subway, auxiliary to No. 1, 1.31 miles in length. It leaves the main line at Canal and Plum Streets, runs south on Plum to Fifth Streets, east on Fifth to Main and north on Main to Canal Street, where it would connect with the main track. Two stations are planned for it.

Scheme No. 3 includes No. 1, except that part east of Plum Street on Canal Street and under Mt. Adams to near Eden Park reservoir. Instead, it is suggested that from the intersection of Plum and Canal Streets the line run south on Plum Street to Fifth, east on Fifth to Walnut, north on Walnut to Ninth and east on Ninth Street and under Mt. Adams to connect with Scheme No. 1 near Eden Park reservoir. This has been designated as the Ninth Street belt line and would make the entire line 16.31 miles in length. There are a number of changes in stations mentioned also.

Scheme No. 4, or the Pearl Street belt line, also includes Scheme No. 1 with the exception of the portion east of Walnut Street on Canal Street and under Mt. Adams, and in its place suggests that from the intersection of Canal and Walnut Streets the line run south on Walnut Street to Pearl, east on Pearl and Martin Streets and private property to a point near Eden Park reservoir. A portion of this substituted part would be subway and the remainder would be a steel trestle, with the necessary changes in the location of the stations. It would be 16.46 miles in length. It is said that this last plan will give about the same service as Nos. 1 and 2 combined and that its construction will entail a smaller cost, with the added advantage that the Kentucky lines may use the subway if this becomes necessary.

Engineer F. B. Edwards estimated the cost of Scheme No. 1 at $10,959,895. Scheme No. 2, if built in connection with No. 1, will involve a cost of $1,609,475. Built as a separate unit, the cost would be about $3,504,109. The estimate for Scheme No. 3 is $11,993,880 and of No. 4, $11,033,528. Engineer Ward Baldwin has fixed the cost of rolling stock, power station and equipment at $2,160,000, but if the downtown loop is built it will bring the cost up to $2,456,000.

Professor Swain, Boston, consulting engineer, reviewed the report before it was made public. He considers it reasonable throughout. He has further given his approval to scheme No. 1 and has expressed the opinion that it will serve the purpose of the special committee and the city as well as any other that can be devised. Professor Swain agrees with the committee that Schemes Nos. 1 and 2 taken together will make an ideal transit plan. No. 3 he considers out of the question and No. 4 omits so much of the downtown loop that it cannot be considered in any way equal to the combination of Nos. 1 and 2, notwithstanding the fact that it costs less and has the redeeming feature of extending further down into the city than the others. Professor Swain suggests that a combination of Nos. 1, 2 and 4 be considered, with the omission of certain portions that duplicate. A better plan than that suggested by Nos. 1 and 2 might be worked out with no increased cost, he says, and this is the object of the investigation. Professor Swain discusses the ways in which the cost may be reduced and suggests that the engineers study the plan to discover minor changes that will tend to this result.

The Rapid Transit Commission, appointed by Mayor Spiegel, consists of E. W. Edwards, president; William Cooper Proctor, Dean Herman Schneider of Cincinnati University, George F. Dieterle and George Puchta. The investigation was made under the direction of the commission, and the purpose is to find a way for bringing all interurban cars to the center of the city and provide a better service on existing roads. For this reason Professor Swain suggests that any line that is built should be operated by the Cincinnati Traction Company.

W. Kesley Schoepf, president of the Cincinnati Traction Company, is quoted as saying that the cost of construction at this time, in his opinion, is practically prohibitive. He added, however, that he would not be able to express a positive opinion until he had had time to study the report in detail. Some time ago he expressed the belief that such an improvement, to cost about $6,000,000, might be financed and that it would be a success if it could be made to solve some of the problems of local transportation.

SERVICE IN BROOKLYN

President Williams on the Grand Jury—Commission Report of Service—Company's Reply

Timothy S. Williams, president of the Brooklyn (N. Y.) Rapid Transit Company, issued a statement on Dec. 31 dealing with the investigation of the company by the Grand Jury. He said that the basis of the information obtained by the company in regard to the investigation was secured through the newspapers despite the fact that Grand Jury proceedings were secret and that it was a misdemeanor to divulge any information as to what transpired in the Grand Jury room. Not having been served with any subpoenas the company did not feel that in making its statement it could be charged with divulging information which the law holds sacred. Mr. Williams assumed that the Grand Jury was acting under its general power to investigate any statement of facts which it deemed of importance to the community. If any pertinent facts bearing upon the transportation problem which were not already generally known to the public could be elicited at the inquiry, or if any measures could be suggested to alleviate admitted discomforts of the present period of transition from inadequate facilities to facilities adequate to Brooklyn's needs, the company would be the first to welcome such disclosures or suggestions. On the other hand, if it should appear that those charged with the duty of providing transportation for Brooklyn had endeavored consistently and as successfully as the conditions permitted to fulfil their obligations, Mr. Williams felt that a presentment should appear certifying the facts. Mr. Williams remarked parenthetically that, as the company was not advertising its statement in the newspapers, the accusation could not be brought against it that it was trying to influence the newspapers of Brooklyn by paid advertising.

Subsequently, Joseph Johnson, chief of the transit bureau of the Public Service Commission of the First District of New York, made public his conclusions in connection with the inquiry which the commission had been conducting into the service of the Brooklyn Rapid Transit Company. These were summarized under twelve heads, and to each one Mr. Williams replied specifically, giving such facts and figures as seemed to him to be necessary to substantiate the case of the company.

In answering Mr. Johnson, Mr. Williams said in part:

"The report now given out, so far as we know, has not been considered or approved by the commission. It is entirely an ex parte statement of the former campaign manager for the chairman of the commission, who is receiving a large salary from the city, and who, according to our information, feels that he should begin to give some public

evidence of his official existence. The commission, however, is responsible for Mr. Johnson's report being made public in advance of its consideration by them or in advance of the completion of their formal hearing, and the inference is plain from such a procedure that even they are somewhat desirous of meeting the present avalanche of public criticism against them by an appearance of official activity. Indeed, we have been told, in substance, that the commission dislikes any voluntary attempts on our part to satisfy public complaint but would prefer to have the public credit of correcting the evils by their official orders. Their action, therefore, in publishing this partially untruthful, entirely ex parte, and generally unfair report, is evidently an attempt to divert against the Brooklyn Rapid Transit Company the public indignation that seems likely to wipe the present commission out of existence. To any person who has known the general policy and practice of procrastination and indecision, as I have known it in my experience with the Public Service Commission in the carrying out of the formalities required by the dual system contracts, in order to get into operation as speedily as possible some substantial measure of transportation relief, it is laughable to hear the commission or its employees talk of any lack of co-operation on our part or of any unnecessary delays on our part in trying to furnish that relief."

This statement provoked Mr. Johnson to retort that if his report had done no more than to show the keen hostility of Mr. Williams to any set of men who presumed to criticise his management it had served a good purpose. He said that the Brooklyn Rapid Transit Company would have a fair opportunity before the commission to try to disprove the conclusions.

On Jan. 4 Mr. Williams gave out another statement, supplementing his reply to the criticisms of the Brooklyn Rapid Transit service by Mr. Johnson. He said that the grievance of the company against the publication of Mr. Johnson's report was, first, that it was not based upon facts in all cases; second, that it condemned the company for evils for which the commission itself was responsible; third, that the summary of it as given out by the commission was not justified in many cases by such of the supporting figures as had been furnished to the company. Mr. Williams said that the company had not up to that time received a copy of the report, but that if the figures were as inaccurate as some that had been brought to the company's attention, they would illustrate unpleasantly some of the methods of the commission.

The Brooklyn *Eagle* quoted Chairman McCall of the commission in its issue of Jan. 5 in part as follows:

"The report of Mr. Johnson was prepared in absolutely good faith by the head of our transit bureau and its findings are a result of the investigations of paid experts who have been in our employ for a long time. It is now before the commission for its judicial consideration and I decline to comment upon it in any way. When the question comes before us Colonel Williams will then be given an opportunity to present his case in the regular way. If we find that the weight of evidence is that Chief Johnson's report is in error then we will throw it out completely."

MR. DOHERTY TO RETURN TO TOLEDO

City Solicitor Thurstin, of Toledo, Ohio, announced on Jan. 4 that he will ask the Council for an ordinance to provide for a bond issue of $4,000,000, the proceeds to be used for the purchase of the local street railway under the municipal ownership ordinance adopted by referendum vote last August. Some time ago the franchise committee announced the completion of another franchise which its members asked the Toledo Railways & Light Company to consider, and on Jan. 4 members of this committee received a communication from Henry L. Doherty, chairman of the board of directors of the company, stating that he will be in the city soon to consider the draft of the ordinance which the committee prepared.

Federal Judge Killits has set Jan. 23 as the date for rendering his decision in the case of Negley D. Cochran and the Toledo Newspaper Company, recently tried before him on the charge of contempt of court in connection with the publication of statements to which the court took exception. Counsel for the defense have until Jan. 9 to file briefs.

SEATTLE MUNICIPAL OWNERSHIP VOTE ON MARCH 2

In committee of the whole the City Council of Seattle, Wash., decided on Dec. 30 to submit to the voters at the general election on March 2 a proposition to purchase the Seattle, Renton & Southern Railway within the citiy limits. The proposition provides for an initial payment to the receivers of the company of $200,000 in 4½ per cent street railway bonds and subsequent payments each year for twenty-eight years of 20 per cent of the gross earnings of the property. For the first ten years, the receivers are to pay annually into the city treasury from the 20 per cent of gross earnings received by them the sum of $15,000 and for the next eight years $20,000 a year. For the remaining ten years, the receivers are to be paid the full 20 per cent of the gross earnings, unless the total payments to them amount to $1,500,000, in which case all payments are to cease, and the property be finally deeded to the municipality. By this agreement, the city will obtain the property without any investment except of bonds and receive from the company during the first eighteen years of the contract, a total of $310,000 divided into annual payments, with which to pay and retire the bonds and to make such extensions and betterments to the line as may be necessary. The proposition of purchase further provides for the dismissal of suits instituted by the city and counter suits brought by the receivers. After the corporation counsel has passed upon the terms of the proposition the Council will pass an ordinance accepting the offer of the receivers. This will be followed by the adoption of a resolution submitting the question to the voters on March 2.

UNION STATION SERVICE IN KANSAS CITY—OTHER MATTERS

At a recent Council committee hearing held to consider the subject of providing adequate traffic facilities around the new Union Station, P. J. Kealy, representing the Metropolitan Street Railway on the board of control which, under the new franchise, will eventually manage the property, said the prospective street railway traffic should be considered in planning streets. He was quoted as follows:

"The South and Southeast are developing very rapidly, especially in that district where small homes may be built on 25-ft. lots. Transporting those people by street cars will soon become a serious question. We now have only Main Street as a street leading straight through the business district from the extreme north to the far south. I believe that within five years a part of this traffic will have to come downtown over a line on McGee Road. We now have as much street car congestion at Thirty-first and Main Streets as at Fifteenth Street and Grand Avenue. As this traffic comes north through the Main Street cut and by way of the station it cannot all be carried over the Main Street Viaduct. Some of the cars will have to go over Twenty-third Street to either Grand Avenue or McGee Street and thence downtown. The building of a line on Twenty-third Street will be necessary in a comparatively short time. The rounding of the corner at Twenty-third Street and Westport Road to permit the cars to get through that narrow throat will be necessary."

Street cars in Kansas City ran on the evening schedules New Year's Eve until 3 a. m., when the owl car service was begun. Heretofore the owl car schedules began at 1 o'clock on New Year's Eve as on other nights. The traffic during the later hours this year was heavy, indicating, it is said, the advance in cosmopolitanism of the city. The holiday traffic otherwise was about normal, considering the steadily increasing business.

It is expected that cars will run over the new Twelfth Street viaduct to the stock yards and implement jobbing district in the West Bottoms about Jan. 15. Tracks were laid on the viaduct as it progressed, and the approaches are now being installed. The "stock yards" electric line has helped to serve the district by a circuitous route during construction.

The Metropolitan Street Railway in its newspaper display space on Jan. 1 used the face of a clock with the hands close to 12, with the injunction "A good new year's resolve: Wait till the cars stop! Look before crossing car

tracks!" There are pictures of a crowded street corner and two cars bound in opposite directions.

C. W. Green, Mayor of Kansas City, Kan., has announced that a bill will be prepared for presentation to the Kansas Legislature giving the city power to purchase or acquire street railway tracks and lease them to public service corporations. The franchise of the Metropolitan Street Railway in Kansas City, Kan., has eight years to run; public ownership of the system is said to present difficulties because of the close relation of the Kansas City, Kan., system with that in Kansas City, Mo., where a new franchise has been granted but waits the fulfilment of its terms by the company.

RATE INJUNCTION ASKED IN MISSOURI

Springfield Gas & Electric Company Carries Rate Case to Federal Court on Ground of Constitutionality and Unfairness of Public Service Commission

The Springfield Gas & Electric Company, Springfield, Mo., has begun a contest against the order of the Missouri Public Service Commission establishing lower electric rates. The original brief in this case and the decision of the commissioner were abstracted in the Electric Railway Journal of May 2 and July 11, respectively. After the denial of an appeal by the commission, the company has omitted the prescribed course of appeal through the state courts and is now asking the federal court for an injunction against the enforcement of the order. The proceedings involve the question of the commission's fairness in its conclusions and the constitutionality of the act creating the commission. The application for injunction was made to Judge Van Valkenburgh at Kansas City, who called in Judge Hook and Judge Pollock. Judge Hook presided at a hearing on Dec. 29, the result of which was the granting of ten days' time for the filing of a brief by the commission.

The company contends that the valuation placed upon the property by the commission was ridiculously low and that the commission made no allowance in the valuation for going concern value. A question is raised as to the right of the commission to exclude from valuation of property items which the company asserts are necessary to its successful operation. The company has a steam power plant, held for emergencies but seldom used, the current being bought from a hydroelectric concern. The exclusion of this plant from the valuation, and the exclusion of other items such as administration expenses paid to a New York holding company, is alleged to have reduced the valuation to such a point that the company making ostensibly 7 per cent actually can earn on the prescribed rates only 3 per cent.

The question of constitutionality arises over the right given by the law to the commission to consider, in preparing a decision, information outside the evidence presented at the hearings. The allegation is made that the commission in this case considered evidence that the company had no opportunity of answering. Whether or not proof can be adduced of the weight given such outside information, the fact that the commission may use such outside information warrants the reasonable assumption that such outside information was used.

W. G. Busby, counsel for the commission, stated that the commission hoped the court would not find it necessary to grant the restraining order, because the commission had given the matter careful consideration and believed it was justified in its decision. J. T. Neville and E. C. McAfee of Springfield also appeared for the commission. The company was represented by John M. Olin, Madison, Wis., and W. D. Tatlow, Springfield.

This Springfield case was the first the Public Service Commission decided involving the methods of valuation and principles to be followed in valuing a property. It established a precedent as to what the commission deemed was a fair return on invested money and the direct power of the commission to fix rates. The commission, after an exhaustive hearing, cut down the claimed valuation of the company materially and ordered an outright reduction in electric light rates from 15 cents per kw-hr. to 8 cents. Although only the electric light rates of Springfield were involved, the order was construed as blazing the way for rate making in all Missouri cities.

SIGNAL AND STEEL CAR RESOLUTIONS ADOPTED BY NEW YORK COMMISSION

The following resolutions were adopted by the Public Service Commission of the First District of New York on Jan. 5:

"Resolved that it is the sense of the commission that the elevated railroad lines of the Interborough Rapid Transit Company should be equipped with a signal system which will prevent collisions, and that the Interborough Rapid Transit Company be required to make an investigation and report to the commission within sixty days on such speed control, cab signaling or other improved signaling devices that will allow the minimum headway on the elevated railroads and provide the greatest factor of safety.

"Resolved that Mr. Gibbs, consulting engineer to the commission, and Mr. Wilder, electrical engineer, be asked to advise the commission whether an all-steel car body, having approximately the dimensions of the wooden cars operated on the elevated roads in Manhattan and the Bronx by the Interborough Company and having three doors on each side of the car, with the necessary couplers, curtains, etc., but without trucks, electrical equipment or air brakes, can be built for operation on the elevated lines having a weight not to exceed the weight of the heaviest wooden cars now operated on such lines."

CHICAGO ELEVATED VALUATIONS

In response to a request from the Chicago local transportation committee, the commissioner of public service has made a valuation of the elevated railway system. Little significance attaches to the valuation, however, since a controversy has arisen between the local transportation committee and the commissioner of public service because he has failed to prepare the valuation in accordance with the committee's request, namely, to bring it up to date and to omit intangibles. This valuation as submitted is entirely new, and intangibles have been included. The purpose of this valuation was for use in connection with the merger of the surface and elevated lines, upon which actual steps toward the beginning of the subway system is said to depend. The public service commissioner's figures on the physical value of the property are as follows

	Cost new	Present value
Metropolitan	$19,591,973	$16,323,744
South Side	14,871,381	12,215,138
Northwestern	15,127,558	12,575,892
Chicago & Oak Park	4,282,672	3,044,510
Total	$53,873,584	$44,159,284
Taxes	150,000	150,000
Total	$54,023,584	$44,309,284
Overhead charges, 18 per cent	9,724,245	7,975,671
Grand total	$63,747,829	$52,284,955

In connection with intangible values the report states that they will vary between $5,000,000 and $20,000,000. A comparison of this valuation with that made by the harbor and subway commission in 1912 shows that there is approximately $1,500,000 difference, the public service commissioner's cost now being that much greater and its present value being that much less than the figures included in the harbor and subway commission valuation.

CINCINNATI SUBURBAN FRANCHISE

The street railway committee of the City Council of Cincinnati, Ohio, and representatives of the Cincinnati, Newport & Covington Railway conferred on Jan. 2 on the proposed new franchise. The committee informed the company's representatives that it would recommend to council a rate of fare of 3 cents between the suspension bridge across the Ohio River and Fourth Street in Cincinnati. The rate on the Newport division and between all points in Newport and Covington and Cincinnati will be 5 cents. The committee insisted on the payment of $65,000 to the city in settlement of the claim against the company for car license fees. The company offered to compromise at $40,000. The company is to pay $12,000 as a franchise tax during the current year and 3½ per cent is then to be added to this amount during the life of the franchise. The city desires to reserve the right to allow any other company to use the company's tracks on terms to be agreed upon between the companies or by arbitration.

CLEVELAND RAILWAY MATTERS

On Dec. 29 members of the Cleveland City Council made a trip over the North Randall Street Railway, which the Cleveland (Ohio) Railway has asked permission to purchase for $146,000. The line was built with private capital and connects the Broadway line with the Forest City fair grounds at North Randall. It is 3½ miles in length. The Cleveland Railway, under the present arrangement, is guaranteed 6 per cent on the investment required in operating cars on the line. The North Randall line is said to have earned 14 per cent on the investment last year.

Councilman Stolte entered objections to the purchase of the North Randall line by the Cleveland Railway on the ground that the city will never be able to purchase the property if its value continues to increase so rapidly.

The street railway committee recommended a reduction in fare from 5 cents to 3 cents between London Road and Dill Road. This leaves the fare between London Road and the Public Square 6 cents. London Road is in Nottingham, a village that has been annexed since the Tayler ordinance went into effect. Mr. Witt explained that special school tickets may be provided under the ordinance, where difficulties are encountered in the annexation of suburban towns.

An ordinance was introduced in the City Council on the evening of Dec. 28, authorizing the company to build a double track on Euclid Avenue between East Twenty-second and East Fortieth Streets, known as "Millionaires' Row." The measure was referred to the committee on street railways. Peter Witt, street railway commissioner, and Director of Public Safety Sidlo have obtained consents of a number of owners of abutting property, and Mr. Witt believes that cars will be in operation over the proposed new section of track by July 4, 1915.

SEATTLE MUNICIPAL RAILWAY SUIT

On a charge that officers of the city of Seattle have illegally expended thousands of dollars on the Highland Park & Lake Burien Line of the Seattle (Wash.) Municipal Railway, known as Division "C," lying outside the city limits of Seattle, and that the city is about to expend more of the public funds unlawfully Attorney-General W. V. Tanner has asked for an injunction against further dissipation of the moneys in the general fund of Seattle for the purpose of maintaining or operating the Lake Burien line. The necessary papers were served on the city comptroller and the city treasurer on Dec. 28.

Mr. Tanner begins his complaint by stating that C. W. Clausen, state auditor, who is ex-officio chief inspector and supervisor of the bureau of inspection and supervision of the public offices of the State of Washington, as such officer received during 1914 from George A. Liebes, a state examiner under his jurisdiction, a report in which Mr. Liebes detailed the facts upon which the suit is brought by the attorney-general. According to the report of Mr. Liebes, he went thoroughly into the records and accounts of the Lake Burien line and found that 4½ miles is outside of Seattle; that between March 7, 1911, and June 30, 1914, Seattle expended $20,491 for construction, part of which was spent on the portion of the road beyond the corporate limits.

Mr. Tanner alleges that the money so spent was derived from the sale of the general bonds of Seattle and from loans from the general fund, but that the books of the city failed to show the exact amount so expended and that, therefore, the exact amount is unknown. He says that between March 7, 1911, and June 30, 1914, $9,000 was transferred from the general fund of the city for the purpose of meeting the operating expenditure of Division "C," of the Municipal street railway system, but that the books of the city also fail to show what sums were spent inside and what outside of the corporate limits. Mr. Tanner finally cites in his complaint a paragraph from the state examiner's report which states that the sums expended exceed the revenues of the car line and that the warrants issued and cashed are illegal because the city has no authority to operate or maintain a street railway outside of its corporate limits. The attorney-general, however, does not ask that the warrants heretofore issued and paid be nullified, but prays that the city comptroller and the treasurer be enjoined from expending other public money on the Lake Burien line outside of the city limits of Seattle.

PUBLICITY IN ATLANTA

A Figure of Speech Recently Expressed Put Into Effect by Georgia Railway & Power Company

The policy of discussing the company's affairs frankly with the public has been developed by the Georgia Railway & Power Company, Atlanta, Ga., through a series of advertisements designed to continue indefinitely, appearing once each week in each of the three Atlanta newspapers and in the local labor journal. The seventh of the series was published in the week between Christmas and New Year's day. In the advertisements the company confines itself to some specific topic which it discusses with an air of intimacy and without reserve, emphasized typographically by the intermittent use of italics or bold-face type. The definite motive is to interest the public through subject and style, to win its confidence through sincerity, and to cement its good-will by logic. In one sense, "The Window," as the discussion has grown to be termed, is the company editorial; in another, it is an expression of the company's personality; in another, it is the brick-on-brick building of a barrier against unintelligent criticism and unsympathetic suspicion.

The opening of "The Window" was a concrete expression by W. T. Waters, advertising manager of the Georgia Railway & Power Company, of a figure of speech by Ivy L. Lee, executive assistant of the Pennsylvania Railroad, who said in the ELECTRIC RAILWAY JOURNAL of Oct. 10: "What the public wants is a window through which it can look into the affairs of public service corporations, and so long as this vision is denied the public will be very suspicious as to what is going on in the windowless houses."

Further than the time schedule and the underlying policy, no plan was prearranged for "The Window" series of the Georgia Railway & Power Company. The topics were left to be selected each week from the matters then in the public mind. A drawing was made, in stipple and line, of a window without sashes or panes, with "The Window—Look In" sculptured in the stones at the top. Etchings measuring two columns by 6¼ in. were made from this, the one for the labor journal being three columns in proportion. In the mortise representing the window space was given the setting for the body of the advertisement, its hand-set caption, and the company's signature. The cut and type style have not yet been perfected to a point accepted as permanent, the effort being to select the best of each and adhere to them without variation thereafter. A uniformity with its own effect is being sought in these advertisements.

The first of the series was published on Nov. 19, under the caption "Are You Looking?" It was the introductory, the keynote. The caption of the second was "Serving You," and that was a declaration of the vital connection between good service and good-will. The caption of the third was "An 1894 Nickel." The text of that was reproduced in the ELECTRIC RAILWAY JOURNAL of Dec. 19, page 1366. The fourth was headed "Baiting Corporations"; the fifth, "Pleasing Everybody" (in the matter of heat in cars); the sixth, "When the Cars Stop," and the seventh, "Our Business, Too," the relation being to petitions then pending before the State Railroad Commission for authority to curtail expenses by reductions in extra or tripper car schedules. Each of these was rewritten under a different caption for the labor journal columns appearing each week-end.

The effect of the series was noticeable before it had been running a month. The impression seems to be growing in the public mind of Atlanta that there is no disposition on the part of the company to hide anything; that it feels no fear of publicity; that it is seeking publicity, in fact; that it wants to make known its side of matters under discussion; that it asks nothing but fair play and a hearing of all the evidence. The effect of the series has been manifest even in a direction not deliberately anticipated. The newspapers themselves have realized that the company will rent the papers' own megaphones to address the realers, and that therefore it is to the best interest of the papers to be accu-

rate whenever they discuss the company's affairs. "The Window" is distinctive by the very reason of its appearance on a newspaper page. It "stands out," in newspaper parlance, no matter what its surroundings.

SAN FRANCISCO MUNICIPAL RAILWAY

Stockton Street Municipal Tunnel Completed and New Line Opened to Exposition Grounds

On Dec. 29 regular service was inaugurated on the Stockton Street line of the San Francisco Municipal Railway system, and an elaborate program was carried out in celebration of the completion of the tunnel that made the line possible. The new line has 2.56 miles of double track, and runs from Market and Stockton Streets through the Stockton Street tunnel and via North Beach to the Van Ness Avenue entrance to the exposition grounds. From this point it makes a wide loop through Fort Mason military reservation over the same track that is to be used by the Van Ness Avenue line of the Municipal Railway.

The tunnel is 911 ft. long. It was built by the municipality at a cost of about $500,000 to eliminate grades on a direct route from the business district to Chinatown and the North Beach section of the city. It has a width of 55 ft., and is arranged to accommodate pedestrians and vehicular traffic as well as the double track railway. The ceremonies which marked the inauguration of service through it were under the auspices of the Down Town Association, and the Mayor, city engineer and other representatives of the city and civic bodies took part. Eight of the new municipal cars were required to accommodate the official party and bands. Luncheon was served en route to the Fort Mason terminus of the line, where Major-General Arthur Murray received the party with a military band and detachment of troops.

Ten cars were put on the new line, and receipts for the first and second days were $293.75 and $297.55, respectively.

Crosser Bill at This Session.—It is reported that the Crosser bill authorizing the District of Columbia to take over the electric railway systems within the district will be taken up at the present session of Congress.

Catalogs Wanted.—A. Lancelevée, Rues Louis Blanc and Marguerite, Oran, writes that he is anxious to secure from American manufacturers catalogs and bulletins of railway material, wheels, air brakes, springs, trolleys, etc., for possible use in connection with electric railway undertakings in Algiers and Tunis.

Covington Ordinance Unconstitutional.—The city ordinance of Covington, Ky., prohibiting cars of the Cincinnati, Newport & Covington Railway, which cross the Ohio River to Cincinnati, from carrying one-third more passengers than the seating capacity, was annulled as unconstitutional by the Supreme Court of the United States on Jan. 5. The court held that the ordinance was a burden on interstate commerce.

Montreal Franchise Extension Urged.—By a vote of 176 to 159 the members of the Montreal Board of Trade have reaffirmed a resolution that the city should take immediate steps to extend the franchise of the Montreal Tramways on an equitable basis. The opponents of this resolution argued that the time is inopportune and that a commission of experts should be appointed to report on the question. The Montreal Builders' Exchange has also passed a resolution in favor of a speedy settlement of the question.

Chicago Railways Expenditures.—The City Council of Chicago, Ill., has authorized the city comptroller to certify the certificates for construction work completed by the Chicago Railways. The company has done $1,140,000 of construction work, against which temporary bond certificates have been issued. Certification of the work accomplished was withheld by the city comptroller because of a controversy which has now been settled. Bonds of the company to cover the expenditures made will be issued as usual.

Franchise Values in New Jersey.—A meeting of the mayors of a number of cities in New Jersey was held at the Newark City Hall on Jan. 4 to decide upon what steps, if any, could be taken to secure a change in the ruling of the Court of Errors and Appeals on franchise valuations in rate making. Among the suggestions made was one that if these values are to be included in the establishment of rates they were proper subject for taxation by the municipalities. Another meeting will be held Jan. 15 to consider legislation to secure this result.

Bill Filed for Dorchester Tunnel.—Representative Sullivan of Boston has filed a bill with the Secretary of State of Massachusetts for the construction by the Boston Transit Commission of a tunnel from Andrew Square, Dorchester, to the junction of Dudley Street, Columbia Road and Stoughton Street, and thence to the intersection of Bowdoin Street and Geneva Avenue, and from that point to Codman Square. The proposed tunnel will provide a rapid transit route looping from Harvard Square, Cambridge, through Boston proper to Codman Square, Dorchester.

Change in Rules of Procedure.—The Public Service Commission of the Second District of New York has just adopted the first changes in its rules of procedure since the organization of the commission in 1907, designed to provide for the new functions imposed on the commission by the Legislature when such activities as those of the telegraph and telephone companies, auto-bus lines, the steam corporations and the baggage transfer companies were put under its jurisdiction. The changes do not in any way detract from the general simplicity and effectiveness of the thirty-four rules.

Texas Interurban Retrenching.—J. F. Strickland, president of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., issued the following statement recently: "The general decrease in business and the falling off in receipts of late have made it necessary for the companies to follow out a retrenchment policy. We have, therefore, decided to cut the salaries of executive officers beginning with the president and including the heads of departments only. There will be no reductions in other salaries." The reduction will amount to $25,000 or $30,000 per annum.

Mr. Thornton Rises to the Occasion.—H. W. Thornton, general manager of the Great Eastern Railway, London, England, and formerly with the Long Island Railroad, is reported by cable from London on Jan. 3 to have received great praise at the hands of the British press in connection with the facilities which he afforded to newspaper men in their work of covering the wreck which occurred on the line of the Great Eastern Railway at Ilford on Jan. 1. His attitude is said to have been in striking contrast to that previously taken in Great Britain of treating newspaper men generally as annoying interlopers in cases of this kind.

Plea for Rehearing in St. Louis Mill Tax Case.—On Jan. 2 the Supreme Court of Missouri instructed its clerk not to file the motion of the United Railways, St. Louis, for a rehearing in the mill-tax case referred to in the Electric Railway Journal of Jan. 2, page 70, because the company had not presented the petition within ten days after the court had rendered its decision. H. S. Priest, counsel for the company, then announced that he would present his argument to the court at Jefferson City, saying that the court has the power to allow a motion for rehearing to be filed at any time during the term in which the original decision is handed down. If he fails to secure consideration before the Missouri court for a rehearing Mr. Priest says the case will be appealed to the United States Supreme Court.

Mayors' Utility Bureau Organized.—Preliminary plans for the organization of the national agency through which all American cities may co-operate in exchanging information about public utilities were made at the University Club, Philadelphia, Pa., on Dec. 28, when the trustees appointed at the recent convention of American Mayors held their first meeting. After perfecting their own organization the trustees outlined the activities which will be essayed in 1915 by the new utilities bureau. The election of officers resulted as follows: President, Charles R. Van Hise, president of the University of Wisconsin; secretary, Clyde L. King of the University of Pennsylvania; treasurer, S. S. Fels. Morris L. Cooke, director of public works of Philadelphia, was chosen acting director of the bureau. The problems discussed at the conference of mayors in Philadelphia were reviewed at length in the Electric Railway Journal of Nov. 21, 1914, page 1144.

Modification of Missouri Utility Law Proposed.—The repeal of that provision of the public utilities act of Missouri which prohibits a stock corporation from purchasing or owning to exceed 10 per cent of the stock of any steam or electric railroad will be recommended to the Legislature by the Public Service Commission, according to John M. Atkinson, chairman. Mr. Atkinson is reported to have said that the commission will ask for the repeal of this section because it is regarded as a serious obstacle to the proper development of transportation facilities in Missouri. As stated in the ELECTRIC RAILWAY JOURNAL of Aug. 8, 1914, page 272, William B. McKinley, head of the Illinois Traction Company contends that this 10 per cent statute is practically a bar to the construction of railroads in Missouri and that it would prevent a company like the Illinois Traction Company from owning the stock of a corporation organized in Missouri to construct electric railways.

Extension of Cambridge Subway Nearly Ready for Service.—The Boston Transit Commission has practically completed the section of the Cambridge subway extension in Boston between Park Street and upper Summer Street and within a few weeks it is expected that train service will be extended to a temporary terminal near Chauncy Street, giving rapid transit connections between the Harvard Square line and north and south-bound Washington Street tunnel trains, through a transfer station near the point where the two rapid transit lines cross one above the other. A small amount of station work is being completed by the commission, and the Boston Elevated Railway is installing tracks, signals and other equipment prior to the inauguration of traffic. The opening of the line to this point in advance of its completion to the South Station will be a great convenience to the public on account of the transfer arrangements above outlined, and it is probable that later in the year service will be extended to the railroad terminal.

The Subway Labor Problem.—The Public Service Commission for the First District of New York has announced that it will appeal immediately from the decision of the Appellate Division, First Department, handed down on Dec. 31, holding unconstitutional the alien labor provisions of the State labor law, in order that a final construction of the statute may be obtained from the highest court in the State. The commission's counsel will move for an appeal and will endeavor to get the case before the Court of Appeals at once. The State labor law provides that none but citizens of the United States shall be employed upon public work and that, so far as possible, preference in such employment shall be given to citizens of the State of New York. The question having arisen in the case of one of the contractors for the new subways, a taxpayer's action was begun in the Supreme Court for an injunction to restrain the commission from declaring forfeited any subway contract because of the employment of aliens by the contractor. The commission demurred to this complaint, and the demurrer was sustained by the lower court; but on appeal the Appellate Division reversed this decision and held the law unconstitutional. It is this decision from which an appeal will be taken.

Auto Bus Franchise Hearing Concluded in New York.—The franchise committee of the Board of Estimate and Apportionment of New York held a final hearing on Dec. 31 in regard to the tentative routes for the establishment of additional bus lines in New York City. James L. Quackenbush, counsel for the New York Railways, defined the relations of the New York Railways to the Fifth Avenue Coach Company, which operates buses on Fifth Avenue and other thoroughfares. He said that the Interborough-Metropolitan Company, which owns the stock of the New York Railways, holds in addition about 100,000 shares of the 235,000 shares of stock of the Fifth Avenue Coach Company. According to Mr. Quackenbush a deficit was likely to occur in the earnings of the coach company when the new subways were placed in operation because the present congestion would not continue to exist with the new rapid transit lines in operation. Edward A. Maher, vice-president and general manager of the Third Avenue Railway, said that 58 per cent of the street accidents in London were the result of motor bus operation. He asked the city to protect the interests of the surface railway companies. Briefs are to be submitted by Jan. 9 and the committee will then formulate a tentative motor bus scheme for further criticism.

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railway Association

The Illinois Electric Railway Association will hold its annual meeting on Jan. 15 at the Auditorium Hotel, Chicago. The session will be devoted to committee reports and the election of officers and will be followed by the regular association luncheon.

Chamber of Commerce of the United States

The annual meeting of the Chamber of Commerce of the United States will be held at the New Willard Hotel, Washington, D. C., on Feb. 3, 4 and 5, 1915. A considerable part of the program will be devoted to foreign trade, the elimination of undue restrictions, the upbuilding of the merchant marine, and the aid that can be rendered by the Federal Reserve Board

Western Association of Electrical Inspectors

The tenth annual national convention of the Western Association of Electrical Inspectors will be held at the Hotel Raddison, Minneapolis, Minn., on Jan. 26, 27 and 28. The program this year includes only one subject of interest to electric railways, namely, the report of the committee on electric traction systems. This committee was instructed to advise the members concerning electrical hazards involved in the operation of electric traction systems and to propose safeguards.

Wisconsin Electrical Association

President P. H. Korst announces that the annual convention of the Wisconsin Electrical Association and the Wisconsin Gas Association will be held in Milwaukee, Wis., on Jan. 20, 21 and 22, at the Hotel Pfister. This is the first year that a joint meeting of the associations has been arranged. Secretary George Allison announces the following program for that part of the association's work which is of special interest to central station and electric railway companies:

Jan. 21

Paper, "Financing of Public Utility Properties," by Andrew Cooke, consulting financial expert, Chicago, formerly vice-president of the Harris Trust & Savings Bank.

Paper, "The Continuous Meter Reading and Discount System," by F. J. Maxwell, auditor of the Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.

Paper, "Advertising Influence of Public Service Employees," by R. O. Jasperson, advertising agent Milwaukee Gas Light Company.

Paper, "The Wisconsin Railroad Commission's Method of Rate-Making," by a member of the commission.

Paper, "Practical Effect of the Workmen's Compensation Act," by Carl Muskat, attorney, Milwaukee, Wis.

Paper, "Increased Taxation in Wisconsin and Its Effects on Public Service Companies," by Edwin Gruhl, assistant to president of the Watertown Gas & Electric Company, Watertown, Wis.

Jan. 22

Paper, "One-Man Electric Car Operation in a Small City," by R. M. Howard, general manager of the Minnesota division of the Wisconsin Railway, Light & Power Company, Winona.

Paper, "Latent Water Powers and Difficulties of Development under the New Wisconsin Water Power Law," by Daniel W. Mead, Madison, Wis.

Paper, "Latest Tendencies and Developments in Street Lighting and Incandescent Lamps," by S. L. E. Rose, illuminating engineer of the General Electric Company, Schenectady, N. Y.

Paper, "How to Overcome Some Operating Difficulties of Small Electric Utilities," by J. N. Cadby and C. B. Hayden, electrical engineers of the Railroad Commission of Wisconsin.

Paper, "Experience and Suggestions for the New Business Departments of a Small Electric Utility," by C. M. Axford, of the commercial department of the Wisconsin Public Service Company, Green Bay, Wis.

Paper, "Practical Suggestions for Increasing the Efficiency of Small Steam-Electric Power Plants," by W. F. Lathrop, of the Wisconsin Gas & Electric Company, Racine.

Financial and Corporate

FINANCIAL REVIEW AND FORECAST

According to a review of the 1914 financial situation, both domestic and foreign, made by John Moody, the last year has marked the culmination of the era of high finance which set in more than fifteen years ago. Practically all the "bubbles" growing out of that extraordinary period have now burst, and security values as a whole have returned to approximate bases of actual values. Moreover, public opinion, which for ten years has generally been antagonistic to corporate interests, has now definitely veered, and the pendulum is about to swing the other way. The federal reserve banking system has for the first time in history given legitimate business opportunity a firm basis on which to build, and has eliminated all dangers of financial panics of the style of 1873 and 1907. The European war has caused a severe setback in the progress towards prosperity for which the country was directly headed six months ago, but it is not a lasting disaster for this country.

Mr. Moody takes the unusual view that the final effect of the destruction of capital and of general impoverishment throughout Europe on account of the war will cause a sharp fall in per capita consumption of goods and average commodity prices. This will reduce the demand for new capital much more than the supply is reduced, which will cause interest rates to fall. This condition will be maintained for five or six years, or even longer. With money cheap it pays better to buy bonds than to loan money, and this buying will tend to maintain and raise bond prices. As a sure result, high grade bond prices will tend to rise steadily until the point of equalization is reached with the general price of capital. Following this will logically come a more cautious rise in bonds and securities of junior grade, the values of which are more directly affected by the trend of interest rates than by earning power and profits. Speculative securities, however, will not be benefited to a large extent by this general factor. There will be dullness rather than weakness in ordinary stocks, as most prices have already discounted a period of unusual depression.

A prominent authority in the electric railway field states that money is getting easier and this will continue during the next three months. At the end of the war, however, high interest rates will prevail for a considerable period on account of the demand for capital to make up the destruction caused by the war. It is expected that during the spring and summer there will be a considerable amount of refunding and financing, as companies will take this opportunity for changing short-time loans to long-term securities. Not much new investment, however, is looked for this year in the electric lighting, power and railway business. All necessary maintenance work will be done and probably a few extensions will be made, but all work will be kept down to a reasonable minimum. There will be less investment in hydroelectric schemes, because investors now realize that the steam turbine is more reliable than water power, requires far less investment and under most conditions is as economical. The tariff situation was initially responsible for the present depression and that it still had something to do with it, but its effect is now overshadowed by the war. In the wheat district the farmers are feeling prosperous because of the high prices secured for their product, although there are a great many men out of work even in that district. This money in these districts will go into refinancing rehabilitation and short extensions, but very little into new construction.

Another electric railway operator believes that these carriers will not give out large orders for supplies until about April; but by that time he expects to see either a considerable business expansion or the exact reverse. The construction period, therefore, will be later this year than usual and the total amount of expenditures will be curtailed. At the same time a slight increase in railway business may be expected, with a corresponding increase in expenditures for maintenance. The primary difficulty is to secure money, which is not due to a shortage but to a feeling of panic resulting in the hoarding of cash in banks. In general the business condition is inherently sound and not so bad as popularly believed.

HUDSON & MANHATTAN RAILROAD EARNINGS

Banking Firm in Letter to Security Holders Reviews Railroad's Progress in 1914

Harvey Fisk & Sons, New York, have issued a statement to the bondholders and stockholders of the Hudson & Manhattan Railroad, New York, N. Y., reviewing the company's record during 1914. The following comparison of income is included:

	1914	1913
Passengers carried	*59,800,000	59,434,152
Gross revenue, all sources	$5,550,000	$5,512,762
Operating expenses and taxes (including depreciation)	2,491,000	2,515,637
Gross income applicable to fixed charges	$3,059,000	$2,997,125
Income deductions other than bond interest	250,000	261,435
Net income applicable to bond interest	$2,809,000	$2,735,690
N. Y. & New Jersey 5's	250,000	250,000
Balance	$2,559,000	$2,485,690
First lien and refunding 5's and H. M. 4½'s	1,870,605	1,870,605
Balance available for income bonds	$688,395	$615,085

*November and December partly estimated.

It is stated that, in view of the fact that company's business was showing a steady increase up to the time of the outbreak of the European war, it is probable but for that event and its immediate general effect, and particularly upon the shipping trade of Hoboken, that this year's business would have been markedly the best in the company's history. As it is, the company more than held its own and reports an excellent year's business with the 5 per cent interest upon its first mortgage bonds earned one and a third times, leaving a surplus, after making proper allowance for the upkeep of the property, depreciation, renewal and amortization, sufficient to permit of the payment of 2 per cent interest upon the adjustment income mortgage bonds.

The statement continues:

"The fact should be kept in mind that these results have been obtained with the use of only about 40 per cent of the capacity of the tubes. There are now being carried in the cars of the company over half of the number of passengers who used the ferries in 1907, the year before the uptown tubes were opened for business. The total number of people crossing under or over the Hudson river in 1914 closely approximated 160,000,000, of which the Hudson tubes carried say 60,000,000, or 38 per cent. Without the expenditure of another dollar for equipment 15,000,000 more passengers could be carried through the tubes and 75,000,000 more, or 150,000,000 in all, could be carried by the expenditure of a moderate amount of capital for additional equipment. These figures of the capacity of the tubes are arrived at after making due allowance for rush hour service. In other words, they do not represent theoretical capacity, but actual capacity, based upon normal and usual operating conditions."

NORTHERN ELECTRIC RAILWAY FINANCES

The bankers' committee which, under A. Bonnheim, chairman, has been working on a plan of rehabilitation for the Northern Electric Railway, Chico, Cal., is sending to security holders of the company a letter outlining its plans and asking signatures to the agreements necessary to make the plan effective. Most of the features of the proposed arrangements were noted in the Electric Railway Journal of Dec. 5.

The new agreements do not differ greatly from the original draft, except as to the release of the Sloss family from liability as endorsers on the delivery of securities aggregating $500,000. The agreements provide for the purchase from the Northern Electric Railway of $1,400,000 of underlying bonds at 90, now held as security by banks and individuals at about 70. The proceeds will pay off obligations of about $980,000 and give the company about $280,000 new money, of which $130,000 will go to the payment of coupon interest and sinking fund on the underlying bonds. This will leave about $150,000 in the treasury of the company for working capital.

In connection with its letter and copies of the proposed agreements the committee has made public a report made on Feb. 6, 1914, by the J. G. White Engineering Corporation with respect to the physical condition and values of the

Northern Electric Railway, including the main trackage and all subsidiaries. This report shows that the net earnings from the operation of the system have grown from $73,365 in 1907 to $381,914 in 1914. The J. G. White Engineering Corporation estimates that $527,103 net ought to be earned in 1915 and $577,935 in 1916. The estimate of the reproduction cost of the road follows: Vallejo & Northern, right-of-way, lands and construction, $1,012,215; Northern Electric, right-of-way, lands and construction and equipment, $5,562,930; Sacramento & Woodland, right-of-way, lands and construction, $707,610; Marysville & Colusa, right-of-way, lands and construction, $903,762; total $8,186,517. Add legal and organization expenses, engineering and supervision, miscellaneous and general expense, interest during construction (20 per cent), $1,637,303. Approximate reproduction cost, exclusive of enhanced value of lands, $9,823,820.

DISTRIBUTION OF PACIFIC GAS & ELECTRIC STOCK

On Aug. 15, 1914, the Pacific Gas & Electric Company, San Francisco, Cal., announced the sale of $8,750,000 par value of its new issue of first preferred 6 per cent stock. The present distribution of this issue, the sale of which has been followed in previous issues of the ELECTRIC RAILWAY JOURNAL, is as follows for stock issued and subscribed for:

	Number of Subscribers	Par Value of Shares Taken
Employees	1621	$548,600
Customers	1162	1,325,600
Stockholders	712	6,875,800
Total	3495	$8,750,000

The participation of employees and consumers in the purchase of the securities is particularly noteworthy. Employees numbering 1621, constituting about 40 per cent of the permanent staff, have become stockholders, and 1162 consumers have purchased $1,325,600 of the new stock. Additional sales to investors in the company's territory are being made at the average rate of about $10,000 per day, and the allotment of stock set aside to meet anticipated demands of consumers promises to become exhausted in the very near future.

The company now has outstanding about $51,000,000 par value of stock, including its common, junior preferred and first preferred. As shown in the following statement, almost one-half of all this stock is owned on the Pacific Coast:

	Number of Holders	Shares	Par Value
Pacific Coast	3976	234,751	$23,475,100
Middle West	768	65,874	6,587,400
Eastern Coast	665	165,459	16,545,900
Europe	383	42,509	4,250,900
Total	5792	508,593	$50,859,300

The proportion of Pacific Coast holdings has increased almost 10 per cent during the last six months, and with the continuing distribution of first preferred stock among local investors it will probably show further increase. Of the total number of individual stockholders, 3976, almost 70 per cent of the total number, are residents of California, having first hand knowledge of the company's properties, business and management.

Alabama Traction Light & Power Company, New York, N. Y.—The holders of certificates of option to purchase shares of the Alabama Traction Light & Power Company, Ltd., at $15 (at current rate of exchange) were lately informed that the option expired on Dec. 31. Any holders desiring to extend the option to Dec. 31, 1915, can do so on payment of ten shillings per share. As an alternative a holder may have the option extended until twelve months after the conclusion of peace or until the expiration of the Court's Act of 1914 on the payment of £2 per share.

Arkansas Valley Interurban Railway, Wichita, Kan.—It is reported that the Arkansas Valley Interurban Railway has been asked to take over the operation of the proposed Newton, Kansas & Nebraska Railway, but no definite response is announced. This new steam railroad has the backing of $20,000 of bonds recently voted by the city of Newton, Kan., and township elections are planned for like purposes. The first unit proposed is 28 miles, from Newton northward to Canton. It is said that the operation of so short a road by steam might not be profitable, and advances have therefore been made to the electric line.

Bay State Street Railway, Boston, Mass.—A semi-annual dividend of 2½ per cent was paid on Dec. 31 on the $20,517,200 of common stock of the Bay State Street Railway. This compares with 2¼ per cent on June 30, 1914, 3 per cent on Dec. 31, 1913, 2½ per cent on June 30, 1913, 3 per cent on Dec. 31, 1912, 2 per cent on June 26, 1912, and 3 per cent on Dec. 30, 1911.

Boston Suburban Electric Companies, Newtonville, Mass.—The trustees of the Boston Suburban Electric Companies on Dec. 31 declared a quarterly dividend of $1 on the preferred stock. This restores the dividend to the usual basis, from which it had been reduced to 50 cents at the last quarter. The reduction was due in part to the increase of $100,000 in wages by arbitration. Since then the company's principal subsidiary, the Middlesex & Boston Street Railway, increased its fares, thus giving larger dividends to the holding company.

British Columbia Electric Railway, Vancouver, B. C.—A dividend at the rate of 8 per cent per annum has been declared on the deferred ordinary stock of the British Columbia Electric Railway for the half year, making 8 per cent for the year. The same amount was paid last year.

Chicago (Ill.) Elevated Railway.—E. H. Rollins & Son, Boston, are offering on a 4¼ per cent basis a small portion remaining unsold of the $2,050,000 of the equipment trust gold 5 per cent certificates, series A, issued by the Commercial Trust Company, Philadelphia, as trustee, with payments jointly and severally guaranteed by endorsement on each certificate by the Metropolitan West-side Elevated Railroad, the Northwestern Elevated Railroad and the South-side Elevated Railroad. These certificates are dated Aug. 1, 1914, and are due in semi-annual installments from Feb. 1, 1917, to Aug. 1, 1926, $102,000 each Feb. 1 and $103,000 each Aug. 1. They are secured by one hundred and eighty-four all-steel passenger motor cars and sixty-six all-steel passenger trailer cars.

Cincinnati, Lawrenceburg & Aurora Electric Street Railway, Cincinnati, Ohio.—On Dec. 28 Frank B. Shutts tendered his resignation as receiver of the property of the Cincinnati, Lawrenceburg & Aurora Electric Street Railway to Insolvency Judge Warner of Cincinnati. C. E. Hooven, who was president of the solvent company, was appointed in his stead, under a bond of $25,000. Mr. Shutts resigned on account of business in the South that required much of his attention.

Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.—At a meeting of the board of directors of the Cincinnati, Milford & Loveland Traction Company on Dec. 29, 1914, Charles C. Harris, superintendent, was elected president to succeed B. H. Kroger, who disposed of his interest recently. Mr. Harris and A. C. Wenzel, auditor of the company, were elected members of the board of directors to represent the interests that purchased Mr. Kroger's stock. Thorne Baker was elected vice-president; C. W. Baker, treasurer, and J. N. Roberts, secretary.

Citizen's Traction Company, Oil City, Pa.—A semi-annual dividend of 3 per cent has been declared on the $1,000,000 of 6 per cent cumulative preferred stock of the Citizen's Traction Company, payable on Jan. 5 to holders of record of Dec. 31. In July, 1914, 2½ per cent was paid; in January, 1914, and July, 1913, 2 per cent., and in January, 1913, an initial payment of 2½ per cent.

Columbus, Delaware & Marion Electric Railroad, Columbus, Ohio.—The Ohio Supreme Court in a recent final ruling confirmed the claim of Newton J. Catrow against the Columbus, Delaware & Marion Electric Railroad. This claim was for $72,963, which he contended was due him on a note originally made to John G. Webb of Springfield, Ohio, who promoted the road, and assigned to him by the latter. This ruling sustains the Common Pleas and Appelate Courts of Franklin county. The case had been in the courts since August, 1919. When the suit was brought, a petition was also filed for a receiver, and Eli M. West was appointed to that position, which he still holds.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The stockholders of the Columbus Railway Power &

Light Company are to vote at the annual meeting on Jan. 26 on the question of purchasing all the property and assets of the Columbus Light, Heat & Power Company. Previous references to the consolidation of these companies were made in the ELECTRIC RAILWAY JOURNAL of Nov. 7, Nov. 14 and Nov. 28.

Gary & Interurban Railroad, Gary, Ind.—The directors of the Gary & Interurban Railroad, which operates four electric railway companies consolidated in January, 1913, have filed a motion through their attorney to dismiss the bill of complaint filed in the Federal Court by J. T. Kinsley, of Philadelphia. The suit is an effort to test the validity of the consolidation of these roads, and follows a denial of a similar order in the State courts, as noted in the ELECTRIC RAILWAY JOURNAL of Nov. 14. The motion by the company's attorneys for a dismissal is based on the fact that the consolidation was made under the Indiana statutes, and dissolution can be brought about only by the State of Indiana.

Havana Electric Railway Light & Power Company, Havana, Cuba.—The Guaranty Trust Company, New York, is offering at 99 and interest the unsold portion of a total authorized issue of $2,000,000 of two-year 6 per cent secured gold notes of the Havana Electric Railway Light & Power Company, dated Sept. 1, 1914, and due on Sept. 1, 1916. The notes are redeemable at the option of the company at any time upon thirty days notice, at 101 and interest prior to Dec. 1, 1915, and at 100½ and interest if redeemed on or after that day. These notes provide funds to complete the new powerhouse of the company. A new mortgage has been filed with the Guaranty Trust Company as trustee to secure not exceeding $25,000,000 of general mortgage 5 per cent sinking fund gold bonds, of which the entire amount now issued ($4,000,000) has been pledged to secure the above $2,000,000 of notes. The new bonds are dated Sept. 1, 1914, and due on Sept. 1, 1954. They are subject to redemption at the option of the company at any time at thirty days notice at 105. An amount of $14,100,000 is reserved to be used in exchange for or to take up certain outstanding obligations, $2,500,000 is reserved to assist in refunding certain issues, and $4,400,000 is reserved for improvements and extensions.

Lorain (Ohio) Street Railroad.—The Public Utilities Commission of Ohio has authorized the Lorain Street Railroad to sell $200,000 par value of its three-year collateral trust promissory notes or bonds, such securities to bear interest at the rate of 6 per cent. They are to be callable at par and interest at the option of the company upon fifteen days written notice, with the privilege of conversion into bonds of the $750,000 issue dated Nov. 1, 1897, on the basis of 92½. The company is also authorized to secure the three-year notes or bonds by depositing under a collateral trust agreement the $200,000 par value of the $750,000 issue which had been retained by the Guaranty Trust Company, New York, trustee, for exchange into the first mortgage bonds of the Lorain Street Railway, maturing on Jan. 1, 1915. There is also to be deposited $100,000 of the $117,000 par value of the bond issue certified by the Citizen's Savings & Trust Company, trustee, on July 1, 1906. The company is authorized to sell the three-year notes or bonds at not less than 95, the proceeds to be used for the payment and redemption of the before mentioned first mortgage bonds of the Lorain Street Railway, maturing on Jan. 1, 1915. Authority is granted to the Lake Shore Electric Railway, the owner of all of the capital stock of the Lorain Street Railroad, to guarantee the payment of the notes, with interest, at maturity.

Los Angeles & San Diego Beach Railway, San Diego, Cal.—The California Railroad Commission has issued a supplemental order approving the form of a trust deed between the Los Angeles & San Diego Beach Railway and the Southern Trust & Savings Bank of San Diego, dated Dec. 31, 1914, and securing an issue of $375,000 of bonds recently approved by the commission, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 5.

Massachusetts Northeastern Street Railway, Haverill, Mass.—N. W. Harris & Company, Inc., and Merrill Oldham & Company, Boston, are offering jointly at 97 and interest, to yield 5¼ per cent, $707,000 of first and refunding mortgage 5 per cent gold bonds of the Massachusetts Northeastern Street Railway, dated July 1, 1914, and due on July 1, 1934, but callable at 110 and interest on any interest date upon forty-three days notice. These bonds are part of a total issue of $2,000,000, of which $356,000 is reserved to retire existing bonds and $1,000,000 for additions and improvements.

Norwood, Canton & Sharon Street Railway, Canton, Mass.—The Massachusetts Public Service Commission has authorized an issue of $30,000 of twenty-year 5 per cent bonds by the Norwood, Canton & Sharon Street Railway to be used in reducing the company's capital stock to $32,500. The application for the issuance of these bonds was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 5.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Wallace Alexander, chairman of the meeting of the security holders of the Oakland, Antioch & Eastern Railway on Dec. 11, has announced the choice of Louis Rosenthal, chairman, J. F. Koster, James S. Wallace and Wallace Alexander as a special committee to act with a committee appointed by the board of directors. This committee will pass upon the reports of experts who are examining the present status of the company and determine the right course for future development.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia Company has declared a quarterly dividend of 1¾ per cent on its common stock, payable on Feb. 1 in scrip, redeemable at the option of the company on or before Feb. 1, 1918, to bear interest at the rate of 7 per cent. This is the second quarter the company has paid scrip. The first scrip dividend was paid on Nov. 2 and matures in eighteen months, while the present issue will not mature in three years. Lengthening the life of the present scrip, it is pointed out, is for the purpose of diversifying the obligations so they may be retired out of earnings.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—The California Railroad Commission has rendered a decision authorizing the San Francisco-Oakland Terminal Railways to renew two promissory notes in the sum of $5,890. These notes will bear interest at 6 per cent per annum and will be payable ninety days after date to the Railway Improvement Company.

Southern Traction Company of Illinois, East St. Louis, Ill.—The receivers of the Southern Traction Company of Illinois on Dec. 31 filed suit against the Lorimer-Gallagher Construction Company for $364,789. The claimants allege that the amount involved is the difference between money actually expended in constructing the partly completed lines of the company and the sum realized on $1,090,000 of securities hypothecated by the construction company with the suspended La Salle Street Bank, Chicago.

United Railways of St. Louis, St. Louis, Mo.—The United Railways of St. Louis has sold to the Mississippi Valley Trust Company and the Altheimer & Rawlings Investment Company $600,000 of St. Louis & Suburban Railway consolidated first mortgage 5 per cent gold bonds. These were held in escrow for the retirement of the $600,000 of St. Louis, Cable & Western Railway first mortgage bonds, which became due and were paid on Nov. 1.

United Traction Company, Pittsburgh, Pa.—It is reported that a preliminary meeting of preferred stockholders of the United Traction Company of Pittsburgh was recently held at the office of the Philadelphia Trust, Safe Deposit & Insurance Company for the appointment of a committee to take action in regard to the anticipated passing or payment in script of the semi-annual dividend of 2½ per cent usually paid on Jan. 1, on the company's $3,000,000 of 5 per cent cumulative preferred stock. The company in a letter to the preferred stockholders had previously stated that under the operating agreement of 1902 between the company and the Pittsburgh Railways, the latter paid ordinary maintenance expenses and the former the expenses for extraordinary repairs. It might, and probably would be necessary to use during 1915 the rental received from the Pittsburgh Railways in payment for such extraordinary repairs and improvements, etc., to the lines of railway and the property of the company, and possibly to issue some form of script to the stockholders. The company's $17,000,000 of common stock, upon which no dividends have been paid since 1912, is all owned by the Pittsburgh Railways.

DIVIDENDS DECLARED

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Bay State Street Railway, Boston, Mass., 3 per cent, preferred; 2½ per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Citizen's Traction Company, Oil City, Pa., $1.50, preferred.

Elmira Water, Light & Railroad Company, Elmira, N. Y., quarterly, 1¼ per cent, second preferred; 2 per cent, common.

Kentucky Securities Corporation, Lexington, Ken., quarterly, 1½ per cent., preferred.

Ottawa (Ont.) Traction Company, Ltd., quarterly, 1 per cent; bonus, 1 per cent.

Ottumwa Railway & Light Company, Ottumwa, Iowa, quarterly, 1¾ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	$64,570	*$30,293	$34,277	$17,484	$16,793
1 " " '13	65,372	*28,704	36,668	17,354	19,314
12 " " '14	777,888	*376,192	401,696	209,010	192,686
12 " " '13	758,775	*344,605	414,170	207,571	206,599

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m., Nov., '14	$84,896	*$55,377	$29,519	$29,122	$397
1 " " '13	97,032	*59,424	37,608	26,072	11,536
12 " " '14	1,096,462	*694,357	402,105	336,185	65,920
12 " " '13	1,200,004	*713,936	486,068	295,931	190,137

COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO

1m., Nov., '14	$261,656	*$150,457	$111,199	$42,584	$68,615
1 " " '13	267,661	*165,022	102,639	.....	.....

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

1m., Nov., '14	$1,239,728	*$668,055	$571,673	$361,226	$210,447
1 " " '13	1,237,366	*689,531	547,835	325,395	222,440
12 " " '14	14,757,391	*8,344,910	6,412,481	4,185,446	2,227,035
12 " " '13	14,045,728	*8,133,070	5,912,658	3,807,765	2,104,893

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m., Nov., '14	$196,249	*$121,462	$74,787	$62,385	$12,402
1 " " '13	195,100	*110,630	84,470	63,576	20,894
12 " " '14	2,515,657	*1,448,814	1,066,843	759,912	306,931
12 " " '13	2,324,384	*1,298,822	1,025,562	707,207	318,355

EAST ST. LOUIS & SUBURBAN RAILWAY, EAST ST. LOUIS, ILL.

1m., Nov., '14	$207,713	*$122,761	$84,952	$58,401	$26,551
1 " " '13	236,850	*137,148	99,702	49,940	49,762
12 " " '14	2,648,458	*1,650,308	998,150	676,854	321,333
12 " " '13	2,690,543	*1,572,337	1,118,206	590,451	527,755

GRAND RAPIDS (MICH.) RAILWAY

1m., Nov., '14	$98,208	*$68,834	$29,374	$13,701	$15,673
1 " " '13	101,387	*66,017	35,370	11,787	23,583
12 " " '14	1,283,116	*837,226	445,890	162,037	283,853
12 " " '13	1,283,466	*797,441	489,025	168,462	320,563

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1m., Nov., '14	$49,437	*$37,253	$12,184	$15,670	†$3,486
1 " " '13	51,794	*34,835	16,959	15,338	1,621
12 " " '14	677,269	*466,270	210,999	186,121	24,878
12 " " '13	672,493	*422,884	249,609	178,637	70,972

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Nov., '14	$184,099	*$104,308	$79,791	$41,899	$37,892
1 " " '13	189,660	*106,246	83,414	39,828	43,586
12 " " '14	2,240,922	*1,352,859	888,063	508,520	379,543
12 " " '13	2,198,393	*1,313,999	884,394	461,300	423,094

PORTLAND (MAINE) RAILROAD

1m., Nov., '14	$76,066	*$52,241	$23,825	$20,436	$3,389
1 " " '13	75,113	*50,468	24,645	21,695	2,950
12 " " '14	1,043,651	*644,979	398,672	252,771	145,901
12 " " '13	1,033,142	*698,666	334,476	167,636	166,840

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Nov., '14	$494,626	$257,639	$236,987	$183,066	$53,921
1 " " '13	576,244	272,250	303,994	176,425	127,569
12 " " '14	6,366,154	3,284,272	3,081,882	2,165,187	916,695
12 " " '13	6,703,123	3,301,122	3,402,001	1,984,520	1,417,481

*Includes taxes. †Deficit.

Traffic and Transportation

ROCHESTER FARE CASE

Final Arguments Before Commission in Rush-Hour 3-Cent-Fare Case

Final arguments on the petition of the city of Rochester for 3-cent street car fares were heard before the Public Service Commission of the Second District of New York at Albany on the afternoon of Jan. 6. For the city Assistant Corporation Counsel Cunningham made the principal address, summing up the arguments he has made throughout the hearings and supplementing his written brief. For the New York State Railways D. M. Beach made the principal argument, supplemented by Horace E. Andrews, president, and Walter L. Kernan, vice-president.

Both sides agreed that for the purposes of the proceedings the capital sum on which the company was entitled to earn a return should be considered as $10,000,000. A disagreement arose over certain items of running expenses as alleged by the company, and the commission has instructed its accountants to examine these and report to the commission. Commissioner Decker, who presided at the session on Jan. 6, stated that should all of the contentions of the company in these respects be sustained by the accountants there would be no grounds for reducing the fare in Rochester. Should the contention of the city authorities that these items are excessive be sustained, Mr. Decker said there might be grounds for reducing the fare in view of the prospective increase of business which such a reduction might under certain circumstances be expected to entail.

The items contested were the company's allowances for damage and accident claims, for the rent of the subways in which it carries all its wires in the Rochester 5-cent-fare zone, for the cost of power, and for the increase in wages granted by the recent decision of the arbitration committee.

The deductions from revenues which the company wanted and the allowance of which will depend on the report of an examiner of the commission were $48,000 for increased wages, $108,000 for increased damages and accidents, and $19,000 for conduit rental.

The city was represented by Mayor Edgerton, as well as Mr. Cunningham, but the Mayor announced that he was present only as a spectator. At the opening of the hearing Mr. Cunningham presented to the commission a copy of an alleged interview with Commissioner Devoe P. Hodson, printed in a Rochester paper on April 17, 1913, in which the commissioner was quoted as saying that a 3-cent fare in Rochester for workingmen "would be discriminatory." Commissioner Hodson, who was sitting, read the printed interview through and then said: "I have never prejudged a case and I have had considerable judicial experience. No one in Buffalo would believe that I would do such a thing. I may have said offhand that a report might be so drawn as to appear unjust, but to express such an opinion deliberately for publication, I never have. If this is presented as a reason why I should be unfit to sit in this case, however, I shall withdraw at once, though I did not express myself as conveyed in this interview."

Mr. Cunningham asserted that he merely submitted the facts to the commission without asking for the withdrawal of the commissioner, and Commissioner Decker, presiding, ruled that they did not constitute legal grounds for the withdrawal of Mr. Hodson. Mr. Hodson nevertheless insisted on withdrawing from the case and announced that he will take no part in the decision of the commission.

Mr. Cunningham suggested that pending the decision of the commission on the general 3-cent-fare proposition the company be ordered to charge only 3 cents for passengers who were not supplied with seats. He said this idea might be further carried out until the decision of this case by charging a 3-cent fare for those in seats and only 2 cents for standees.

D. M. Beach, for the company, declared that if street railways and other large enterprises were to be operated successfully they must get an even larger return than 6 per cent on their stock. As an instance of the difficulty of the Rochester railways he cited their failure to sell bonds authorized by the commission last year at the price specified, and said that unless stock could be made an attractive purchase for

the investor it would be increasingly difficult to finance extensions and improvements. He declared that the Rochester railways had expended more for extensions and improvements in the last few years than any other business enterprise of like magnitude in the city, but said that with a 3-cent fare these expenditures would have to stop.

Mr. Beach met the assertion of Mr. Cunningham that Rochester had to pay more for power than other cities deriving it from the same source by explaining that the other cities bought the power "raw" or the high tension voltage, transforming it themselves, while Rochester bought it already transformed to low voltage direct current for use in the cars. He concluded his argument with the assertion that even on the reduced figures for which Mr. Cunningham contends the company is entitled to return, that return would be only 1 per cent under a 3-cent fare ruling of the commission.

Mr. Kernan answered the contention of Mr. Cunningham that the street railway properties had been consolidated into the New York State Railways to stifle competition. He said that the whole proceeding was conducted under the supervision of the commission and had been approved by it as a proper means for financing the properties involved.

TWIN CITY PENSION ANNOUNCEMENT

Fifty Per Cent of Former Wage for All Employees Who Retire on Pension

C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., made the following announcement on Jan. 1 regarding the establishment of a pension plan for the employees:

"For some years past it has been the desire of the management of the companies comprising the Twin City Lines to adopt some plan providing for faithful employees when they had reached the age when they could no longer stand the physical strain incident to their employment, and when it was desirable that they should be relieved of their active work and at no expense whatever to them. We believe that our companies are now financially able to carry out this plan and have worked out one which we hope will meet with the approval of our employees.

"Briefly, the plan provides for the organization of an employees mutual benefit association, in the management of which our employees shall participate, and for the payment of disability, sickness and death benefits, as well as free medical services at the stations. Membership in the association is to be divided into three classes as follows:

"Class A—Employees whose monthly wage is $100 and not more than $208.33.

"Class B—Employees whose monthly wage is $60 and less than $100.

"Class C—Employees whose monthly wage is less than $60.

"The company will pay the entrance fee of every employee who joins the association during the first three months of its organization.

"The monthly dues of the association will be:

"Class A members, 90 cents; Class B, 60 cents; Class C, 30 cents.

"The company will pay into the association for its use and benefit monthly an amount equal to 50 per cent of the monthly dues of members. In addition the company will also pay the entire cost of management and administration of the affairs of the association, including the salaries and expenses of the medical staff. The company will also continue to furnish clubrooms to employees, as in the past. The Employees Mutual Benefit Association will pay accident benefits as follows: Class A members, $12.25 per week for fifty-two weeks; Class B members, $10.50 per week for fifty-two weeks; Class C members, $7 per week for fifty-two weeks.

"It will pay sick benefits as follows: Class A members, $12.25 per week for fifty-two weeks; Class B members, $10.50 per week for fifty-two weeks; Class C members, $7 per week for fifty-two weeks.

"It will pay death benefits as follows: Class A members, $600; Class B members, $500; Class C members, $300.

"The pension system established at this time provides for the payment of pensions to old employees who may be retired at the age of sixty-five years, and draw a pension thereafter. The pension system is based on 2 per cent per year of service of the average annual wage for the last ten years, with a maximum of 50 per cent. Practically speaking, this means that all of our employees who retire on pensions will draw 50 per cent of their former wage. No part of the pension payments is to be contributed by employees, the company paying the entire pension.

"We believe when the employees of our companies have familiarized themselves with the provisions of the constitution and by-laws of the Employees Mutual Benefit Association and the rules governing it that the plan will meet with their cordial endorsement and that the association will have practically all of the employees enrolled in its membership within a few months."

ST. JOSEPH RATES RESTRAINED

An order restraining the Missouri Public Service Commission from enforcing its decision establishing lower commutation rates on the Kansas City, Clay County & St. Joseph Railway was issued on Dec. 30 by Federal Judge A. L. Van Valkenburgh at Kansas City. The lower rates had been ordered to go into effect on Jan. 1. The company had asked a rehearing by the commission, which had been denied. The injunction will be effective against the lower rates until such time as two other federal judges may hear the case with Judge Van Valkenburgh, who intimated that this might occur within three weeks.

The application for the restraining order was based upon the confiscatory nature of the commission's order. The complaint alleged that the valuation arrived at by the commission, on the basis of which the new rates were figured, was so low that apparently reasonable earnings upon it would not allow a living income upon the operation of the property. Among the items of the complaint displaying the allegations of deficient valuation by the commission were many affidavits by persons formerly connected with the railway and by officials of other interurban railways serving Kansas City. The court gave the commission ten days in which to file a brief. The company's case was presented by Judge J. M. Olin, Madison, who has conducted the company's affairs before the commission, and Bowersock, Hall & Hook, Kansas City.

AUGUSTA-AIKEN FARE INCREASE ALLOWED

Full Text of the Resolution Allowing the Company to Increase Fares from 1 Cent to 2 Cents a Mile

The Railroad Commission of South Carolina on Dec. 29 adopted a resolution reaffirming the order of Nov. 18, which allows the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., to increase its passenger rates from 1 cent to 2 cents a mile. B. L. Caughman and G. McDuffie Hampton voted for the resolution. John G. Richards, Jr., chairman, voted against the resolution. Commissioner Hampton offered the following resolution, which was adopted:

"After carefully weighing all the testimony during the hearing held Dec. 10 in Columbia and continued to Augusta on Dec. 16 and 17, inclusive, I am more than ever convinced that the resolution adopted by the majority of the board on Nov. 12, 1914, should stand in its entirety, with the addition to the resolution of the words, 'the minimum fare shall be 5 cents.'

"My decision is arrived at for the following reasons: First, the testimony, especially at the Augusta hearing, convinces me that the Augusta-Aiken Railway & Electric Corporation did not get a fair return on its investment; secondly, that as an interurban line operating in South Carolina it should be entitled to the same rate and privileges enjoyed by similar roads. For the last twelve years this road has operated under a passenger rate of 1 cent per mile voluntarily put in. It has applied to the Railroad Commission for a flat rate of 2 cents, which I sincerely think is just and equitable. Should the Railroad Commission refuse to grant the petition it would be a decided case of discrimination and would deny the Augusta-Aiken Railway & Electric Corporation the right to be placed on a parity with similar roads in the State. To my mind, this would create a distinct discrimination and establish a precedent by the commission that would be far-reaching and lead to a change of rate-making in the future that would be hard to adjust, in my judgment.

"Complaint of service, which incidentally developed at these hearings, has nothing to do with rate-making. The

commission will investigate this matter in the usual form and have the proper service rendered in a reasonable time.

"Section 3174, code of South Carolina, 1912, reads, in part, as follows: 'The commissioners . . . shall make reasonable and just rules and regulations to be observed by all railroad companies doing business in this State, as to charges to any and all points for the necessary hauling and delivery of all freights; shall make just and reasonable rules and regulations as may be necessary for preventing unjust discrimination in the transportation of freight and passengers on the railroads in this State.'

"Well-established statistics all over the United States have shown conclusively that no interurban road can successfully operate and maintain itself under a passenger rate of less than 2 cents per mile.

"Therefore be it resolved, That the Augusta-Aiken Railway's petition be granted to increase its maximum passenger rate to 2 cents per mile, minimum fare to be 5 cents, to become effective on Jan. 1, 1915, with the distinct understanding that in the meanwhile the physical condition of the road shall be improved as rapidly as possible and continue to be kept in a safe condition, and that competent and efficient service shall be rendered on all cars and enough cars must be put into operation comfortably to care for the patrons, the above improvements to be subject to the approval of the Railroad Commission.

"Resolved, further, That the company shall submit its tariff to the Railroad Commission for approval within thirty days in order that said tariff, when approved, may be included in the commission's annual report."

REDUCTION ORDERED IN SEATTLE-EVERETT FARE

The Public Service Commission of the State of Washington has prescribed a passenger rate of 2 cents a mile instead of 3 cents on the Seattle-Everett line of the Puget Sound Traction, Light & Power Company. The order of the commission sets forth that in the opinion of the commission the fair value of the line is $1,500,000 and that on that investment the earnings have been 13 per cent a year. The commission rejects the contention of the company that the losses sustained in operating the Bellingham-Mt. Vernon line should be set off against the profits of the Seattle-Everett line. The commission, in its order, also requires the road to carry children between the ages of five and twelve years at half fare and to furnish at least one car in each direction daily to carry checked baggage up to a limit of 150 lb., free of charge. No ruling is made on freight rates, the commission urging that the company and patrons endeavor to effect an amicable arrangement on this subject. The commission says that it has no power to prescribe the issuance of commutation tickets.

A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, in a statement to the press, said:

"All of the evidence submitted plainly showed that the earnings of the line were not sufficient to provide a fair return on the investment. The earnings for 1913 came nearer to a suitable return on the investment, but those of 1914 have fallen far below the total of last year. There was nothing introduced at the hearing to sustain such an order as the commission has made, in reducing passenger rates from 3 cents to 2 cents a mile."

In the absence of the official order from the commission, neither Mr. Leonard nor James B. Howe, counsel for the company, would intimate the attitude of the corporation toward an appeal.

CHRISTMAS ENTERTAINMENT IN WASHINGTON

Children and parents to the number of about 2200 crowded the New National Theater, Washington, D. C., on the afternoon of Dec. 29, at the fourteenth annual Christmas celebration of the Washington Railway & Electric Company and the Potomac Electric Power Company, given by the public service companies for their employees and employees' children. The feature of the afternoon was a dancing and singing act in which thirty-five children, ranging in age from nine to fourteen years, participated. After the children finished their act several vaudeville numbers from local theaters delighted the spectators—and then Santa Claus himself arrived. He lit with electricity the two large trees, one either side the stage. All the children and parents were then invited upon the stage, where fruit and candy and other gifts were handed to each child. Not only were the children thus provided for, but car tickets were distributed for the trip home.

Change in Local One-Way Fare.—The Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has announced that the local one-way fare in both directions between Irving and Silver Creek will be advanced from 7 cents to 10 cents, effective on Jan. 24, 1915.

Curtailing Free Tickets in Topeka.—The Kansas Public Utilities Commission has issued an order calling in complimentary tickets on the Topeka Street Railway, and announcing that after Jan. 1, 1915, no street car passes should be issued to members of the commission or employees.

Savings Accounts in Columbus.—In order to encourage thrift the Columbus Railway, Power & Light Company, Columbus, Ohio, as a Christmas present opened a savings account for each of its employees in the Citizens' Trust & Savings Bank, starting with $1 for the single men and $2 for the married men. The clerks received turkeys.

"Safety First" New Year Resolution.—Several days before New Year's the Louisville (Ky.) Railway placed in its cars, as one of the series of "safety first" cards it is using, a big yellow affair with this slogan: "Let your New Year's Resolution for 1915 be 'Safety First.'" Credit was accorded on the card to Motorman J. M. Hinkle, the author of the sentence.

Community Christmas Tree Stimulates Traffic.—The Jovian Order at Erie, Pa., this Christmas gave Erie its first community Christmas tree. The tree was mounted on a platform in the center of Perry Park, the crowning adornment being a 4-ft. electric star. It was incidentally discovered that the electric railways in Erie took in probably $300 more than their regular Christmas revenue in moving the extra crowd to the park.

Reduction in Fare Asked.—A complaint has been filed with the Public Utilities Commission of Kansas by patrons of the Missouri & Kansas Interurban Railway at four stations asking for a round-trip fare of 25 cents and tickets on the return trip good for five days. The one-way fare is 15 cents. It is also asked that the company be required to extend the time on its thirty-day commutation books so that they shall be good for a year.

Car Step Order in New Hampshire.—As a result of an inquiry into the height of street car steps in New Hampshire the Public Service Commission of that State on Jan. 4 issued an order that the steps of street cars operated in New Hampshire should not be more than 15 in. in height. The order does not apply to the Concord & Manchester Electric Branch of the Boston & Maine Railroad, which has already complied with an order of the commission in regard to steps.

Increase in Fare in Effect in Vermont.—The increased fare on the Barre & Montpelier Traction & Power Company's lines, running between Montpelier and Barre, Vt., went into effect on Dec. 28, in accordance with the new schedule filed with the Public Service Commission. The new fare is 15 cents between the two cities, or 25 cents for a round trip. For the last eight years the fare has been 10 cents. Last summer the company raised the fare to 11 cents, but the Supreme Court ruled that the company could now collect more than 5 cents in either Barre or Montpelier.

Extension of "Copper Zone" System of Fares in Indiana.—The Indiana Railways & Light Company, Kokomo, Ind., applied to the Public Service Commission of Indiana on Jan. 2 for permission to place in effect the "copper zone" system of passenger fares on the 2 cent a mile basis. As previously announced in the ELECTRIC RAILWAY JOURNAL, this system of fares went into effect on the lines of the Union Traction Company of Indiana on Jan. 1 and it is stated that the officials of the Terre Haute, Indianapolis & Easton Traction Company have signified their intention of applying to the State for permission to install a similar system on their line.

Accidents in Greater New York.—According to the reports of accidents on railroads and street railroads in Greater New York received by the Public Service Commission for the First District the number of killed in November,

1914, was only eighteen as against thirty-one in November, 1913, and thirty-two in November, 1912. The total number of accidents also decreased from 5860 in November, 1913, to 4726 in November, 1914. The decrease in the number of accidents was largely upon the surface car lines, and one of the causes is believed to be the operation of the "near-side stop" rule, which went into effect on Sept. 1. The report shows that the boarding accidents decreased from 827 to 652 and the alighting accidents from 717 to 451 for November.

New Ventilating Ordinance for Chicago.—Past heating and ventilating ordinances governing the Chicago Surface Lines' cars have specified 350 cu. ft. per passenger per hour, based upon the maximum seated and standing load, or approximately 28,000 cu. ft. of air per hour with an eighty-passenger load. In addition to specifying the quantity of fresh air, the location of the intakes and outlets were also defined, the former being beneath the seats and the outlets in the ceiling. The new ventilating ordinance just passed does not specify the character of ventilation, but provides that the carbon-dioxide content shall not exceed twelve parts in 10,000. The new ordinance was passed because the combined ventilating and heating requirements included in the old ordinances were not practical under extremely low outside temperature conditions.

Annual Atlanta Luncheon.—Officials and employees of the electrical department of the Georgia Railway & Power Company, Atlanta, Ga., observed a custom more than twenty years old when they gathered on New Year's Day in the Davis Street plant of the company in Atlanta as its guests at the annual feast. Five hundred covers were laid by the proprietor of an Atlanta restaurant, and the viands were kept hot in improvised ovens. At the conclusion of the luncheon the guests gathered outside, where P. S. Arkwright, president, welcomed them, introducing H. M. Atkinson, chairman of the directors. Twenty years ago the New Year's Day luncheon custom was inaugurated by Mr. Atkinson, then president of the Georgia Electric Light Company. The first luncheon was served, as have been all others since, in the Davis Street plant, then the main station of the old company.

The Louisville I. C. C. Case.—Local shippers at Louisville, Ky., have taken the announcement of the Interstate Commerce Commission that it would at once reopen the case against the Indianapolis, Columbus & Southern Traction Company and other Insull lines, by which they were ordered to make a division of the through rates between Louisville and Indianapolis, and other northern Indiana points, as indicating that these companies having failed to put the order into effect, the commission will now determine how these rates shall be divided. In this connection the Louisville Board of Trade, complainant in the case, points out that the relief ordered in the matter of better provisions for handling freight at the local terminals has not been provided. The Louisville & Indianapolis Company owns tracks of its own between Seymour and Sellersburg, but for the rest of the distance operates over tracks of the Indianapolis, Columbus & Southern Traction Company and the Louisville & Southern Indiana Traction Company.

Reduction in Southern Pacific Company Rates Asked.—The city of Palo Alto, Cal., and the Palo Alto Chamber of Commerce have filed a complaint with the Railroad Commission of California against the Southern Pacific Company, in which it is alleged that that company's rates from San Francisco, San José and intermediate points to Palo Alto are excessive and discriminatory. As evidence of discrimination, the complaint points out that the distance from San Francisco to Palo Alto is 30 miles and that the distance from San Francisco to Niles, via the Oakland ferry, is approximately the same; yet the single fare from San Francisco to Niles is 75 cents, while the single fare to Palo Alto is 95 cents. The monthly daily commutation ticket from Niles to San Francisco is $8.50, while the monthly daily commutation ticket from Palo Alto to San Francisco is $9.50. Richmond and Melrose are cited as other points enjoying lower fares than Palo Alto in proportion to distance. The commission's attention is also called to the fact that the Palo Alto rates include the transportation of baggage, although most of the patrons do not desire this privilege. Complainants ask, therefore, that the company be compelled to publish a schedule of non-baggage fares less than rates that include the baggage privilege.

Personal Mention

Mr. W. E. Mandelick, secretary of the Underground Electric Railways, Ltd., London, England, who has been on a short visit, has returned to London.

Mr. J. A. Wright has been appointed auditor of the Dallas Traction Company and the Southern Traction Company, Dallas, Tex., to succeed Mr. W. L. Davis.

Mr. J. W. Simons has been advanced from the position of trainmaster to be superintendent of transportation of the Chicago & Milwaukee Electric Railroad, Highwood, Ill.

Mr. H. I. Gahagan, in addition to his duties as treasurer of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., succeeds Mr. Burr Martin as superintendent of safety.

Mr. G. S. Henry, formerly superintendent of transportation of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., has been appointed general superintendent to succeed Mr. E. J. Bock, resigned.

Mr. J. W. Lee, Jr., publicity agent, will have charge of the publicity department of the Pennsylvania Railroad, Philadelphia, Pa., succeeding Mr. Ivy L. Lee, whose resignation from the company was announced recently in the ELECTRIC RAILWAY JOURNAL.

Mr. R. B. Stichter, who has been general manager of the Texas Traction Company and the Southern Traction Company, with offices at Dallas, Tex., has been elected vice-president of both companies. Mr. Stichter has been general manager of the companies since March, 1909, when he succeeded Mr. Theodore Stebbins.

Mr. Edward Horner, superintendent of the Danville Railway & Light Company, Danville, Ill., has resigned, effective on Jan. 15. Mr. Horner entered the service of the company in 1904 as a conductor and in 1910 was promoted to be superintendent. He will be succeeded by Mr. Jesse F. Smalley, dispatcher in the office of the Illinois Traction System at Danville.

Mr. Guy E. Mitchell, for some years associated with the late Ralph D. Gillett in electrical construction work in connection with the building of electric railways in the Berkshire district of Massachusetts, and formerly chief draftsman of the motive power department Boston & Maine Railroad, has been appointed manager of the Westfield (Mass.) electric lighting department.

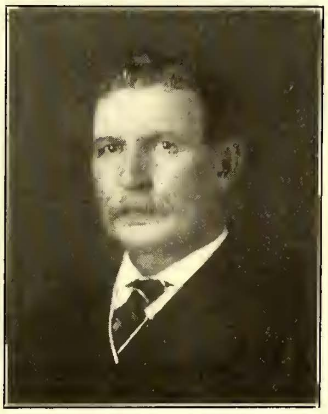
Mr. E. J. Bock, who for the last four years has been general superintendent of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., has resigned on account of ill health. Prior to becoming general superintendent of the company, Mr. Bock served as superintendent of transportation for two years, and previous to that he was chief dispatcher of the Metropolitan West Side Elevated Railway, Chicago, Ill., for twelve years.

Mr. Burr Martin, who has been superintendent of safety and way and structures of the Texas Traction Company and the Southern Traction Company, Dallas, Tex., has been appointed general manager of the companies to succeed Mr. R. B. Stichter, who, as announced elsewhere in this column, has been elected vice-president of the companies. All departments will report to Mr. Martin except the auditing department and the claim department, both of which will report direct to the president.

Mr. Joseph B. Eastman has been appointed a member of the Public Service Commission of Massachusetts by Governor Walsh, succeeding Hon. George W. Anderson, who resigned recently to become United States District Attorney. Mr. Eastman was born at Katonah, N. Y., in 1882. After he was graduated from Amherst College in 1904 he spent some time at the South End House, Boston, in sociological work, later becoming counsel and secretary of the Boston Public Franchise League. For the last nine years he has played a prominent part in many commission and legislative matters affecting electric railway, lighting and gas companies and assisted in drafting the bill which established the Public Service Commission in 1913 upon its present basis. Among the matters of street railway interest which have occupied Mr. Eastman's attention have been the renewal of tunnel leases at Boston, the investigation of

holding companies and the study of railroad and street railway relations. During the last eighteen months Mr. Eastman served as counsel for the unions in the arbitrations of wages on the Boston Elevated Railway and the Middlesex & Boston Street Railway, and is at present counsel for the union in the arbitration between the Bay State Street Railway and local branches of the Amalgamated Association. He is a member of the Boston Chamber of Commerce and the Boston City Club.

Mr. D. D. Curran, whose election as president of the New Orleans Railway & Light Company, New Orleans, La., was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 26, 1914, will assume his duties with that company on Feb. 1. In a statement which he issued Mr. Curran said that he accepted the presidency of the company with the full knowledge that it was a local institution; that large sums of New Orleans money were invested in the securities of the company, and that his best efforts would be put forth to reconcile any differences which might exist between the corporation and the public. Mr. Curran has long been a resident of New Orleans and is thoroughly familiar with local traditions. The company with which he now becomes connected controls and operates more than 200 miles of electric railway in New Orleans and furnishes current for both power and lighting service. Mr. Curran's previous experience has all been in steam railway work, but in this he has been eminently successful and is most highly regarded in New Orleans and in the territory through which the lines of the company with which he has so long been identified operated. He entered railway service in 1873 as a brakeman on the Pennsylvania Railroad, which position he held for five years. He was then successively freight conductor of the Mobile & Montgomery Railroad, passenger conductor of the same road, yard master of the Louisville & Nashville Railroad at Montgomery and trainmaster of the same road at Birmingham, Ala. From 1887 to 1893 Mr. Curran was connected with the Central of Georgia Railroad successively as superintendent of the South Carolina Division, superintendent of the Southwestern division, superintendent of the Columbus & Western division and superintendent of the Savannah & Western division. He was appointed to the last mentioned position in 1892. From February, 1893, to August, 1907, he was superintendent of the New Orleans & Northeastern Railroad. In August, 1907, he was elected president of that company, of which he is also general manager.



D. D. CURRAN

OBITUARY

D. E. Budd, one of the pioneers in street railway development in Portland, Ore., is dead. He is said to have obtained the first franchise for the operation of street cars in Portland.

A. W. Westman, superintendent of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., was electrocuted at the company's carhouse at Kingsville on Dec. 21 while preparing to put the snow plow in action.

Giles S. Allison, long associated with the Security Register Company, St. Louis, Mo., and for many years prominent in the electric railway manufacturing field, died on Dec. 24 in St. Louis. The cause was throat trouble. Mr. Allison was sixty-two years old.

Mr. Joseph Donlan, at one time superintendent of the New Haven (Conn.) Street Railways, now included in the system of the Connecticut Company, is dead. After leaving the New Haven Street Railway Mr. Donlan became connected with the National Casket Company at New Haven, and subsequently entered the main office of that company in Brooklyn.

Construction News

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

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

RECENT INCORPORATIONS

***United Public Service Company, Rochester, Ind.**—Incorporated in Indiana presumably to build electric railways and other public utilities in Rochester. Capital stock, $250,000. Incorporators: John E. Beyer, Earl E. Beyer and Charles A. Davis.

***Portland, Vancouver & Northern Railway, Vancouver, Wash.**—Application for a charter has been made by this company in Washington to build an electric line between Vancouver, Wash., and Portland, Ore. Headquarters: Vancouver, Wash. Officers: Henry Crass, Mayor of Vancouver, president, and George W. Ford, secretary.

FRANCHISES

Fresno, Cal.—The Fresno Traction Company has received a franchise from the Council along Fresno Avenue and on Fresno Street from Belmont Street along J Street, Stanislaus Street, O Street, Tulare Street and P Street to the Southern Pacific reservation in Fresno.

San Jose, Cal.—Blaming the European war for its failure to begin construction upon the electric line from Alviso to San Jose, the San Jose Terminal Railway, through Lee H. Landis, its president, at a recent meeting of the Council surrendered its deposit of $500 which guaranteed construction would be started before Jan. 1, and asked for a new franchise for that portion of the railway which will lie within the city limits. Mr. Landis addressed the Council and an ordinance for the granting of the new, or renewed franchise, was given first reading. That portion of the line which lies in San Jose will run on Second Street between Julian Street and the northerly city limits. Mr. Landis promised that actual construction would be begun immediately after the first of the year and that the line would be in operation before the end of 1915.

Macon, Ga.—The Macon Railway & Light Company has asked the Council for a franchise to extend, relocate and remove different sections of its tracks in Macon.

Carbondale, Ill.—The Murphysboro & Southern Illinois Railway has asked the Council for a franchise in Carbondale. This is part of a plan to build an electric line between Carbondale and Murphysboro. A. B. Minton, Murphysboro, president. [E. R. J., Oct. 3, '14.]

New Orleans, La.—The Orleans-Kenner Electric Railway has purchased the franchise from the Council to build an interurban line between New Orleans and Kenner.

Camden City, N. J.—The Public Service Railway has asked the Council for a franchise over White Horse Pike. The company proposes to reroute the Haddon Heights line.

Saratoga Springs, N. Y.—On the condition that it erect a trolley station at a cost of $50,000 and meet other requirements asked by the village officials of Saratoga Springs, the request of the Hudson Valley Railway for a franchise to maintain tracks across Broadway in Saratoga Springs to connect the Glens Falls line with the Troy division will be granted. Whether or not the proposition will be received favorably by the Hudson Valley Railway officials is not known.

Cincinnati, Ohio.—The Cincinnati, Newport & Covington Street Railway has asked the Council for a renewal of its franchise in Cincinnati.

Urbana, Ohio.—The Ohio Electric Railway has received a twenty-five-year franchise from the Council in Urbana.

Easton, Pa.—The Easton Transit Company has received a franchise from the Council to reconstruct all of its lines on the South Side, laying new track, etc. The company has also received permission to lengthen several of the switches in Easton.

Waco, Tex.—The Southern Traction Company has asked the Council for a franchise to extend its tracks south from Elm Street about 1 mile in Waco.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—This company plans to expend $105,000 for betterments on its lines from San Bernardino to Highland and Patton.

Bristol & Plainville Tramway, Bristol, Conn.—Plans are being made by this company to ask the next General Assembly for the right to amend its charter to extend its lines on Main Street, South Street, East Road, Wolcott, Crown, Earl, View and Divinity Streets, making a circuit which will take in the entire south section of Bristol. The company will also ask for permission to discontinue its tracks on Park Street in Bristol.

Wilmington, New Castle & Delaware Railway, New Castle, Del.—Plans are being made by this company to rebuild and install a new roadbed on about 5½ miles of its lines.

Columbus (Ga.) Railroad.—Plans are being considered by this company and the Girard City Council for an electric line in Lower Girard, presumably to connect at some point in the western part of Lower Girard with the present Girard line and complete a loop or belt, crossing the new Dillingham Street bridge into Columbus.

Savannah (Ga.) Electric Company.—Work has been begun by this company on the extension of its Habersham line from Thirty-Seventh Street in Savannah giving a direct service from the business section to the Chatham Crescent in Savannah.

Caldwell (Idaho) Traction Company.—Citizens of Caldwell have agreed to take bonds of this railway to finance the construction of the Wilder branch of the Oregon Short Line. The estimated cost of electrifying the branch is $50,000.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—This company has perfected plans to remove its tracks on Franklin Avenue in the center of the street. When the old horse car line from Bloomington to Normal was established many years ago the track was laid on the west side of Franklin Avenue and has since remained there.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—E. L. Coleman, representing Wolf Teitle & Company, Chicago, who are financing this railway, announces that the line will be built. Residents of Peoria are reported to have subscribed for $350,000 of the stock, residents of Canton for $300,000, and it is expected to sell $300,000 in Quincy. It is intended to begin construction work in the spring. [E. R. J., Dec. 26, '14.]

Illinois Traction System, Peoria, Ill.—Plans are being made by this company to double-track the Prospect Heights line in East Bluff to the city limits of East Bluff.

Springfield & Central Illinois Traction Company, Springfield, Ill.—It is reported that this company, headed by Isaac A. Smith, St. Louis, organized under the laws of Illinois and authorized to issue bonds to the amount of $20,000,000, will during the coming summer begin construction work on an interurban railway which will ultimately extend from St. Louis across Illinois to Terre Haute, Ind. It is announced that the right-of-way has been obtained from Terre Haute to St. Louis, and also for an intersecting line from Springfield to Duquoin, and that the necessary franchises have been granted. The promoters of this line state that the first issue of $2,500,000 of bonds will be taken by a syndicate of English capitalists, and that 60 per cent was already underwritten before the war broke out. The temporary failure to realize on the remaining 40 per cent is given as the reason for delaying the work of construction until next summer. According to the plans announced, the building of the line will begin at St. Louis, and it is now contemplated to construct the line as far as Newton, county seat of Jasper County. It is said that the line will be put in operation as soon as the first 25 miles are completed. Plans provide for a power plant to be erected 46 miles east of St. Louis, near the intersection of the north and south and east and west lines of the proposed system. It is also planned to operate electric lighting plants in the small towns along the lines. Isaac A. Smith, president; George W. White, vice-president, A. C. Skilman, secretary, and N. E. McMillan, treasurer. All are residents of St. Louis.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—This company has placed in operation its new 1-mile line on Minnesota Street from Shelby Street to Churchman Avenue in Indianapolis.

Des Moines (Ia.) Railway.—Plans are being contemplated by this company for an extension from Colfax to Newton. Also for plans to build a line through territory south of Des Moines.

Bangor Railway & Electric Company, Bangor, Maine.—This company has ordered the necessary equipment for the building of a double-track loop on Harlow and Central Streets in Bangor. It is expected that this loop will relieve the congested railway conditions on Main Street. The sum of $40,000 will be expended in this work.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Plans are being contemplated by this company to extend its Harney line south from the Sixth Street terminus to Gibson.

***Haddonfield, N. J.**—Plans are being considered to build an electric railway to connect Haddonfield, Berlin and Gibbsboro. Frank O. Stem, Berlin, and associates are interested.

Morris County Traction Company, Morristown, N. J.—Plans are being made by this company to reduce the running time between Morristown and Dover by fifteen minutes. Work has been begun laying 1000 ft. of double track at Morris Plains for a new turnout. The new track begins at Glen Brook Place and extends past the business section toward the hospital junction.

***Flushing, N. Y.**—The Public Service Commission, First District, has announced that in all probability the so-called Flushing route extending from Corona to Bayside has been legalized by the consent of the property owners at Broadway and Twenty-Second Street, Flushing, where the route of the proposed line would extend.

Monticello & Middletown Railway, Monticello, N. Y.—As soon as surveys are completed work will be begun by this company on its line to connect Middleboro, Bloomingburgh, Wurtsboro, Rock Hill, Bridgeville, Monticello, White Lake and Bethel, a distance of 45 miles. The motive power will be gasoline and the repair shops will be located at Monticello. Capital stock, authorized, $500,000. Blake A. Mapledoram, Monticello, general manager and chief engineer. [E. R. J., Dec. 26, '14.]

Cincinnati (Ohio) Traction Company.—Plans are being made by this company to extend and double-track many of its lines in Cincinnati.

Columbus Railway, Power & Light Company, Columbus, Ohio.—A resolution has been adopted by the City Council of Columbus providing for the appointment of a committee to act with the Chamber of Commerce representatives in conferring with the Columbus Railway, Power & Light Company on the plan to obtain funds with which to make extensive improvements on East Main, East Long and West Broad Streets the coming spring.

East Linden Electric Railway, Linden, Ohio.—It is possible that the new route of this railway proposed to the Council recently will prove unsatisfactory, because of complications that may result from granting franchises to two different corporations in the same street for a portion of the route. Phillip B. Gaynor, of New York, president of the company, was in the city last week looking into the situation. [E. R. J., Oct. 5, '14.]

Niagara Falls, Welland & Lake Erie Railway, Welland, Ont.—The Council of Welland, Ont., has accepted the offer of this company to pay $60,250 in twenty years towards the cost of street paving. The Council also gave its formal permission to allow the company to cross the Canal Bridge at Main Street in Welland to connect up with the west side extension.

Portland, Ore.—W. H. Daly, Commissioner of Public Utilities, will take steps immediately to revoke the franchise granted George F. Heusner, for a system of electric railways operating between Renton and the downtown districts of Portland and the $10,000 bond forfeited. This will be done owing to the failure of Mr. Heusner to comply with the provisions of the franchise which was granted on Nov. 26, 1913, and accepted Jan. 30, 1914. One of the provisions

of the grant was that work was to be begun within thirty days after final action by the Council, and cars were to be running within eighteen months. Nothing has been done to indicate that a car line is ever to be built in accordance with the grant. The franchise provided that $350,000 was to be spent in construction. [E. R. J., March 14, '14.]

Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa.—This company has placed in operation its new Ellwood, Koppel & Beaver Falls branch. R. H. Boggs, Pittsburgh, president, of the new line.

***Sharon, Pa.**—With the beginning of operations on the construction of the line between Sharon and Brookfield Center it is learned that a syndicate of Cleveland capitalists has had engineers at work surveying for the construction of an electric line between Warren and Sharon which would make a feeder for the Cleveland-Youngstown Railway.

Montreal & Southern Counties Railway, Montreal, Que.—Plans are being contemplated by this company to extend its tracks to Youville Square in Montreal.

SHOPS AND BUILDINGS

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Preliminary arrangements are being made by this company to build a three-story brick building on Market Street at Logansport. In this new structure will be located the local superintendent's, dispatcher's and division offices, also the freight office and storage rooms. Work on this new structure will be begun as soon as the weather permits.

Bangor Railway & Electric Company, Bangor, Maine.—Plans are being made by this company to establish a new passenger station in the Graham building on Harlow Street in Bangor.

Chambersburg, Greencastle & Waynesboro Railway, Waynesboro, Pa.—This company has begun the construction of a new passenger station at Kauffmans station to replace the old building.

POWER HOUSES AND SUBSTATIONS

Staten Island, Midland Railway, New Brighton, N. Y.—This company will install new substation apparatus consisting of two 500-kw rotary converters, six 165-kva and four 400-kva transformers, switchboard and accessories, all of which have been purchased from the General Electric Company.

Hocking Sunday Creek Traction Company, Nelsonville, Ohio.—This company has ordered for shipment to Nelsonville, Ohio, one 400-kw, 1200-volt rotary converter set consisting of two machines on common bedplate, each of 200-kw capacity, 600-volt, direct current, three-phase, sixty cycles and 1200 r.p.m., and three 135-kva, 11,000-volt high-tension to rotary-voltage oil-insulated, self-cooled transformers, with one switchboard for the control of the above apparatus. The order has been placed with the Westinghouse Electric & Manufacturing Company.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for the following apparatus, to be shipped to Steubenville, Ohio: one outdoor transformer sub-station consisting of two 1500-kva, oil-insulated, water-cooled, three-phase, sixty-cycle, 66,000-volt or 33,000-volt to 16,500-volt outdoor radiator type transformers; one set steel work and towers, and outdoor switching equipment. The company has ordered for its Steubenville sub-station, the following apparatus: three 500-kva, 16,500-volt to 2400-volt; single-phase to two-phase; six 24-kva, single-phase automatic induction regulators with accessories; one 500-kw, sixty-cycle, 600-volt direct-current 900 r.p.m., six-phase rotary converter; one 550-kva, sixty-cycle, 15,000-volt to rotary-voltage, three-phase oil-insulated self-cooled transformer; two 330-kva, three-phase, sixty-cycle, 15,000-volt to rotary-voltage oil-insulated self-cooled transformers, with one switching equipment for the above apparatus.

San Antonio (Tex.) Traction Company.—A new rotary converter is being installed by this company at its power plant on Villita Street in San Antonio. The new converter has a capacity of 1500 hp.

Manufactures and Supplies

ROLLING STOCK

Toronto (Ont.) Civic Railway is reported as expecting to buy six steel and six wood cars.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., is in the market for six interurban cars.

Oklahoma City (Okla.) Railway has ordered eight double-truck T-post city cars from the St. Louis Car Company.

London & Port Stanley Railway, London, Ont., is reported as having ordered three trailers from the Preston Car & Coach Company.

Shore Line Electric Railway, Norwich, Conn., according to an unconfirmed report, has ordered about five cars from the Wason Manufacturing Company.

Interborough Rapid Transit Company, New York, N. Y., has ordered twelve all-steel cars from the Pressed Steel Car Company for operation in the Steinway Tunnel.

Sheboygan (Wis.) Railway & Light Company, noted in the ELECTRIC RAILWAY JOURNAL of Dec. 12 as expecting to order two new steel cars for city service, has purchased this equipment from the St. Louis Car Company. The cars will be equipped with Baldwin trucks.

Boston (Mass.) Elevated Railway, according to later developments in the placing of its 100-trailer order, has ordered seventy-five cars from The J. G. Brill Company, while twenty-five cars will be built by the Laconia Car Company. The trucks for all these equipments will be built by the former company.

Bureau of Foreign and Domestic Commerce, Washington, D. C., is in receipt of a communication from a business man in South America who desires to establish commercial relations with American manufacturers of gasoline and electric motor cars, and who states that he now has an inquiry for two cars and trailers.

Detroit (Mich.) United Railway has placed an order with the Westinghouse Electric & Manufacturing Company for a 50-ton Baldwin-Westinghouse locomotive. This machine is to be used between Royal Oaks, just outside the city limits of Detroit, and Flint, a distance of about 55 miles. The freight between the terminals and intermediate towns is composed chiefly of l. c. l. movements. The railway, after considerable investigation, selected a standard locomotive type instead of the car-type locomotive with which this class of service has been previously and is at present handled. The locomotive will be equipped with No. 301-D-6 field control, slow-speed motors especially designed for locomotive application, and pneumatically operated unit switch control. This company is reported as having authorized the construction of fifty stepless trailers in its own shops.

TRADE NOTES

New York Insulating Wire Company, New York, N. Y., has appointed Lewis O. Brewster as general manager.

Gould Storage Battery Company, New York, N. Y., has located its Detroit office in Room 604, Kerr Building, 100 Beaubien Street.

Nachod Signal Company, Inc., announces the removal of its office and plant to Louisville, Ky. Carl P. Nachod remains the president and chief engineer.

Wallace Supply Company, New York, N. Y., has changed its corporate name to Wallace Supplies Manufacturing Company. This company, besides making its own car fittings and specialties, also manufactures for others.

W. R. Kerschner Company, Inc., New York, N. Y., has been incorporated to take over the business which for the past twelve years has been conducted by W. R. Kerschner personally. The financial interest and personnel which comes into the new company are closely allied with the manufacturing and equipment end of the electric railway industry. The increasing business which Mr. Kerschner has done for the last several years has necessitated the expansion into an incorporated company.

Canadian General Electric Company, Toronto, Ont., has appointed the Hon. J. S. Hendrie, Lieutenant-Governor of Ontario, as a director to fill the vacancy created by the

death of the late Senator Jaffray. At the annual meeting of the company an appropriation of $50,000 was set aside to cover the expense of maintaining during the continuance of the war the corps of electrical engineers raised by the company, and subscriptions to the Red Cross Fund and other patriotic and benevolent purposes.

Hodenpyl, Hardy & Company, New York, N. Y., has been incorporated with capitalization of $2,000,000 to manage public utilities corporations and do a stock and bond brokerage business. The new company will take over the business of the firm of Hodenpyl & Hardy. There will be no change in the interests connected. The officers of the new company will be H. G. Hodenpyl, president; George E. Hardy, B. C. Cobb, J. C. Wendock, W. H. Barthold and A. H. Johnson, vice-presidents, and Jacob Hekman, secretary and treasurer.

Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., reports that the New York Central Railroad's recent order for open-hearth steel rails includes 2000 tons of titanium-treated steel. These rails will be treated with 0.10 per cent of titanium. The order constitutes the first that has been placed by the New York Central Lines for titanium open-hearth steel and is the result of experimental work which has covered a period of at least two years. Titanium has been used in Bessemer steel by these lines in the past, but until now their open-hearth rails have been untreated with the exception of those used for experimental purposes.

Coil Manufacturing & Repair Company, Cleveland, Ohio, has purchased the factory equipment, business and goodwill of the Cleveland Coil & Manufacturing Company. The new company took charge of the business on Dec. 31 and is prepared to supply the trade with armature, field and induction motor coils and do a general rewinding and repairing business. About three years ago the business which this company has assumed was conducted as the electrical department of the Van Dorn & Dutton Company. The principal owner and manager of the new company is H. A. Kuhle, who for a number of years was secretary of the Cleveland Switchboard Company and during the past three years was one of the proprietors of the Electric Wiring Company, Cleveland, Ohio.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has organized a separate department for the production and sale of automobile accessories to be known as the Automobile Equipment Department, of which G. Brewer Griffin is manager and to which he will devote his entire time hereafter. Mr. Griffin was formerly manager of the detail and supply department, having had active charge of automobile equipment sales from the inception of the business by the Westinghouse Company. John J. Gibson, formerly district manager for the company at Philadelphia, has been appointed manager of the detail and supply department to succeed Mr. Griffin. This company also announces the appointment of H. W. Cope, formerly assistant manager of the industrial and power department at East Pittsburgh, as director of its exhibit at the Panama-Pacific International Exposition in San Francisco. This company has recently received orders from the Hershey (Pa.) Transit Company for several four-motor equipments of No. 101-B-2 motors and type K control, and from the Birmingham-Tuscaloosa Railway & Utilities Company, Tuscaloosa, Ala., for one quadruple equipment of No. 310-C, 75-hp, 600-volt railway motor for installation on a combination baggage, express and freight car, also for a substation and car equipment to be used in connection with the electrification of a portion of the road near Tuscaloosa.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, reports the shipment of headlights and equipment to the following railroads during the month of December: Cambria & Indiana Railroad, Colver, Pa.; Toronto (Ont.) Suburban Railway; Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.; Virginia Railway & Power Company, Norfolk, Va.; Tarentum, Brackenridge & Butler Street Railway, Tarentum, Pa.; Union Electric Company, Dubuque, Ia.; Sioux City (Ia.) Service Company; Hot Springs (Ark.) Street Railway; Princeton (W. Va.) Power Company; Chicago & Joliet Electric Railway, Joliet, Ill.; Los Angeles (Cal.) Railway Corporation; Lawrence (Kan.) Railway & Light Company; San Francisco-Oakland Terminal Railway, Oakland, Cal.; Shreveport (La.) Traction Company; Mahoning & Shenango Railway, Light & Power Company, Youngstown, Ohio; Wilmington, New Castle & Delaware City Railway, New Castle, Del.; Jamestown, Westfield & Northwestern Railway Company, Jamestown, N. Y.; Warren Company, Warren, Ariz.; Altoona & Logan Valley Electric Railway, Altoona, Pa.; Roanoke (Va.) Railway & Electric Company; New York Central & Hudson River Railroad, Croton-on-Hudson, N. Y.; Railway Motor Car Company, Marion, Ind.; Cincinnati, Bluffton & Chicago Railroad, Bluffton, Ind.; Osgood Bradley Car Company, Worcester, Mass. (for Richmond, Staten Island, new cars); Savannah (Ga.) Electric Company; Boston & Maine Railroad, North Adams, Mass.; Lincoln (Neb.) Traction Company; Allentown & Reading Traction Company, Kutztown, Pa.; San Antonio (Tex.) Traction Company; Vicksburg (Miss.) Light & Traction Company; Birmingham (Ala.) Railway, Light & Power Company.

ADVERTISING LITERATURE

Steel City Electric Company, Pittsburgh, Pa., has issued bulletin sheets Nos. 26, 27 and 28 describing respectively its star fixture stems and beam straps, outlet boxes for concrete work and conduit bushing adapters and Hickey fixture hangers.

Sangamo Electric Company, Springfield, Ill., has issued Bulletin No. 40, describing and illustrating its a.c. single-phase and polyphase watthour meters. The catalog discusses the features, constructions, adjustment and performance characteristics of the type "H" watthour meter, and gives directions for testing and for connecting the meters. The catalog also describes current and potential transformers. The bulletin is designed and written by Ray D. Lillibridge, Inc., New York, N. Y.

Prepayment Car Sales Company, New York, N. Y., has issued a folder which contains a novel presentation of the merits of prepayment car platforms. Following the spirit of the suggestion recently made, that electric railways should endeavor to analyze and apply in a practical manner each idea embodied in the ten principles adopted by the American Electric Railway Association at Atlantic City last fall, the folder demonstrates how each principle of the code in turn is fostered and supplemented by prepayment operation.

Pawling & Harnischfeger Company, Milwaukee, Wis., has issued a handsome booklet which outlines the progress of this company during its thirty years of activity. The booklet is well illustrated with interior views of the manufacturing plant and offices of this company. A brief sketch is also included of the organization of the company accompanied by photographs of its personnel. Among the products now manufactured by the company are traveling cranes of various types, grab buckets for foundry service, traveling electric hoists and monorail systems, I-beam trolleys, horizontal drilling and power machines, wheel and boom type excavators and power traction tampers.

Harrison Safety Boiler Works, Philadelphia, Pa., has issued a booklet of seventy-two pages describing its Cochrane multiport valves for back pressure, relief and vacuum service, flow service in connection with mixed flow turbines, and check valve service with bleeder or extraction turbines. The essential idea of the multiport valves is the use of a number of small disks instead of large disks in order to secure greater safety, quietness, lightness of moving parts and tightness. The several disks are each fitted with an independent dashpot held to seat by independent springs, the tension of all the springs being adjusted simultaneously by a pressure plate, the position of which can be changed by means of a handwheel on the outside of the casing. Thus there are no parts directly connected to the disks themselves extending through the casing, hence no possibility of binding, as by over-tightening of glands, or of tying down or overweighting, the movement of the pressure plate being definitely limited. Another advantage claimed is the ability to adjust the back pressure quickly and easily by changing the position of the pressure plate, which may be done from any distance, as by means of chain or rods. In addition to full descriptive and tabular matter the book contains numerous diagrams and layouts, also data on the effects of air in condensers and upon turbine performance.