Electric Railway Journal

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AN OPPORTUNITY FOR SALESMEN

A very interesting suggestion, which should appeal to the managers of electric railway properties, particularly small ones, was recently received by the editors from the superintendent of a railway and lighting company in the Middle West. The suggestion is simply that visiting salesmen be invited to talk to groups of employees interested in the salesmen's specialties. The plan has been tried on this property with good success, and undoubtedly the same idea has occurred to managers elsewhere. The modern salesman in this field is particularly well qualified to describe recent developments in the several lines of electric railway work. By the very nature of his work he must be up to date, and if he is successful in selling goods he must be enthusiastic regarding them. He has at hand exactly the information regarding railway supplies which operating men want and, as the average salesman is a fluent talker, he should have no difficulty in presenting this information attractively. If he will confine his remarks to topics on which he has first-hand information he is assured of the attentive interest of his audience. Here is a simple educational opportunity which requires no organization, would yield good results to all concerned, and would cost nothing to put into operation.

REAL DIRECTORS NEEDED

The caustic comment of the Interstate Commerce Commission in regard to the Rock Island board of directors adds one more authority on the side of those who assert that corporations have a vital need for directors who actually direct. We have long believed that too great a premium is placed upon the board membership of "big" men, chosen because of the glamor of their names rather than for the time, energy and enthusiasm that they can bring to their work. It is not a question of ability to direct in the case of the man of large affairs, but of his tendency to abuse his ability by accumulating so many directorships in addition to his regular business that he cannot acquire and maintain the close insight into the properties that a real business-minded director should have. "Big" directors are prone to acquiesce, without knowledge or investigation, in what certain others more directly concerned with the management of the property desire to have done, forgetting that a directorship is a position of trust and that any dereliction or neglect of responsibility therein is the more to be condemned as the prominence and the business sagacity of a director increase. We believe that no corporation should choose, and no man should accept a position as, a director unless he is prepared to acquaint himself thoroughly with the commercial, technical and public policy problems of the company. Furthermore, the board of directors should be small enough to permit frequent convening and prompt action—seven or nine members are quite sufficient in most cases. A board thus constituted would be organized for work and not for show.

REDUCING WAGES BY ARBITRATION

The decision of the board of conciliation and investigation in the British Columbia Electric Railway wage arbitration is vitally important to all electric carriers, for it is an excellent example of the use of the Canadian industrial disputes act as a means of lowering wages as well as of increasing them. The theory underlying the decision, however, is not altogether satisfactory. The points at issue were easily proved—the general business depression in Vancouver has led to a wide-spread wage reduction, the cost of living has decreased, the financial condition of the company is making it unable to continue the old wage rates, and since 1913, in spite of the depression, the wages, because of the sliding scale, have advanced about 8 per cent. Yet of the desired 15 per cent reduction only an average of 7 per cent is recommended by the board, with reasoning that seems to be a compromise on basic principles. The board concluded that the financial standing of the company should not be a governing or controlling factor in recommending wage rates, yet it remarks that an outline of the company's financial condition is wise as showing that the company is not in a position "to deal liberally" with its employees. In dealing with a prosperous company are we to suppose that the board would adhere to this principle that the financial standing is not a controlling factor, but would analyze such standing to show that the company could, if it so desired, deal "liberally" with its employees? Financial standing should or should not be considered—there should be no vacillation on this point. Incidentally, we may say, it should be considered until some system of control causes increases in wages to be automatically followed by equal increases in rates. The board in the present case believes in a "fair wage based on proper conditions"—this apparently under the general depression and lower cost of living means about 7 per cent less than existing wages. We wonder if this figure, however, did not easily come from simply reverting in general to the 1913 wages, in spite of the expressed approval of the board for the general principle of the sliding scale system, which had caused the increase since 1913. In short, while the reduction is gratifying,

we are sorry that the board has not met with greater exactness and clearness the issues raised, for they merited an exhaustive and authoritative study.

ELECTRIC RAILWAYS AND THE JITNEY BUS

In a recent issue of the *American City*, Dr. Clyde L. King, the author of an article on the jitney in our issue for Aug. 21, discusses the probable effect of the jitney upon street railways. He concludes that "the jitneys will probably not seriously disturb the existing business of street railway companies, while they can be used to develop new business and to give the cities more elastic and more rapid transit facilities." This conclusion is based upon a consideration of the cost limitations of jitney development, the new avenues of transportation that will be opened up by both the jitneys and the larger buses, and of the facts that each type of transit tends to develop its own customers, that the jitney probably picks up many pedestrians who would not otherwise use the street cars and that the "riding habit" tends to increase more rapidly than the population. He adds, "That the jitney and the motor bus should be regulated, goes without saying. As a minimum, permits should be required, routes and fares specified, and minimum provisions for public safety and convenience enforced. Chauffeurs should pass an examination and be licensed, cars should be periodically examined, and requirements for driving and for loading and unloading should be enforced. Reasonable bonds may well be required to insure indemnities in case of accidents, limitations should be placed on overcrowding, * * * definite routes should be required, and destinations plainly indicated in large letters." He also recommends a special pavement tax based on the use of the streets and the additional cost of repairs to the pavements caused by jitney bus operation. If these conditions are enforced the jitney will begin to assume the aspect of a real public utility, not full fledged, perhaps, but at least incubated.

The position of the Electric Railway Journal on this subject was clearly stated in an editorial printed in the issue for July 3 where we expressed the belief that bus lines operating under electric railway conditions will not be permanently profitable. If the jitney or the auto bus should look for chances to serve where the street car cannot operate, it would be a welcome addition to the transportation needs of a community and might prove, in many cases, profitable to the operators. But it is cold comfort to be told that under the conditions under which these cars have been operated the existing business of street railway companies will not be seriously disturbed. The trouble has been that the jitney has thrived by skimming the cream from the business of the electric railway and has forced upon the latter an unfair proportion of the long-haul business. Professor King fears that the street railway companies will aim to have the tax on jitneys so high as to be prohibitive, but he recommends himself for the jitneys in addition to the requirements already mentioned, transfer provisions, limited franchises, police traffic regulation, limitation of traffic to designated roads of proper stability and character, efficient safety fenders and standardization and publicity of accounts. We have no fear, if the regulations on all of these points are at all as stringent as those applied to electric railways, that the motor bus will find that it can no longer compete with electric cars and will assume its proper place, namely, as a supplement to electric railway service rather than as a competitor to it, or else will drop out.

THE 1915 CONVENTION PROGRAM

The American Electric Railway Association is to be congratulated upon the early completion and announcement of its convention program, printed in full in last week's issue of the Electric Railway Journal. The members of the association little realize the labor involved in making up such a program and in marshalling the committee reports and addresses for actual presentation. Close scrutiny of the program will reveal a very ingenious dovetailing of the sessions to provide for overlapping where mutual interest makes joint consideration of certain topics desirable. Those who have followed week by week the reports of committee activities as they have been recorded in this paper must appreciate the substantial value of the work done this year. Never have there been more important reports to be considered and never have they been presented more systematically and effectively.

The industry looks to the annual convention program to reflect its live problems. Topics and speakers are selected with a view to stating the problems clearly and pointing out fundamentally correct solutions for them. The topics selected for consideration by the American Association this year are, therefore, significant. These topics are government ownership, principles of valuation, and welfare work, and these are to be discussed by Ex-United States Senator Jonathan Bourne, Jr., Bion J. Arnold and Jesse W. Lilienthal, respectively. It is interesting also to note the topics which are to take the attention of the affiliated associations. The accountants this year are to discuss their ideas of the prepayment car, under the leadership of R. J. Clark, and the more technical subject of the treatment of charges for rent of track and equipment will be presented by Paul Shoup. Two professors are to address the accountants, and these speakers are apparently left free to make their own selection of topics. The engineers, too, are this year calling in outside experts to give them the benefit of the government researches into wood preservation. At Madison, Wis., a federal laboratory is maintained for the conducting of researches on the properties of forest products. The electric railway industry has much to gain by close co-operation with this laboratory. In addition to papers on technical topics the Claims Association is to consider broadly the subjects of automobiles, and safety and its relation to conservation. The claims departments of electric railways "have magnified their office" in recent years by reaching out into the field of conservation of life with the idea of reducing claims to the minimum. The program of the Transportation & Traf-

fic Association is also replete with interest, with one outside address and committee reports on subjects of great concern to the industry.

In commenting upon the 1914 program we called attention to a tendency to reduce the number of addresses and papers, as pressure for program space for the presentation of the committee reports became greater. While the idea was not expressed at the time, we had supposed that the limit had about been reached with a reduction of 40 per cent in the number of papers over the preceding year. That this is not so is indicated in the present program where the number is still further reduced. It seems to us most profitable to occupy the larger part of the convention time with careful consideration of committee reports, the balance being devoted to inspirational and technical addresses, few in number but comprehensive in scope and powerful in inception and in delivery.

CO-OPERATION IN "MISSIONARY WORK"

In encouraging manufacturers to build within their territory electric railway companies should co-operate with the local electric light and power companies in deciding what factory locations will be most economical for themselves as regards distribution of current, construction of new transmission lines and track and convenience of handling transportation. Having made this agreement they may then jointly, and therefore more effectively, describe to the prospective manufacturer the special local facilities afforded by natural resources, convenience of location and cheapness of light and power and of freight transportation. When these companies are under a single management with a common source of current supply, the matter is, of course, simplified. A still more economical arrangement is possible for the holding company interested in several electric properties. In this case it would be more profitable for the management to attract a residential population to one of its railway properties which specializes on passenger transportation, while manufacturers should be drawn toward a property capable of industrial development where an adequate equipment for handling electric railway freight is provided and where, if possible, cheap hydroelectric power may be obtained.

An example of successful co-operation was recently shown by the railway and power companies of a certain small-sized city, just outside of which lay a large undeveloped slate quarry. Representatives of the local electric companies succeeded jointly in interesting the investor in a process for grinding slate into a roofing material by selling him on the installment plan a plot of land for a factory and agreeing to build a freight siding alongside of the plant. Reasonable rates were granted for electric freight transportation and electric power. At one time the obligations of the manufacturing concern to the electric companies amounted to $12,000. This amount, however, was all paid back out of the earnings of the thriving industrial, which had increased its monthly payments for electric service from only $40 the first month to $1,800 two years later.

CARS AT LESS THAN COST

We are in receipt of a letter from a car builder who says: "If a railway man believes that he is entitled to a fair return on his investment, why is he so pleased when he cajoles a feeble-minded car builder into accepting an order for cars in ruinous competition at less than the cost of manufacture? If selling transportation at less than cost is an economic crime, why is not buying cars at less than cost an accessory to a similar crime? If the ELECTRIC RAILWAY JOURNAL protests against the one, why should it not also protest against the other?"

We do. We believe that cut-throat competition among supply dealers is just as disastrous in the long run for the purchaser as it is for the seller, and this is so whether the articles sold are car bodies, or anything else a company uses. No business can continue unless it makes a fair return on the investment. If the condition of the car-building business is such that the manufacturer who is favorably situated for manufacturing and uses economical methods cannot sell his output at a sufficient profit to pay a good return on his investment, the railway companies will ultimately suffer. Builders will have to turn to other lines of work, and when the demands for cars come, the few car-building companies which remain will be able to charge very high prices. Railway companies have a vital interest in the continued prosperity of those from whom they purchase supplies.

In stating this conclusion, however, we must not lose sight of the differences in underlying principles of the business conducted by a public utility and by a manufacturer. The prices at which the utility sells its service are fixed by law; those at which the manufacturer sells his product, by competition. The law says to the utility: "We guarantee you a monopoly of your business. The service which you sell is a necessity, and if you fixed your own prices the consumer would have to pay them no matter what they are. Hence you shall charge only so or so much." The manufacturer, on the other hand, can charge anything that he wishes, and no limit is set to the profits which he may make. If the railway is limited by law or by the action of public service commissions to its possible profits, it should have some assurance from the State that the prices which the State sets for its service should not be so low that the company cannot earn a fair return on a fair investment. There is no limit under the law for the prices which a manufacturer may receive for his products or for the profits which he can make, and, in return, there is no warrant under the law which will assure him even a fair return on a fair investment.

For these reasons the legal situation, so far as the manufacturer and the public utility are concerned, is radically different. But this does not change the business condition that the railway companies are not permanently benefited when the situation is such that for any considerable time they can purchase apparatus at less than the cost of its manufacture under economical conditions.

Steel Cars for Chicago & Milwaukee Electric Railroad

These All-Steel Interurban Railway Cars, Which Are Designed for High-Speed Train Operation, Are Built Without Continuous Center Sills and Are Provided with Extensible Vestibule Trapdoors for Use with Raised Station Platforms Having Various Clearances

The Chicago & Milwaukee Electric Railroad is about to place in service fifteen all-steel, double-end cars which are being delivered at the present time by the builders, The J. G. Brill Company. The cars are intended for high-speed interurban service, and they are constructed with corresponding strength, but they possess the unusual feature of an underframing without continuous center sills, the buffing and pulling strains being transferred to the side girders. The over-all dimensions conform to the clearance requirements of the Northwestern Elevated Railroad, to which the Chicago & Milwaukee Railroad connects and over which the interurban line may have occasion to operate to obtain entrance to the Chicago loop district. Owing to the presence of the raised station platforms over part of the route, vestibule trapdoors have been provided, these being arranged because of clearance variations so that they will slide outward when necessary and thus fill any gap between the station platform and the car.

For the present, the cars will be used in an hourly limited train service between Evanston, Ill., and Milwaukee, Wis., a distance of 73 miles. The limited trains in this service run through the densely populated suburban section immediately north of Chicago and through a number of manufacturing centers between this district and Milwaukee. Present schedules require two hours and eighteen minutes to make this run, which contains a maximum of twenty stops, but with the new equipment it is planned to reduce the time to one hour and fifty-five minutes. With this fast schedule, speeds up to 65 m.p.h. will be the rule, single cars and multiple-unit trains being operated according to the varying requirements of the daily service.

Steel Framing Details

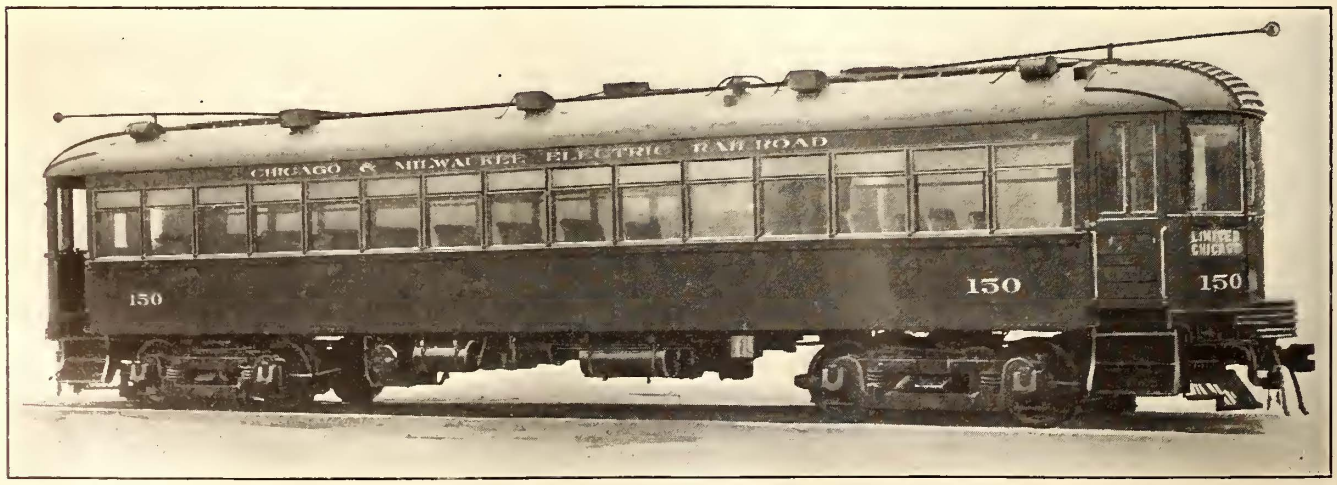
The car bodies contain the customary main passenger and smoking compartments and a saloon. There are vestibules at each end, and a corner of each of these is partitioned off to form a motorman's cab. The general dimensions are shown in the accompanying table.

The most striking feature in the design is the omission of continuous center sills between buffers. Although this constitutes a novelty for interurban service it conforms to the most modern practice in the design of the side-girder steel cars because it permits a more uniform distribution of the buffing and pulling strains throughout the car frame and provides, at the same time, a relatively light-weight structure. Details of the underframe are shown in one of the accompanying illustrations. In this it will be noted that two 6-in., 23.8-lb. girder-beam center sills transfer the buffing strains from the anti-climbers to the car-body framing. These beams are spaced on 28-in. centers, and they extend only from the anti-climbers to the first underframe panel points inside the body bolsters.

To provide against the destructive effect of collisions the vestibule underframing is made particularly heavy. The two girder-beam center sills under the vestibule have a ⅛-in. top cover plate riveted to them, and that portion of the vestibule between the circular 6-in., 10½-lb. channel buffer and the step openings also is covered with ⅛-in. plate. The vestibule framing above the underframe is substantially built, the end door openings being formed by 6-in., 13-lb. channels riveted between the center sills and the 3½-in. x 2½-in. x ¼-in. angle deck plate, which is made continuous across the end of the car.

The arrangement of the structural steel members in the body-bolster panel is rather unusual and results in a very rigid, shock-absorbing structure. The two heavy girder-beam center sills, in connection with two 6-in. x 3½-in. x 5 16-in. side-sill angles, form the longitudinal members. These are held rigidly in position by 4-in. x

Length over anti-climbers	56 ft. ¾ in.
Length over vestibules	53 ft. 7 in.
Length over body corner posts	44 ft. 2¾ in.
Length of platform	4 ft. 8 in.
Length of passenger compartment	32 ft. 3⅞ in.
Length of smoking compartment	11 ft. 10⅞ in.
Truck centers	32 ft. 8 in.
Width over side sheathing	8 ft. 8 in.
Width of car inside below windows	8 ft. 2 in.
Height top of rail to top of trolley board	12 ft. 5⅜ in.
Truck wheelbase	7 ft.
Minimum radius curve	49 ft.
Seating capacity	58



CHICAGO & MILWAUKEE CAR—EXTERIOR VIEW

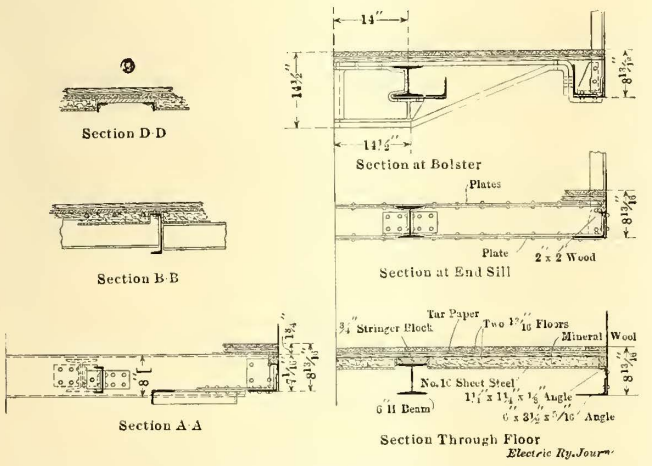
4-in. x 5/16-in. angle diagonal braces riveted between the outer corners of the underframe bolster panel and the point where the bolster connects to the girder-beam center sills. To give these diagonals additional stiffness under compressive strains, they are tied at the middle to the center sills by 2-in. x 1½-in. x 3/16-in. angles.

End sills are formed of 6-in., 10½-lb. channels, and to give them additional lateral stiffness these are provided with ½-in. x 6-in. cover plates which are securely riveted to the top and bottom flanges and to the side sills. The floor beam at the first panel point inside the body bolster is a heavy member, being formed of an 8-in., 11¼-lb. channel. The center sills are riveted to one side of this channel and the members of the floor system in the three central panels of the car-body underframing are riveted to the other. From the rigidly constructed bolster panels at each end of the underframe, buffing and pulling strains are transmitted to the central panels, which are also braced diagonally. The longitudinal floor-system members in these central panels are formed by two 5-in., 9-lb. channels spaced on 36-in. centers. Two transverse 3-in., 4-lb. channel cross-bearers to each set of diagonals also aid in stiffening the underframe between the bolster panels.

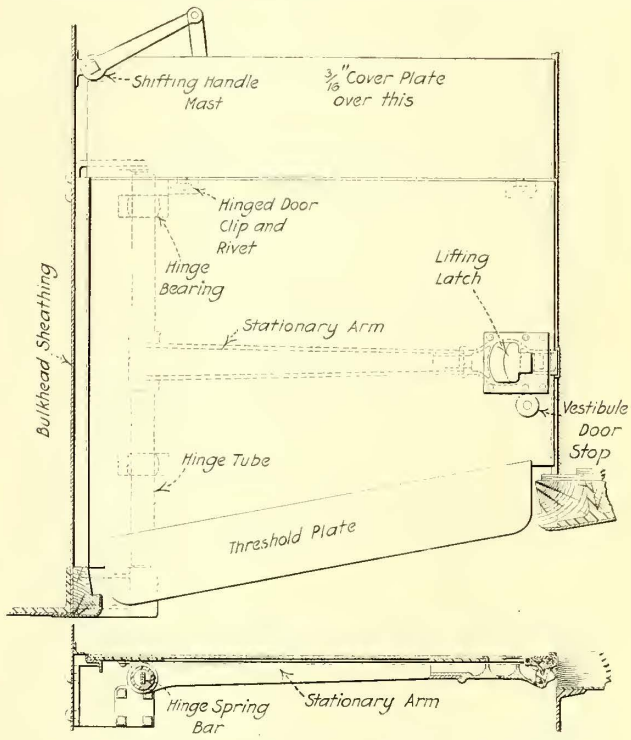
Structural steel shapes arranged for fifteen windows on each side are used in framing the car body. The side girder is formed of ⅛-in. plate 3 ft. ¾ in. deep which is riveted to a 6-in. x 3½-in. x 5/16-in. side-sill angle at the base, and to the 4-in. x ½-in. dropper bar at the belt rail. T-beam window posts on 2-ft. 11-in. centers are continuous from side sill to side sill. The letterboard is formed of two angles and a 10½-in. x ⅛-in. plate. The deck plate to which the letterboard is riveted is continuous around the car body and is formed of a 3½-in. x 2½-in. x ¼-in. angle on the outside of the car and a 2-in. x 1½-in. x ¼-in. angle on the inside. The roof is covered with 9/16-in. narrow tongued-and-grooved poplar nailed to wooden strips that are bolted to the steel ceiling carlines, and the headlining is No. 16 gage sheet steel.

Other Details

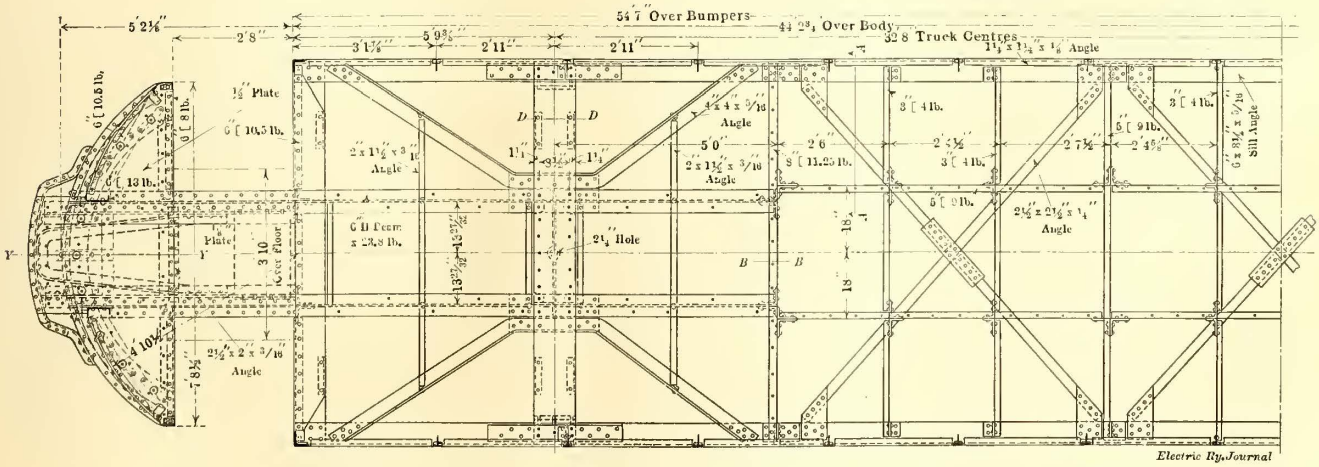
Framing connections are so arranged that no steel member is exposed both to the exterior and the interior of the car. This in addition to the ¼-in. Agasote panels, the mahogany trim below the window stools, and the double yellow-pine flooring with mineral wool closely packed beneath, thoroughly insulates the car body against heat and cold, and serves as well to dampen vibration. Battleship linoleum ¼-in. thick is cemented to the wooden car-body floors and is laid with as few joints as possible to make it practically waterproof. The mineral-wool insulation beneath the wooden floor is from 2 in. to 3 in. thick and is held in place by a



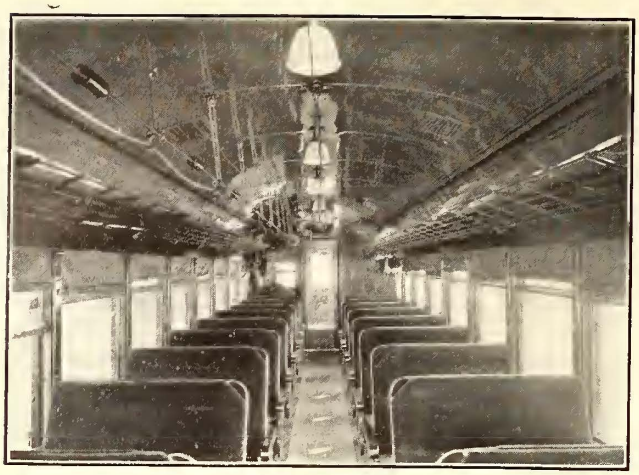
CHICAGO & MILWAUKEE CAR—SECTIONS THROUGH UNDERFRAME



CHICAGO & MILWAUKEE CAR—SLIDING VESTIBULE TRAPDOOR



CHICAGO & MILWAUKEE CAR—UNDERFRAME DETAILS



CHICAGO & MILWAUKEE CAR—INTERIOR OF PASSENGER COMPARTMENT

false floor that is formed by riveting No. 16 gage sheet steel to the underframe.

Seventeen Hale & Kilburn Walkover seats, 38½ in. long, and three non-reversible seats are installed in the main passenger compartment. Four seats of the same type, three non-reversible seats and one bulkhead seat furnish the seating space in the smoking compartment. All seats in the main passenger compartment are upholstered in green plush and those in the smoking compartment in rattan. Other specialties include Hedley anti-climbers, Tomlinson M.C.B. radial couplers, Advance air sanders with Ohio Brass air-sander valves, U. S. Trolley bases, Edwin S. Wood & Company's antifriction side and center bearings, Curtain Supply Company's Rexall metal rollers, Forsythe brass sash, Ohmer fare registers, Pyrene fire extinguishers, Electric Service Supply Company's illuminated signs, luminous arc headlights, Peter Smith hot-water heaters, Monarch weatherstripping on the doors, Stanwood three-tread steel car steps, West's deodorizer, pressed prism glass, B. F. Goodrich corrugated rubber mats, Safety Car Heating & Lighting Company's fixtures, Consolidated Car Heating Company's buzzer system, A. & W. Company's ticket holders, and Ackley hand brakes. In painting the car the Detroit Graphite Company's primer was used and the Chicago Varnish Company's method of applying exterior car finish was adopted.

The bodies are mounted on Brill M. C. B.-type trucks with Midvale rolled-steel wheels and Carnegie heat-treated axles of the Association standard. Westinghouse 557-A-5 tap-field motors insulated for 1200 volts and rated at 140 hp. with 600 volts, 198 amp. and 840 r.p.m. were also specified, the equipment including Westinghouse HLS unit-switch control. The General Electric Company furnished combined automatic and straight air-brake equipment, which is of the variable release type.

Sliding Vestibule Trapdoors

An item of exceptional interest in the equipment is the previously-mentioned extensible folding trapdoor over the vestibule steps. This permits the use of the cars on routes where stops are made both at crossroads and at stations with raised platforms having variable clearances. By extending the trapdoors when at a station with raised platforms, there is eliminated any possibility of accident to passengers because of gaps between the car and the station platform edge, such openings being inevitable if the station is located on a curve or if the car is operating over a foreign line having wider platform clearances than those for which it is designed. Thus an arrangement of extraordinary flexibility is provided which is, nevertheless, obtained in a very simple manner.

The trapdoors, which were furnished by the O. M. Edwards Company of Syracuse, are of a new design that operates normally in much the same manner as the standard Edwards vestibule trapdoor as it folds upward against the bulkhead when unlatched, the movement being made easy by a counterbalancing spring inside of the horizontal hinge tube on which the trapdoor pivots. The cover plate of the trapdoor, however, is supported at the bulkhead side upon two hinge bearings which slide upon the hinge tube. At the end-sill side it merely rests upon a narrow bracket upon which it can easily be moved.

The lifting latch, as shown in the illustration on page 389, is made in two mutually-engaging parts, one of which is attached to the cover plate and the other to the so-called stationary arm. The latter, of course, is attached to the hinge tube and swings upward when the trapdoor is folded up against the bulkhead but it does not slide horizontally and is not attached to the cover plate except through the interlocking of the two parts of the latch. In consequence, when the cover plate is slid outward the two parts of the latch are separated and disengaged, and the latch as a whole becomes inop-

CHICAGO & MILWAUKEE CAR—VIEW SHOWING EXTENSIBLE TRAPDOOR IN VARIOUS POSITIONS

erative, the stationary arm being held in place by that part of the latch which is attached to it. The trapdoor, therefore, cannot be unlatched when it is in extended position.

Power for extending the trapdoor is applied through a mast with a folding handle which is placed close to the bulkhead on either side of the vestibule. An arm on this mast below the vestibule floor level is linked to a sliding plate to which the trapdoor is attached by clips and rivet-shaped catches. These clips and catches engage, of course, when the trapdoor is horizontal and this permits the trapdoor to be moved, although it has no permanent connection with the mast arm. The vestibule door, when it is in any but wide-open position, naturally prevents the trapdoor from being raised and this automatically provides a safety feature for the operation. Another feature is the introduction of a vestibule door stop, which is a small button of rubber set in the trapdoor cover plate in such a position that when the trapdoor is wholly or partly extended it interferes with the movement of the vestibule door. The latter, therefore, cannot be fully opened or fully closed if the trapdoor is partly extended, so that it is impossible for the trainman to close the vestibule door inadvertently and let the train proceed with the trapdoor projecting beyond the side of the car.

Power Economy Expert Obtains Results

Several months ago the Elevated Railroads of Chicago detailed an employee of the electrical department to investigate and make recommendations for reducing energy consumption. This company now purchases all its power from the Commonwealth Edison Company and any saving in energy could be measured in dollars and cents in the annual power bill. Numerous economies have been effected in the operation of cars, special attention at first being directed to regulating closely the use of the lights and electric heaters. During the summer months, however, this expert has devoted his attention to schooling motormen in the art of coasting and handling their controllers, and a decrease in the energy consumed is easily traceable to his efforts. An inquiry from the trainmen regarding the actual results or savings obtained by reason of the increased coasting brought out the following table from the management:

KILOWATT-HOURS PER CAR-MILE

	June, 1915	June, 1914	Decrease in Per Cent
Metropolitan	3.127	3.186	2
Northwestern	2.522	2.625	4
South Side	2.621	2.757	5
Oak Park	3.083	3.013	*2
Loop	3.407	3.726	10
Total	2.823	2.930	3

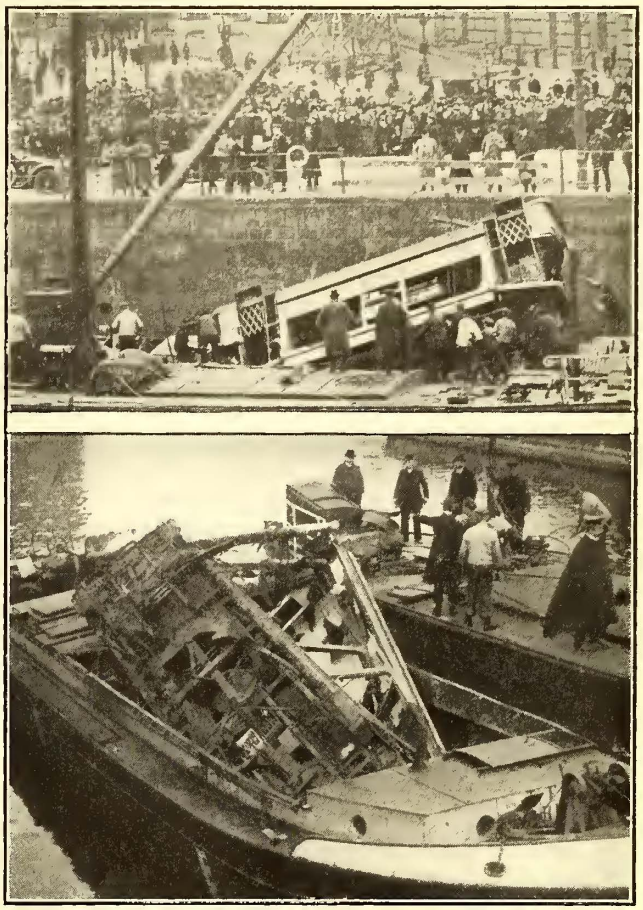
*Increase.

These cars averaged 25 tons each, the weights of the cars on the several divisions being as follows: Metropolitan, 24.55 tons; Northwestern, 25.95 tons; South Side, 25.95 tons; Oak Park, 22.80 tons; Loop, 25 tons. The tonnages given include average loads.

In explanation of the table it should be stated that the month of June was taken for the comparison because no electric heaters were in operation. This put the comparisons on the basis of the energy consumed by the motors and lights. The increase in energy consumed by the Oak Park line was because more motors were operated per train in June, 1915, than in June, 1914. The company is entirely satisfied with the results being obtained, and a steady improvement in the amount of energy consumed per car-mile is being noted from month to month. The larger amount of energy used by the Metropolitan-Oak Park lines over that consumed by the Northwestern-South Side lines is due to the relatively heavy local service with more stops on the first two roads.

Berlin Street Car Accident

Five people were killed and eight injured on April 22 when a street car of the Berlin (Germany) Stadtring line jumped the rails at a sharp curve near the Reichstag building and plunged over an embankment into the Spree River, 8 ft. deep at that place. Whereas the allowable speed limit in that particular locality was only 12½ m.p.h. the motorman approached the curve at the rate of 15 m.p.h. As the track was slippery from rain he failed to apply the brakes at the right moment and the car jumped the track. The motorman and conductor were able to jump from their platforms at the last moment, but unfortunately some of the passengers were imprisoned in the car and drowned.



BERLIN STREET CAR ACCIDENT—RECOVERY OF CAR FROM RIVER

A wrecking tug was chartered by the railway company to lift the car out of the river into a lighter. All parts joining truck to car body were disconnected and the truck was lifted separately. The upper figure shows the lifting of the car body into the lighter. At the moment in which the car was nearing the bottom of the lighter the cable slipped and the car body was badly crushed, as shown in the lower illustration.

Power house employees of the Louisville (Ky.) Railway appoint safety-first inspection committees each month, whose duty it is to visit each of the stations and substations during that period and inspect them for "accident opportunities" and for dangerous conditions which may be eliminated.

Seven Per Cent Wage Reduction Granted

British Columbia Electric Railway, Ltd., Receives Favorable Majority Report in Case Before Arbitration Board—Arbitrators' Comments on Company's Contentions Are Published

The arbitration board considering the dispute between the British Columbia Electric Railway, Ltd., Vancouver, B. C., and its employees on Aug. 25 presented a majority report favoring an all-around reduction of wages by about 7 per cent on the average. This was in answer to the company's contention before the board that the wage scale should be decreased 15 per cent. When the agreement between the union and the company expired on June 30 the company notified the men through the general manager that it desired to make a 10 per cent cut in wages throughout. This proposal was rejected by the union, and the company found it necessary to apply to the government for an arbitration board under the industrial disputes investigation act.

This act, which merits a few words of description because of its unusual character, provides that in the case of any dispute an application may be made by either employer or employees to the Minister of Labor for the appointment of a board of conciliation and investigation. This application must be accompanied by a statutory declaration, that failing of an adjustment by the board, to the best of the knowledge and belief of the declarant a strike or lockout will be declared. Under heavy penalties the employer is forbidden to declare or cause a lockout and any employee to go on strike prior to or during the reference of the dispute to the board. One of the members of the board must be recommended within a certain time by each party to the dispute or else be appointed by the Minister of Labor. The two members must agree on a third or he will be appointed by the minister. The decision rendered by the board is only a recommendation to the parties. Nothing in the act restrains lockouts or strikes in disputes which have been duly referred to the board and decided.

The arbitration board chosen in the present British Columbia Electric Railway case was composed of Justice McDonald, chairman, appointed by the Dominion Government; A. G. McCandless, representing the company, and J. H. McVety, representing the employees. Public hearings were opened on July 19 and continued from time to time until Aug. 13. At these hearings W. G. Murrin, general superintendent, and W. Saville, chief clerk, represented the company, and F. A. Hoover and W. Yates appeared for the employees.

Position of Both Sides

At the hearings the company sought a reduction of 15 per cent in the wage scale, basing its arguments on the following grounds: (1) The general business depression existing throughout the company's territory had led to an almost universal reduction of wages. (2) The financial position of the company, owing to decreased business, made it unable to continue the old wage rate. (3) If the rate of wage was determined by the cost of living, such cost had decreased since the last wage agreement was signed in 1913. (4) The wages paid by the company were, in general, higher than those paid by other street railways. (5) The wages paid had advanced 8 per cent since 1913 because of the sliding scale, this increase coming in the face of decreased business. The company also in a general way submitted that the rate of wage should depend upon the supply of and demand for labor. Representatives of the employees asserted that the wage scale which had prevailed could not be designated as a living wage, and that through the time of prosperity the wages should have been higher.

Supply and Demand

In discussing the question of the supply of and demand for labor, the board stated in its report that in general wages are dependent upon the universal law of supply and demand, but this has only a limited application to the employees of this company. It might be true that there is an over-supply of labor outside the employees' association that might be utilized for the operations of the company, but the company proposes to agree for its labor supply not with workmen generally, but with a particular union or association as representing the employees necessary for its purpose. Under these circumstances the question of supply and demand to a great extent loses its force in determining the rate of wages.

Business Depression

In the board's opinion, there is no doubt that a business depression has existed in the company's territory and may continue for some considerable time. The labor market has become congested and has resulted in reduction of wages generally. Wages in mercantile and industrial establishments have been reduced from 10 to 25 per cent. The City Council of Vancouver recently lowered the standard rate of wage 25 per cent, viz., from $3 to $2.25. In work on the new drill hall in Vancouver the previously stipulated carpenters' wages were reduced from $4.25 to $3.60; painters' from $4.50 to $3.60; plumbers' from $5 to $4.50; laborers from $3 to $2.40.

Present Cost of Living

As to the present cost of living, as compared with 1913, it appears from statements based on information in the *Labor Gazette*, that with respect to a typical family of five, the cost of living in Vancouver, including all foods, fuel, light and rent, per week, in the month of March, 1913, was $16.28¼, and that it fell to $13.22¼ in March, 1915. It also appears that this later cost was lower than in the cities of Calgary, Edmonton, Regina, Winnipeg and Toronto.

A further investigation to cover different months and different cities showed that for this typical family, during January, March and May, the cost per week in 1913 for Vancouver was $16.48¾ as compared with $13.46¾ in 1915; in Victoria it was $17.87¼ in 1913 as compared with $14.31¾ in 1915; while in New Westminster it was $16.89¾ in 1913 as compared with $14.56¼ in 1915, thus showing decreases in each of these cities. A statement was also made of the compounded averages, according to the number of the company's employees in the respective cities, and this showed a decrease in cost between these two periods of 18.92 per cent for Vancouver, 19.89 per cent for Victoria and 13.80 per cent for New Westminster, or making a compounded average decrease for all the cities of 18.17 per cent.

As a result of these investigations the board was satisfied that as between 1913, when the wage scale was last fixed, and the present time, the cost of living had on the whole slightly decreased in the community affected by the inquiry. This result was brought about

by the fact that while the cost of foodstuffs has risen to some extent, this was offset by a considerable reduction in rent and an appreciable decrease in the cost of fuel. The cost of cotton goods has fallen, and the present retail cost of woollen goods is less than it was two years ago, although the opinion of merchants is that in the near future the cost to the consumer of all woollen goods is bound to increase.

Comparative Wage Scales

The company contended that its employees were receiving a higher rate of wages than was paid by any other company carrying on a like business under similar conditions. It stated that, with reference to motormen and conductors, among more than 1000 street railways only a small number could be found paying a higher rate of wages, and that these exceptions could in most cases be accounted for by peculiar local conditions. This statement was found to be substantially proved. A statement filed showing the maximum rate paid in some of the cities gave the following information: Peterborough, 20 cents per hour; Hull, 23 cents; Hamilton, 25 cents; Montreal, 25 cents; Ottawa, 27 cents; Toronto, 27½ cents, as compared with the existing rate paid by the British Columbia Electric Railway of 35 cents in the cities and 36½ cents per hour on the interurban lines.

In the neighboring coast cities in the United States the length of service, in order to reach the maximum rate of pay, is greater in most cases than in British Columbia. The rates supplied were as follows: Tacoma, 21 cents per hour; Stockton, 27½ cents; Everett, 28 cents; Los Angeles, 30 cents; San Francisco, 33 cents; San Francisco (municipal), 37½ cents, and Oakland, 40 cents per hour. The board had no evidence showing the different agreements with their employees under which the railways in these cities were operatd, nor whether the employees had the benefit of privileges and concessions as liberal as those granted by the British Columbia Electric Railway. The nearest city to which it felt it might look for comparison was Seattle. There, however, the 32 cents maximum rate is only reached after six years' service. From the evidence the board was satisfied that on the whole there was no appreciable difference in the cost of living between the two cities. The climatic and general conditions of operation would be practically the same for the employees, but those working for the company in British Columbia have not only the benefit of an agreement guaranteeing permanent employment with reasonable working conditions, but also receive valuable concessions in the form of half rates for electric lighting, reduced charges for gas, free installation of meters, and free transportation for themselves at all times, and also for their families to a limited extent.

Wages Increased Since 1913

In regard to the company's assertion that the rate of wages paid its employees, especially motormen and conductors, had risen 8 per cent since 1913, the board states that this was due to the sliding scale by which length of service entitled an employee to a higher rate of wages. The board did not think that this increase should be considered as an argument for lower wages now. The point, however, might be worthy of consideration to this extent—the employees were presumably satisfied to work for the company in 1913 at the then existing rate of wages and cost of living, and it would not now be unjust under the changed conditions to have them revert to the rate of wages then being paid. In other words, if the rate of wages to motormen and conductors were decreased by 8 per cent, they would, in these times of depression, receive the same wages as in the period of prosperity.

Company's Financial Position

The company presented statements in detail showing its financial position and inability to pay the present rate of wages. An extract shows that while the net profit for May, 1914, was $162,674, it had fallen to $23,745 in May of 1915, and other amounts showed a corresponding decrease. The whole capital investment in all undertakings of the company, on June 30, 1914, amounted to $45,935,669, and the net profit for the year was $2,156,585, giving a net profit of 4.69 per cent on the capital invested, while with the same amount invested the net profit up to June 30, 1915, was $1,273,603, representing only 2.67 per cent profit.

The proportion of the gross earnings absorbed by wages of motormen and conductors increased from 1913 to 1915. For example, the earnings in the city of Vancouver in June, 1914, were $161,589 and the wages to motormen and conductors amounted to $48,402, being 29.95 per cent of the gross earnings, while in June, 1915, the gross earnings were $84,023 and the wages of motormen and conductors were $41,488, being 49.37 per cent of the gross earnings. The entire system for the same period did not show disproportion to the same extent, viz., in June, 1913, the gross earnings were $315,205, and the wages of motormen and conductors were $81,638, being 25.89 per cent, while in June, 1915, the gross earnings were $186,586 and the wages were $71,707, being 38.43 per cent of the gross earnings.

On the subject of the financial standing of the company the board concluded that it should not be a governing or controlling factor in its recommendation as to the rate of wages. Whatever course a company might see fit to pursue of its own accord, the board did not think it should recommend that the company carry on its operations by paying its employees less than a fair wage, based on proper conditions. The arbitrators believed it well, however, to outline the financial condition to show that the company is not in a position to deal liberally with its employees. The presentation of the financial position of the company was also deemed important as a strong argument in favor of using extreme care in making recommendations.

Working Conditions

With regard to the change in working conditions asked by the company, the majority report states that in view of the fact that the board which dealt with the dispute between the company and its employees two years ago, did not deem any change necessary; and also in view of the fact that the representatives of the men and the company had agreed upon a majority of the working conditions against which objections were raised, the board thought it advisable not to interfere with this phase of the dispute.

Recommendations

The majority of the board felt satisfied in recommending the adoption by the parties interested of an agreement containing reductions in the wage schedule. In the working conditions, the seniority clause was left intact. This protection, when coupled with efficiency, was believed to create permanency of employment, more especially to those who, by length of service, had secured to themselves an advantageous position under this privilege. In fixing the rates of wages the board did not attempt to capitalize in dollars and cents the concessions enjoyed by the company's employees, but did not overlook their consideration. In making the recommendations the board bore in mind the permanency of employ-

ment that will be guaranteed to the employees by the execution of an agreement covering a definite period. The board recommended that the agreement should expire on June 30, 1917, twenty-two months from Sept. 1, 1915.

Reduction in the case of conductors and motormen was of a little more than 8 per cent. The suggested agreement provides that rates of wages on city and suburban lines for motormen and conductors be, for the first year, 26 cents per hour, rising gradually to 32 cents per hour after four years' service. The rate under the old agreement was 27 cents for the first year, rising gradually to 35 cents per hour after four years' service. A clause in the agreement stating that motormen and conductors on work train service shall receive 1½ cents additional is the same as prevails under the old agreement. The rate of wage for motormen and conductors on the interurban lines, i.e., Central Park, Burnaby Lake and Saanich, it is suggested be reduced to the same extent as conductors and motormen on city lines, the maximum wage on the interurban lines being 33½ cents per hour. For brakemen, trolleymen and baggagemen the rate recommended is 25 cents per hour for the first six months, 26 cents per hour for the second six months, 26½ cents per hour for the second year, 27½ cents per hour for the third year, and 28½ cents per hour for the fourth year and after. The recommendations also cover reductions in the wages of shop and carhouse employees.

The Small Car versus the Large Car

BY D. C. HERSHBERGER, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

The advent of the jitney into the transportation field has caused serious investigation which already is bringing with it development and invention to meet the competition of this new system of selling transportation. It is somewhat doubtful if this form of competition will be long lived, so that it need not be taken very seriously. However, we are about to return to a small, but efficient car as a means of meeting this competition.

In returning to the small car we would appear to be retrogressing, but upon investigation it will be found that this is an illusion. The small car of to-day will have a greater weight efficiency as regards seating capacity than has been obtained heretofore. It will also be designed for more economical operation both as to crew expense and power cost.

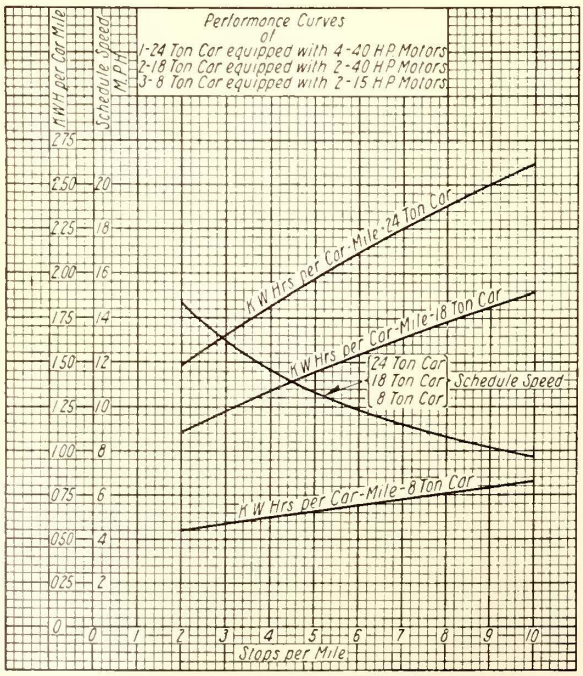
We naturally question the riding qualities of the small car as compared with that of the large car, but judging from the automobile it would seem reasonable that the riding qualities of the large car in city service could be approached very closely. In the small and medium-sized cities the small car will prove most adaptable in supplying frequency of service, thereby offering more opportunity to ride, especially in the short-haul service, which obviously is the most profitable.

There are some unfavorable features to be overcome in the operation of small cars, one of which is reduced schedule speed with the one-man type car, especially in rush-hour service, because more time is required to collect fares and issue transfers than with two men per car. This objectionable feature can be checkmated to a large extent by employing the skip-stop feature in the outlying districts where permissible and by equipping the cars with adaptable fare collecting apparatus. In the small number of places where it is absolutely necessary to maintain high schedule speeds, the cars could be operated during rush hours by a motorman and conductor. With a greater number of cars handling the same service the number of stops per mile will decrease slightly, which permits a higher schedule speed.

Assuming that the one-man car requires four seconds longer per stop than the two-man car, and that by reason of more cars and fewer passengers per car, the average number of stops per mile would be reduced from eight to seven, approximately the same schedule speed could be maintained. This statement will serve partially to give an idea of the effect of the number of stops and duration of stops on schedule speed.

The accompanying performance curve was made up to show graphically the relative power consumption in city service for (*a*) a 24-ton car equipped with four 40-hp. motors, (*b*) an 18-ton car with a double 40-hp. motor equipment, and (*c*) an 8-ton car with a double 15-hp. motor equipment operating at the same schedule speed. It will be noted that the 24-ton car is over-motored—a condition common to many cities and towns. It would be possible to make a slightly higher schedule speed with the four-motor equipment, which in turn would raise the power consumption considerably.

The accompanying table will give an indication of the relative operating costs of the three weights of cars covered by the above performance curve. The data employed for the basis of this comparison have been taken to represent the average condition throughout the country for medium and small-sized cities.



POWER-CONSUMPTION CURVES FOR CARS OF VARIOUS SIZES

Comparative Operating Data for Large and Small Cars

Weight of car, loaded—tons	24	18	8
Number of motors per car	4	2	2
Horsepower per motor at 500 volts	40	40	15
Stops per mile	8	8	8
Average duration of stop—seconds	10	10	10
Kilowatt-hours per car-mile	2.38	1.73	0.76
Kilowatt-hours per car per year at 30,000 car-miles per car	71,400	51,900	22,800
Cost of power per car per year at 1 cent per kilowatt-hour at the car	$714	$519	$228
Assumed seating capacity	45	35	25
Per cent increase in number of cars to carry a given traffic	0	28.7	80
Number of cars required to accommodate the traffic on an assumed property	100	129	180
Yearly power bill	$71,400	$66,900	$41,000
Yearly saving in power bill {	0	6.3 per cent	42.6 per cent
over four-motor car {	0	$4,500	$30,400
Crew-men per car	2	2	1
Average time of each car in service—assumed	12 hours	12 hours	12 hours
Cost of crew per day at 25 cents per man hour	$600	$774	$540
Cost of crew per year—365 days	$219,000	$282,000	$197,000
Yearly power bill and wages of crews on assumed property	$290,400	$349,300	$238,000
Yearly saving of 8-ton car {	.....	.....	18 per cent
over 24-ton car {	.....	.....	$52,000
Yearly saving of 8-ton car {	.....	.....	32 per cent
over 18-ton car {	.....	.....	$111,000

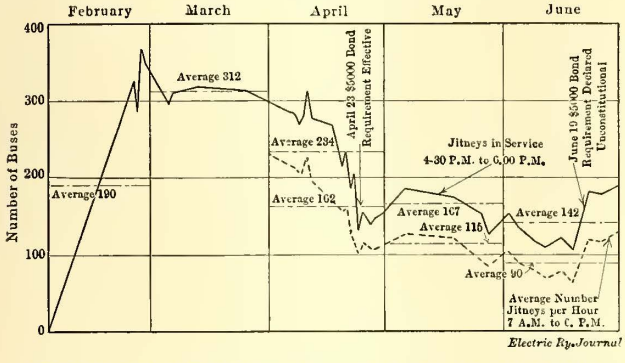
It will be observed that the yearly power bill decreases with the weight of the car, even taking into account the increased number of cars to handle the same amount of traffic. Any increase in traffic resulting from the more frequent service offered by the small car can be taken care of at a better load factor.

The crew expense is the greater item of expense as compared with the power bill. The above figures show that the 18-ton car is the most expensive to operate on account of larger yearly crew expense to handle the same traffic. This statement, however, does not apply to the latest type of two-motor cars with large seating capacity and in many cases larger motor equipments than considered here.

These figures show a saving in the yearly power bill of 42½ per cent in favor of the small car as compared with the four-motor car, and 18 per cent in crew expense and power bill combined. Furthermore, it shows a saving of 32 per cent in crew and power cost over the 18-ton two-motor two-man car.

Jitney Bus on the Wane in Memphis, Tenn.

The accompanying graph displays the record of the number of jitney buses in operation on the streets in Memphis, Tenn., since the beginning of the movement and until July. This record was inaugurated by T. H. Tutwiler, president Memphis Street Railway Company, and it shows that the general tendency of the jitney bus movement has been a steadily declining one after the first few weeks of its operation. The upper one



RECORD OF JITNEY BUS OPERATION IN MEMPHIS

of the two curves displays the number of jitneys in service during the afternoon rush hour only or from 4.30 p. m. to 6.30 p. m. The lower curve shows the average number of individual jitneys per hour from 7 a. m. to 6 p. m.

It will be noted that there is a sharp break in both curves in the latter part of April, at which time there was made effective a requirement for a $5,000 bond for jitney buses in accordance with a State law. Within two weeks, however, the number of jitneys in operation increased enough to recover a large part of the loss, but thereafter, during the months of May and June, the downward tendency again was manifest, so that during the latter month the daily average of all-day jitneys was only ninety. During the latter part of June the $5,000 bond requirement was declared unconstitutional, and the immediate result was that the number of jitneys increased to a point approximately equal to that established in the early part of May, but by no means equal to the record of the early part of April, before the statute went into effect. During the month of July, which is not included in the graph, the high point was 190 for the rush-hour jitneys and 133 for the all-day operators, both maximums being reached on July 2. Thereafter the number of cars again fell off steadily, reaching minimums of 160 and 105 respectively at the end of the month.

In Memphis the types of jitney buses have been about equally divided between Fords and other miscellaneous types of cars, seating five passengers. There have been also about twenty seven-passenger cars, and during the past two months, about ten buses with seating capacities between nine and fourteen.

Traffic Count in Manila

The Board of Public Utility Commissioners at Manila recently made a count of the passengers on the electric railway system there to determine whether the service given the rush hours was adequate. The count was taken during the six week-days of the week from May 21 to May 27. The accompanying tabulation of the data obtained was made by the Manila Electric Railroad & Light Company. These data, particularly the percentage figures in the last three colunms, are interesting as bearing out the company's contention, made at the commission hearing and in its brief, that it was not responsible for the so-called inadequacy of service or overcrowding of cars, as long as reasonably adequate service was furnished. The alleged overcrowding was caused by the manner in which the public used the service in crowding certain cars. There was no occasion to do so, provided the passengers would distribute themselves more equitably over a reasonable number of cars and not congest a few cars during the rush hours.

The situation in Manila is complicated somewhat because the company must furnish facilities for both first and second class passengers on each car. The franchise of the company provides that "at least 60 per cent of the accommodation furnished will be second class." The figures show that approximately 15 per cent of the total passengers carried are first class passengers and approximately 85 per cent are second class passengers. In practice, the company requires its conductors to reserve for first class passengers such portion of the car as experience has shown should be reasonably adequate, preserving at least 60 per cent of the capacity of the car for second class passengers. The first class section of the car is separated from the second class section by means of a movable barrier. Conductors are required to set this barrier in position before the car starts on its journey from its terminal, and are not permitted to shift it to increase the space allotted for first class passengers unless there are unoccupied seats in the second class section of the car. In practice, about 80 per cent of the capacity of the car is reserved for second class passengers and 20 per cent for first class.

TABLE SHOWING RESULT OF TRAFFIC COUNT IN MANILA THREE PRINCIPAL LINES DURING RUSH HOURS, MAY 21-27, 1915.

					Passengers			Seats			Percentage seats to passengers		
Line	Direction	From	To	Cars	1st class	2d class	Total	1st class	2d class	Total	1st class	2d class	Total
Pasay-San Juan ..	in	6 a.m.	8 a.m.	95	980	4,285	5,265	1,161	2,742	3,903	118	64	74
Pasay-San Juan ..	in	noon	2 p.m.	47	185	822	1,007	604	1,396	2,000	326	169	198
Pasay-San Juan ..	out	noon	2 p.m.	47	418	1,542	1,960	609	1,347	1,956	145	87	99
Pasay-San Juan ..	out	3.30 p.m.	7.30 p.m.	199	1,131	5,704	6,835	2,261	5,321	7,582	199	93	110
Pasig-Tondo	in	6 a.m.	8 a.m.	24	171	798	969	280	734	1,014	163	92	104
Pasig-Tondo	in	noon	2 p.m.	24	89	556	644	294	1,078	1,372	330	194	213
Pasig-Tondo	out	noon	2 p.m.	24	170	774	944	278	738	1,016	164	95	102
Pasig-Tondo	out	3.30 p.m.	7.30 p.m.	48	185	1,476	1,661	586	2,002	2,586	317	136	156
McKinley-Tondo ..	in	6 a.m.	8 a.m.	23	119	707	826	232	596	828	194	84	100
McKinley-Tondo ...	in	noon	2 p.m.	24	62	188	250	242	622	864	390	330	345
McKinley-Tondo ...	out	noon	2 p.m.	24	140	392	532	242	622	864	173	158	162
McKinley-Tondo ...	out	3.30 p.m.	7.30 p.m.	46	127	766	893	472	1,184	1,656	371	155	185

Way Department Report Forms

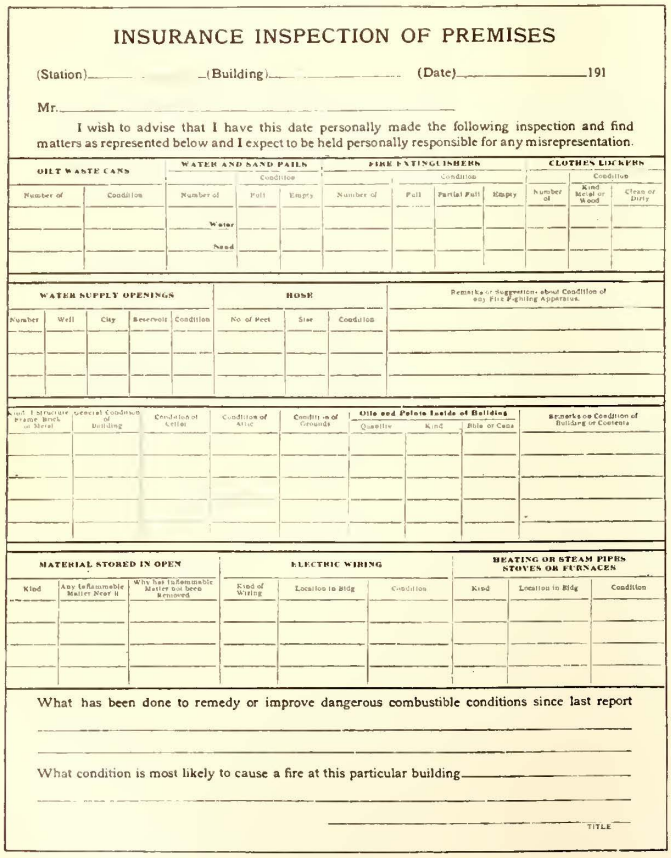
The Forms Were Designed for the Purposes of a Small Road with Particular Reference to Their Disciplinary and Record Value

The report forms which are used by the employees of the way department of the Chicago, Ottawa & Peoria Railway, Joliet, Ill., were designed with two objects in view. One was that they should include all the information desired from a record standpoint. The other was for their disciplinary value. It was found that when reports were required in the form of letters or brief memoranda, many of them did not contain all the information desired and, as the arrangement of the data in the letters varied, the information was difficult to check. Furthermore, there was a tendency on the part of the man who simply wrote a letter report to omit information which would seem to criticise a fellow workman. But with a printed report form the employees feel that they are in duty bound to answer the questions on the forms to the best of their ability, no matter where "the chips may fall." Another reason why the men prefer to submit their reports on forms is that the questions reduce the effort required to prepare a report by suggesting the subjects to be covered as well as by reducing the amount of information which must be recorded.

Probably the most striking example of the type of form employed to obtain both disciplinary value and financial return is that used in reporting the results of an insurance inspection of premises (Form 1). This report is compiled once each month by the substation repair foreman, whose duties include the inspection of all structures for insurance purposes. At this time the person in charge of the building is directed to eliminate fire hazards and not to take any extraordinary risks during the period between inspections. On his rounds the regular inspector examines all fire extinguishers, which, prior to the time of adopting this method, were occasionally found to be broken or stolen or cast into a hidden corner when empty. In a similar manner sand and water pails are inspected and the condition of fire hose and hydrants is determined. As a result of this monthly fire inspection the men in charge of buildings have begun to have pride in the condition of their premises, the fire-fighting equipment is kept in good condition, and fire risks are not taken. In connection with this report form the company has been enabled to reduce its insurance rate from $1.41 per thousand to 73 cents, by removing fire hazards and by providing certain fire protective apparatus.

Other forms designed to have disciplinary value as well as record interruptions to service are reports on accidents or damage to overhead lines and equipment, the line and signal maintainers' daily report and the dispatcher's line trouble record. The accident report (Form 2) is made out by the overhead line foreman and forwarded to the office of the engineer of maintenance of way, being a record of damage. Form 3, the dispatcher's report form, is designed to furnish a record of service interruptions, and at the same time it may be checked against reports of the line and signal department for discrepancies.

The work-train report (Form 5) also accomplishes the same end and in many instances has brought about



INSURANCE INSPECTION OF PREMISES

(Station)_____ (Building)_____ (Date)_____191

Mr._____

I wish to advise that I have this date personally made the following inspection and find matters as represented below and I expect to be held personally responsible for any misrepresentation.

OILY WASTE CANS		WATER AND SAND PAILS			FIRE EXTINGUISHERS				CLOTHES LOCKERS		
			Condition			Condition				Condition	
Number of	Condition	Number of	Full	Empty	Number of	Full	Partial Full	Empty	Number of	Kind Metal or Wood	Clean or Dirty
		Water									
		Sand									

WATER SUPPLY OPENINGS					HOSE			Remarks or Suggestions about Condition of any Fire Fighting Apparatus
Number	Well	City	Reservoir	Condition	No. of Feet	Size	Condition	

Kind—Structure, Frame, Brick or Metal	General Condition of Building	Condition of Cellar	Condition of Attic	Condition of Grounds	Oils and Paints Inside of Building			Remarks on Condition of Building or Contents
					Quantity	Kind	Bbls or Cans	

MATERIAL STORED IN OPEN			ELECTRIC WIRING			HEATING OR STEAM PIPES STOVES OR FURNACES		
Kind	Any Inflammable Matter Near It	Why has Inflammable Matter not been Removed	Kind of Wiring	Location in Bldg	Condition	Kind	Location in Bldg	Condition

What has been done to remedy or improve dangerous combustible conditions since last report

_____

_____

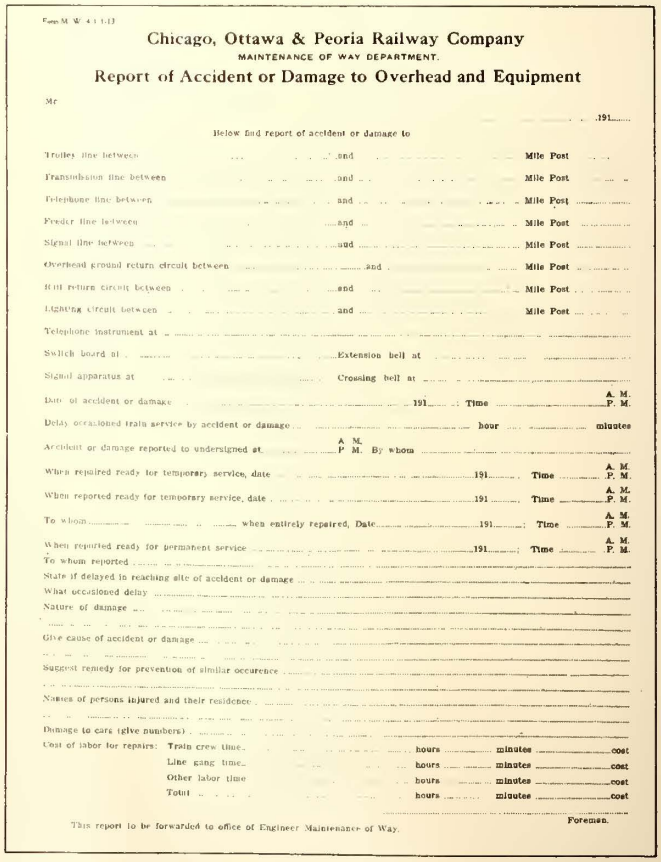
What condition is most likely to cause a fire at this particular building_____

_____

_____

TITLE

WAY REPORTS—FORM 1—INSURANCE INSPECTION OF PREMISES



Form M. W. 4-1-13

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

Report of Accident or Damage to Overhead and Equipment

Mr _____ 191_____

Below find report of accident or damage to

Trolley line between _____ and _____ Mile Post _____

Transmission line between _____ and _____ Mile Post _____

Telephone line between _____ and _____ Mile Post _____

Feeder line between _____ and _____ Mile Post _____

Signal line between _____ and _____ Mile Post _____

Overhead ground return circuit between _____ and _____ Mile Post _____

Rail return circuit between _____ and _____ Mile Post _____

Lighting circuit between _____ and _____ Mile Post _____

Telephone instrument at _____

Switch board at _____ Extension bell at _____

Signal apparatus at _____ Crossing bell at _____

Date of accident or damage _____ 191_____ Time _____ A. M. P. M.

Delay occasioned train service by accident or damage _____ hour _____ minutes

Accident or damage reported to undersigned at _____ A. M. P. M. By whom _____

When repaired ready for temporary service, date _____ 191_____ Time _____ A. M. P. M.

When reported ready for temporary service, date _____ 191_____ Time _____ A. M. P. M.

To whom _____ when entirely repaired, Date _____ 191_____ Time _____ A. M. P. M.

When reported ready for permanent service _____ 191_____; Time _____ A. M. P. M.

To whom reported _____

State if delayed in reaching site of accident or damage _____

What occasioned delay _____

Nature of damage _____

Give cause of accident or damage _____

Suggest remedy for prevention of similar occurence _____

Names of persons injured and their residence _____

Damage to cars (give numbers) _____

Cost of labor for repairs: Train crew time _____ hours _____ minutes _____ cost

Line gang time _____ hours _____ minutes _____ cost

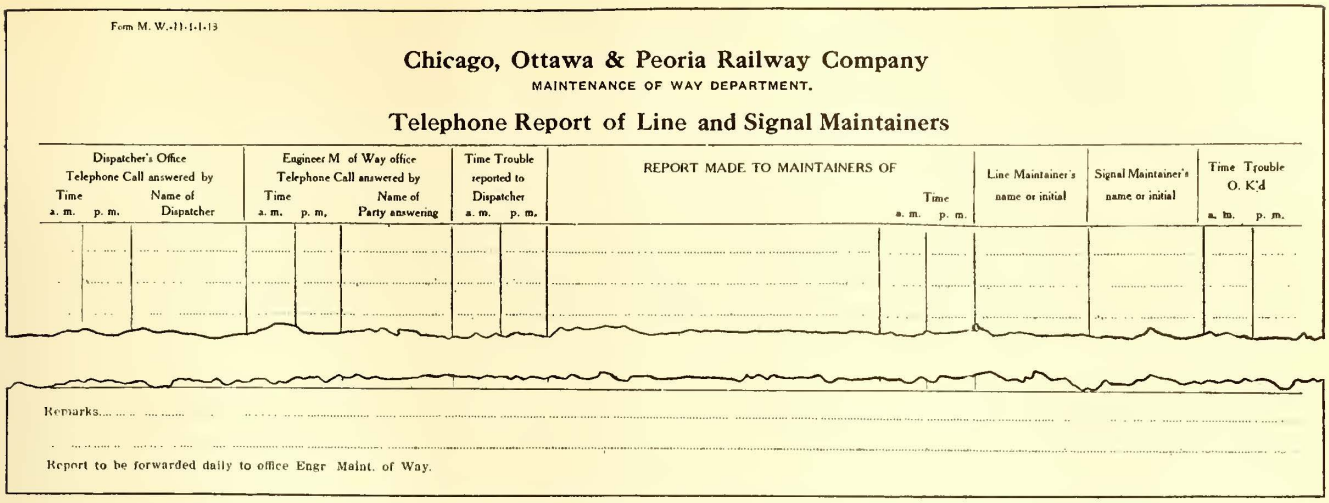
Other labor time _____ hours _____ minutes _____ cost

Total _____ hours _____ minutes _____ cost

This report to be forwarded to office of Engineer Maintenance of Way.

Foreman.

WAY REPORTS—FORM 2—ACCIDENT TO OVERHEAD OR EQUIPMENT



Form M. W.-11-1-1-13

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT.

Telephone Report of Line and Signal Maintainers

Dispatcher's Office Telephone Call answered by Time a. m.	p. m.	Name of Dispatcher	Engineer M of Way office Telephone Call answered by Time a. m.	p. m.	Name of Party answering	Time Trouble reported to Dispatcher a. m.	p. m.	REPORT MADE TO MAINTAINERS OF Time a. m.	p. m.	Line Maintainer's name or initial	Signal Maintainer's name or initial	Time Trouble O. K'd a. m.	p. m.

Remarks.....

Report to be forwarded daily to office Engr Maint. of Way.

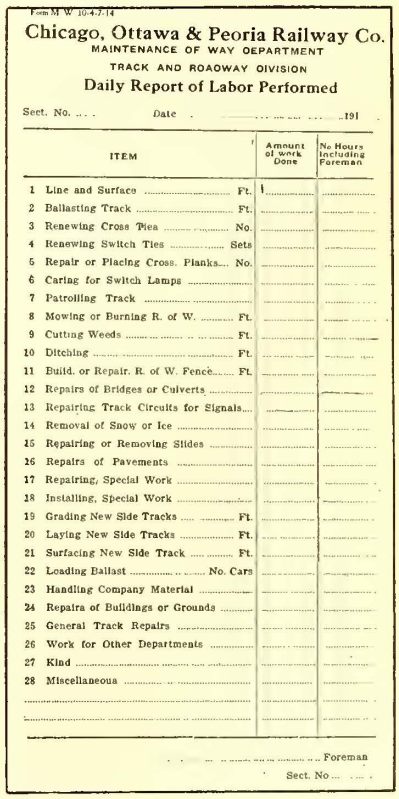
WAY REPORTS—FORM 3—DISPATCHER'S REPORT AND MAINTAINERS' TELEPHONE REPORT

real financial saving to the company. As a rule the operation of the work-train on an electric road is regarded by the transportation department as a favor to the way department, and as it is considered that the train has no rights of any kind, it therefore should be subject to any number and length of delays. With this company it was found that if the work-train received certain limited rights and had the benefit of extra time because of delayed trains or other reasons, the way department could accomplish more work for considerably less money and at the same time reduce the cost of work-train service to the department.

Perhaps the section foreman's daily report (Form 4) presents the most effective method of reducing the clerical work of the foreman, at the same time giving a legible record to the maintenance of way department. This report is printed on manila cardboard and on one side are the name of the railway company, the letters R. R. B. and blanks for the address. The reproduction of the report form shows that the writing which the section foreman must do includes the insertion of the date and his name. All of the entries regarding the amount of work done and the hours required to do the work may be made in figures. This reduces the work to routine and minimizes the time required to make a report.

Two other report forms which are not in general use but have proved of value are outlines of the labor performed and materials used by the overhead and the bridge and building departments. While it is general practice to require a report from the bridge and building department foreman, this company has gone one step further in setting down in printed form an outline of all the kinds of labor performed and materials used by this department (Form 6). This form also reduces the work of the foreman largely to recording figures rather than writing and thereby provides a much neater report to be filed away for record purposes. The same might be said of the overhead line daily report (Form 7), which is not in general use on electric roads. Both of these forms also have a disciplinary value in that they obtain a record of work performed, against which a check may be made at any time and the foreman disciplined for inaccuracies.

Similarly the daily report form for signal and crossing-bell operation (Form 8) was designed to minimize the clerical work and at the same time to be so comprehensive in character as to cover all the work which might be done by an employee of that department. Since this company has only 16 miles of block-signaled territory, with crossing bells scattered over the entire 106 miles of line, only one maintainer is necessary. In order to handle his work to best advantage he moves over the road on a predetermined schedule unless he is called away on special emergency trouble. To provide for the two classes of work, the upper portion of his report form is for emergency work and the lower for routine. This report form is also used by the transportation department, as well as by the signal maintainer, one being checked against the other; hence, it has a disciplinary value in the way of obtaining correct reports like the other forms used by this company.



Form M. W. 10-4-7-14

Chicago, Ottawa & Peoria Railway Co.

MAINTENANCE OF WAY DEPARTMENT

TRACK AND ROADWAY DIVISION

Daily Report of Labor Performed

Sect. No. .... Date 191

	ITEM		Amount of Work Done	No. Hours Including Foreman
1	Line and Surface	Ft.		
2	Ballasting Track	Ft.		
3	Renewing Cross Ties	No.		
4	Renewing Switch Ties	Sets		
5	Repair or Placing Cross. Planks	No.		
6	Caring for Switch Lamps			
7	Patrolling Track			
8	Mowing or Burning R. of W.	Ft.		
9	Cutting Weeds	Ft.		
10	Ditching	Ft.		
11	Build. or Repair. R. of W. Fence	Ft.		
12	Repairs of Bridges or Culverts			
13	Repairing Track Circuits for Signals			
14	Removal of Snow or Ice			
15	Repairing or Removing Slides			
16	Repairs of Pavements			
17	Repairing, Special Work			
18	Installing, Special Work			
19	Grading New Side Tracks	Ft.		
20	Laying New Side Tracks	Ft.		
21	Surfacing New Side Track	Ft.		
22	Loading Ballast	No. Cars		
23	Handling Company Material			
24	Repairs of Buildings or Grounds			
25	General Track Repairs			
26	Work for Other Departments			
27	Kind			
28	Miscellaneous			

Foreman

Sect. No....

WAY REPORTS—FORM 4—SECTION FOREMAN'S REPORT

In order to obtain a cost record of the material used and the labor performed in construction work or of money expended and charged to capital account, the bridge and building department is required to make a structural report. A copy of one of these reports is reproduced in Form 9. From this it will be seen that a complete record of every item of lumber used, as well as of all labor and haulage, is recorded. This being merely the actual cost of work done, to which engineering, superintendence as well as overhead may be added, makes it possible to obtain an accurate charge against any account.

STOREROOM RECORDS

This being a comparatively small property a large storeroom was unnecessary; hence a simple yet accurate method of compiling and filing storeroom records was

Form M. W. 2-1-7-15-2m. F. D.

Chicago, Ottawa & Peoria Railway Company
MAINTENANCE OF WAY DEPARTMENT.
WORK TRAIN REPORT

.....191....

Mr. .....

Please find below report of work train service on section No. .....

(or) between ..... and .....

Motorman ..... Conductor .....

Brakeman ..... Car or Engine number. .....

Time called..... A. M. P. M. Time leaving shops. ..... A. M. P. M. Reported for duty..... A. M. P. M.

At (state location) .....

Kind of work and amount of work done .....

.....hour .....minutes delayed at ..... siding, account of train number .....

(or) account of .....

.....hour .....minutes delayed at ..... siding, account of train number.....

(or) account of .....

.....hour .....minutes delayed at ..... siding, account of train number.....

(or) account of .....

Other delays .....

Total time delayed ..... hours ..... minutes.

Total cost of maintenance men account of all delays.....

Total cost of train crew account of all delays .....

Train released or quit work. A. M. P. M. Train arrived at shops A. M. P. M.

If car is regularly employed as work car or work motor, as line car, fill out following:

Car defects .....

Reported, Date..... Time ..... A. M. P. M. Repaired, Date ..... Time ..... A. M. P. M.

Foreman.

It is the train crew's duty to answer any questions asked by foreman necessary to fill in information asked for on this form. Whenever a work train is not working or in on a siding, it is a delay and must be noted hereon as a delay.
This report to be made out each time a work train is used and forwarded to office of Engineer of Maintenance of Way.

WAY REPORTS—FORM 5—WORK-TRAIN REPORT

Form M. W.-8-1-1-13

Chicago, Ottawa & Peoria Railway Company
MAINTENANCE OF WAY DEPARTMENT.
BRIDGE AND BUILDING DIVISION

Daily Report ..... '19

Mr .....

The following labor has been performed and materials used:

WATERWAYS

Piles driven No. ..... Length..... Sills framed No. ..... dimensions .....

Sills placed in Structure No ..... dimensions..... Concrete sills placed No..... dimensions .....

Posts framed No..... dim. ..... Posts put in bridge No. ..... dim. .....

Stringers framed No..... dim. ..... Stringers put in bridge No..... dim. .....

Ties framed No..... dim ..... Ties put in bridge No..... dim. .....

Guard rails framed No. ..... dim ..... Guard rails put on bridge No..... dim. .....

Longitudinal girts put on bridge No..... dim. ..... Braces put on bridge No. .....

Steel guard rails put on bridge No. ..... Total length ..... Excavation No. Cu. Yds .....

Forms built for concrete, pieces of lumber used, No ..... dim. ..... ; No. ..... dim. ..... ; No. ..... dim. .....

No. of barrels of cement used No. ..... Cubic yards of aggregate used No. ..... Kind .....

No. of pounds of reinforcement used ..... dim ..... ; No. lbs. ..... dim ..... ; No. lbs. ..... dim .....

Feet of pipe used ..... size..... kind ..... Feet of tile used ..... Size.....

BUILDINGS

Doors hung No. ..... Doors repaired No. ..... Windows placed No. ..... Windows repaired No. .....

Floors repaired or built No. sq. feet ..... Locks placed No. ..... Repired No. .....

Roof repaired or built No. sq. feet ..... Roofing paper applied No. sq. feet .....

Partitions built or repaired No. sq. feet ..... Wall sheeting repaired or built No. sq. feet. .....

Platform repaired or built No. sq. feet ..... Platform posts set No. ..... dim. .....

Water conductors repaired or placed, Length ..... Size ..... Kind .....

Above labor performed for waterway No. ..... or structure at .....

Kind of waterway ..... Kind of structure .....

Miscellaneous labor performed at .....

Miscellaneous material used .....

Suggestions for forwarding progress of work .....

Total hours of labor including Foreman's time..... Cost .....

Foreman B. & B.

This report to be forwarded to office Engr. Maint. of Way

WAY REPORTS—FORM 6—BRIDGE AND BUILDING REPORT

Form M W.-5-1-1-13

Chicago, Ottawa & Peoria Railway Company
MAINTENANCE OF WAY DEPARTMENT.
Daily Report of Overhead Line Division

.....191....

Mr .....

The following labor has been performed and materials used:

Poles framed, No. ..... ; Length..... Kind..... Pole holes dug No. .....

Poles set, No. ..... Length..... Kind ..... ; Poles anchored and guyed, No ..... Anchors used, No. ..... ; Kind.....

Cross arms applied, No. ..... ; Kind..... Insulators applied, No ..... Kind .....

Mast arms applied, No. ..... ; Length..... ; Style ..... Span wires placed, No. ..... Size .....

Catenary hangers and ears applied, Length ..... ; No..... ; Length ..... ; No. ..... Length ..... ; No. .....

Trolley wire strung, No. of feet..... Size..... Kind ..... Trolley ears used, No. ..... Kind..... Hangers Used, No. .....

Trolley wire break at ..... Account of ..... ; Time repaired ..... M.

Transmission wire strung, No. of feet ..... ; Tied in, No of feet ..... Size .....

Transmission insulators changed, No ..... Wooden pin, No. ..... Steel pin, No ..... Miles transmission wire inspected .....

Transposition brackets applied, No. ..... Side brackets attached, No. ..... Chubbuck brackets attached, No. .....

Feeder wire strung, No. of feet..... ; Tied in, No. of feet ..... Size .....

Feeder taps applied complete, No. ..... Partially applied, No. ..... ; Length..... ; Kind .....

Lightning arresters installed, No. ..... ; Ground rods installed, No. ..... ; Length..... ; Size .....

Telephone instruments put up, No. ..... Telephone instruments repaired, No. ..... ; Strand wire used, ft. ..... ; Size .....

Lighting circuits installed at..... Repaired at ..... ; Lamps used, No. ..... ; C. P. .....

Track bonds applied, (brazed), No. ..... ; Size ..... ; (compressed), No. ..... Size. ..... Wood strains, No ..... ; Size. .....

Miscellaneous work .....

Miscellaneous material used .....

Suggestions for forwarding progress of work .....

Total hours of labor, including foreman's time, ... ; Cost .....

Above labor performed and material used on .....

at (or) between ..... and .....

Foreman.

This report to be forwarded to office of Engineer Maintenance of Way.

WAY REPORTS—FORM 7—OVERHEAD LINE DIVISION REPORT

Form M W.-8-1-1-13

Chicago, Ottawa & Peoria Railway Company
MAINTENANCE OF WAY DEPARTMENT.

Daily report of signal operation for ..... 191.....

Location, No. or Name of Signal or Crossing Bell	Cause of Failure	Time out of order	Time Spent on Repairs	When Failure Reported Time	By Whom
1				..... M.	
2				..... M.	
3				..... M.	
4				..... M.	
5				..... M.	
6				..... M.	
7				..... M.	
8				..... M.	
9				..... M.	
10				..... M.	

No. of signal failures during the day ..... No. signal movements ..... No. crossing bell failures .....

No. of trains stopped by signal failures ..... Total amount of time delayed .....

Suggest remedy for prevention of similar occurance of failure shown on line No. .....

TIME EMPLOYED IN	TIME:
Inspecting track circuit between ..... and	..... and ..... ; .....
Inspecting line circuit between ..... and	..... and ..... ; .....
Inspecting impedance bond at ..... at	at ..... at ..... ; .....
Inspecting and caring for relay at ..... at	at ..... at ..... ; .....
Inspecting and caring for mechanism at ..... at	at ..... at ..... ; .....
Renewing lamps at ..... at	at ..... at ..... ; .....
Inspecting trolley trips and contactors at ..... at	at ..... at ..... ; .....
Repairing line or track circuit at ..... at	at ..... at ..... ; .....
General condition of signal system between ..... and	.....
Repair work in shop	.....

Remarks: (State conditions found by inspections) .....

Signal Maintainer.

This report to be forwarded to office of Engineer Maintenance of Way.

WAY REPORTS—FORM 8—SIGNAL AND BELL REPORT

Form M. W. 13-2-1-12.

Chicago, Ottawa & Peoria Railway Company

MAINTENANCE OF WAY DEPARTMENT

Bridge and Building Division

STRUCTURE REPORT

The following material was used House for Gasoline storage, Ottawa Shops

Work authorized Feb 10, 1913 Commenced Feb 11, 1913 Finished Feb 15, 1913

KIND OF MATERIAL	Quantity	Price	Amount
1"x10"x12' O.P. Sel.	17	204 ft. @ $32.00 per M	6.53
1"x12"x12' O.P. Cutters	11	132 ft. " "	1.68
2"x4"x7' W.P. Rough 2nd hand	20	94 ft. B.M. @ 20.00 per M	1.88
2"x8"x12' O.P. S2S 2nd hand	1	16 " " " 24.00 " "	.38
3"x6"x7' W.P. Rough 2nd hand	3	31.5 " " " 20.00 " "	.64
4"x4"x5' W.P. " " " "	1	7 " " " 20.00 " "	.14
1" O.P. Sheeting 2nd hand		77 " " " 20.00 " "	1.54
3 Ply Comp. Roofing		77 sq. ft. 2.00 per sq.	1.54
Four light sash	1	1 25¢	.25
2 lbs. 6d nails		2 lbs. 2.00 Cwt	.04
4 lbs. 8d "		4 " 2.10 "	.08
2 " 6d "		2 " 2.20 "	.05
1 pr. 6" Strap hinges		10¢	.10
Door Latch stapled			.05
Gate latch	1		.05
Yellow priming paint	1 gal.		.40
Paint buff with green trim	1 gal.		1.60

Kind of Labor	Hours		
Carpenter	31	27½¢ per hr.	8.52

Other Charges

Drayage on lumber		75¢	.75

The above statement is correct. H. R. Lynn Foreman, B. & B.

This report to be forwarded to office Engr. Maint. of Way.

WAY REPORTS—FORM 9—STRUCTURAL REPORT

important to minimize the force required to accomplish the work. A single storekeeper performs all the duties required in this department, but to permit him to keep up his records, the storeroom is open only during certain hours. Except in emergencies, the various departments must anticipate their needs and secure material when the storeroom is open. To simplify the work the company has adopted the bin-tag method of keeping a temporary count of the stock on hand, with very satisfactory results. These tags (Form 10) are printed on a heavy manila cardboard, 4 in. x 7½ in. in size, one card being hung on a hook provided on the front of each bin. Each tag gives a history of the contents of the bin to which it is attached and also a record which may be transferred to the stock ledger from time to time as the storekeeper is able to devote time to its transfer. From time to time material is purchased for special jobs and held in the storeroom. To designate which bins contain this special material red bin tags are used in the place of the manila ones. When a requisition is made for material contained in one of the bins marked with a red tag, it must state specifically that the material is to be used on the job number for which it was ordered. This insures correct distribution of the charges as well as a sufficient quantity on hand for a particular job when it is needed.

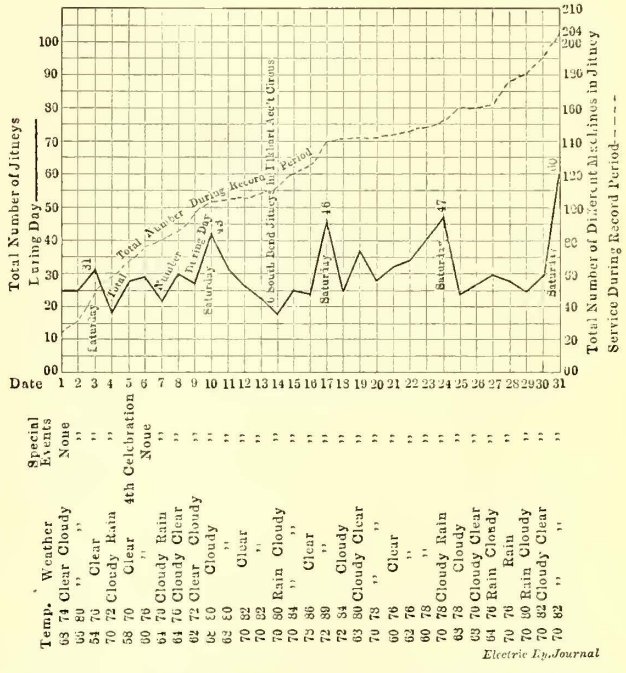
Form 106. 1M. 1-14. F.T.

Order No.	Date
Job No.	
Received from	
Article	
Quantity	
Price	
Forwarded Previous Card	
Total	
Taken Out	Balance
Date	

WAY REPORTS—FORM 10—BIN TAG

South Bend Collects Jitney Data

During the month of July the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., collected sufficient jitney traffic data to make a graphical study of their operation. The result of this graphical analysis is shown in the accompanying diagram. It shows the total number of jitneys operated during the various days of the period and the total number of different machines in the jitney service during the month. In addition a careful record was kept of the temperatures and the weather conditions. It was found that in South Bend the peak of the jitney service always occurred on Saturday, and that the peak increased from thirty-one jitney buses on the first Saturday of the month to 120 on the last Saturday of the month. It is also interesting to note that as a rule the low points in the jitney bus service are on the rainy days. It will also be noted that during the month of July the total number of different machines operated increased from twelve to 204. Many of these, however, were only operated one day, and others ran only on Saturdays.



GRAPHICAL STUDY OF SOUTH BEND JITNEYS DURING JULY

It will also be seen that the total number of automobiles operated has increased much faster than the rise in the peak of jitney service offered. In other words, many drivers were disappointed with their earnings and after operating a few days decided that they were in an unprofitable business.

The railway company intends to continue the collection of jitney data and will make a more complete analysis showing the number of jitneys in service during the various periods of the day. The management expects to find that the maximum number of jitneys will be operated at about 6 o'clock in the evening and the minimum number in the early morning hours.

The *Tramway & Railway World* states that the Germans in their search for various metals have taken away the overhead tramway wires and telegraph wires in a number of the Belgian and French towns and districts which they have devastated.

COMMUNICATIONS

Operating Costs and Shifts in Service

American Electric Railway Association
Bureau of Fare Research

New York, N. Y., Aug. 27, 1915.

To the Editors:

Some question may be raised as to the validity of comparing costs of operation with an index number determined by adding together twenty-four differences in percentages, as was done in my article on "Operating Costs and Shifts in Service" appearing in the issue of the Electric Railway Journal for Aug. 21. It may therefore be of interest to indicate here somewhat more fully than was done in that article the steps which preceded that comparison, and their significance.

In making a study of the effect of changes in distribution of service throughout the day, a number of cases were assumed, and it was found that the unit cost

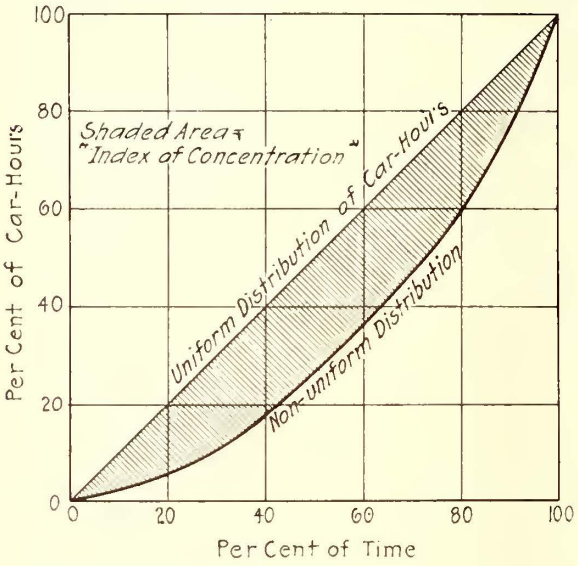


DIAGRAM OF TIME DISTRIBUTION OF CAR-HOURS

of operation, that is to say, the total cost per day divided by the number of car-hours per day, showed a considerable variation. An effort was made to relate these costs to the various load diagrams.

A load diagram, is, in itself, a rather difficult thing to express in units of any sort, but as the differences between the diagrams assumed lay in the extent of the concentration of the service within certain periods, resort was had to a well-known statistical method of measuring concentration. This consists in representing graphically such data as were given in the table on page 307 of the issue for Aug. 21, as in the accompanying illustration. Here per cent of total car-hours is plotted against per cent of total time for uniform and non-uniform service. The principle is the same as that employed in statistical studies of the concentration of wealth, in the "Lorenz graph," which is readily adapted to the purpose of indicating and measuring concentration of service.

In the diagram the straight diagonal line represents uniformity of distribution, or no concentration. The curved line drawn between the same points as the diagonal line shows the actual distribution of service as determined from an assumed load diagram. The area between these two lines is a measure of the departure from uniformity of the variable, in this case per cent of car-hours, and may be termed the index of concentration. It graphically represents the sum of the per cent differences in car-hours as given in the table, and enables one to visualize this difference.

The conclusions from this analysis are simply that the cost per car-hour is not fixed for any property but tends to increase with increased concentration of service. The concentration index is not a pure functional unit of cost, but it serves the purpose of affording a concrete conception of a complicated array of facts.

F. W. Doolittle, Director.

Girder and High T-Rail Renewals

The Toledo & Western Railroad Company

Sylvania, Ohio, Aug. 14, 1915.

To the Editors:

I note on page 179 of your July 31 issue certain statements regarding the rate of rail wear in paved streets. There are some points with which I agree, but for the sake of discussion I shall give you my views concerning the subject of this article.

While I have had no great amount of rail corrugation, yet I believe that in some cities it should be taken into serious consideration when determining the life of various classes of rail. Corrugation is generally taken care of by grinding down the rail head and this naturally shortens the life of a rail. Therefore the life limits for a certain weight of rail under the same traffic will not be the same in different cities. Engineers in deciding rail life must necessarily bear the idea of corrugation in mind, as I understand that in some cities it amounts to considerable.

I imagine it was the intention of the article mentioned to suggest the establishment of rail wear limits so that, for the sake of valuation purposes, all railroads could work toward the same end and with the same general ideas in mind. I disagree with you that an arbitrary limit would probably never be reached in service, but that the mere fixing of a wear limit would place the economics of rail renewals on a definite basis. I believe engineers should not fix a limit that would not be reached in service, but that this question should be thoroughly threshed out to get the limit as near the actual life as possible. There is no doubt that the question of a proper foundation is a very great item in the life of rail so that I believe there must necessarily be established life limits for both open and paved track work.

I have never thoroughly understood why street railways use the tram rail and girder-groove rail, except, of course, where franchise requirements make it necessary. I believe that if the engineering associations of the country bear on this matter strongly enough such requirements can be overcome. With the restrictions that city governments are constantly placing upon street railways, careful consideration should justifiably be given by the city officers to the life of rail.

As shown in your article both by statements and by the sketches, it is very apparent that as great life cannot be obtained from a tram rail as from a T-rail section. It is my opinion that when wheels begin to ride the tram of a rail, this rail has practically reached its limit. When cars ride on the wheel flanges, naturally there is more danger of derailments, which in a great many cities is a question that comes into play when rail renewals are considered.

A street railway is hardly in the same position as a steam road because it can very seldom take rail for relaying on a street of lighter traffic. Public policy frequently demands that this should not be done. I was once connected with a steam railroad where curves constituted a greater per cent of the track than tangents. The traffic was very heavy and rail wear was correspondingly heavy. I note that the Boston Elevated shows a

40 per cent wear on a 70-lb. section used on a curve. On this particular steam railroad we permitted even greater wear than that, so that the allowable limits of the Boston Elevated are not as great as those permitted on a heavy trunk line. I suppose that the Boston Elevated adopted this limit because, being on elevated structure, it could not safely afford to allow a greater head reduction. By the same token the allowable wear of rail in subways may be something different from that on surface tracks or on an elevated structure. It therefore appears there should be four classes of rail wear considered, namely, open track, paved track, elevated track and subway track.

As stated in the article, grooved rail should have sufficient depth to permit maximum headwear before wheel flanges ride the floor. Where a great many interurban cars operate over city tracks and the wheels have deeper flanges than wheels on city cars, it is my opinion that the standard grooved rail will not permit the maximum rail wear to be obtained. The cross-section of girder-groove rail is such as to prove unstable usually before a reasonable life has been obtained from the rail. By this I mean that one hardly obtains the value from the track structure before the grooved rail is worn out. I will admit that tram and girder-groove rail may possibly give a better general condition of paving, but this has been largely overcome by the use of granite nose blocks on the gage side of T-rails.

In my opinion, due consideration has not been given in the past to the character of foundation supporting the track superstructure. If a foundation fails because it has not sufficient strength to carry the superstructure, just that soon does the rail become the part of the structure that takes the brunt of the rolling weight. It is my belief that with a good foundation, T-rail will last at least thirty years. With pavement properly laid around the track superstructure the paving can well be renewed two, three or even four times before any attention need be given to the general surface of the rail. Therefore, I believe that all rail should be laid ⅜ in. above the top of paving. If the average life of paving is about seven to ten years, it can hardly be possible that rail will be worn down ⅜ in. in that length of time. As the article states where there is much car traffic, the team traffic is usually correspondingly great, consequently the paving wears down faster.

As an argument with some engineers regarding the different types of construction, it is my opinion, always has been and always will be, that the track must have a certain resiliency to give a maximum wear. The article states that indications are that rail wear is less in ballasted open track construction than in paved streets and a conclusion is drawn that the resilient construction shows less wear than rigid construction. It hardly seems unreasonable that this conclusion was reached. Even though the rate of rail wear was not so great, when the time comes to renew, even when the street grade is not changed, it is necessary to destroy the subfoundation to get to the ties incased in it. This seems an unnecessary waste of money, particularly when a foundation sufficiently strong may be provided in which track structure rests upon a cushion of ballast. This type of foundation makes destruction unnecessary and provides resiliency. The foundation may be used again for the track structure.

The article states "mere sentiment should not govern the final decision" when the paving is to be renewed and it is economical to leave the rail in place. In a great many cases "mere sentiment" is a big factor in preventing adverse criticism from those who reside on the street. Adverse criticism is one thing that neither engineers nor anyone else can readily overcome.

A. SWARTZ, Vice-President.

UNITED RAILWAYS COMPANY OF ST. LOUIS

ST. LOUIS, MO., Aug. 26, 1915.

To the Editors:

Referring to the article entitled "Girder and High T-Rail Renewals" in the July 31 issue of the ELECTRIC RAILWAY JOURNAL, I believe that there are comparatively few cases where the head wear on the longer sections of track is the determining factor in connection with rail renewals.

When the rails become so badly worn that the wheel flanges have cut from 1/16 in. to ⅛ in. into the flangeway, the rails generally become loose on account of the improper position of the load upon the head. The resulting vibration under the wheels makes it very difficult to maintain a satisfactory paving along the rails. When the rails are worn to such an extent they are usually corrugated, surface bent or cupped at the joints, or the paving or foundation is in bad condition, so that it is advisable to renew the rail some time before the head-wear limit has been reached.

If it was possible for street railway companies to wear out the rails regardless of the noise or the condition of the pavement along the rails and without damage to the track foundation, by simply keeping the track in safe condition for the operation of cars at a speed of approximately 10 m.p.h., the question would be very much simplified. But with the present public demand for smooth pavements for automobiles and with the ordinary objections to unnecessary noise, it is not often economical to maintain joints, foundation and pavement until the rail head has been entirely worn out. There will, of course, be some pieces of rail in a long section of track where the head wear will exceed 50 per cent, and it will be necessary to renew these rails because the wear limit has been reached. For such work worn rails that are taken from other tracks laid with the same section can be used. Practically all worn rails can be relaid in this manner, or in carhouse tracks, temporary tracks or yards.

While there has been some improvement in joint life due to the use of the newer types of rails and greater care in placing joints, the old adage, "The life of the joint is the life of the rail" will probably continue to hold. Our experience with excessive rail corrosion has been that it is always found in poorly drained, level grade streets.

C. L. HAWKINS,
Engineer Maintenance of Way.

Starting Resistance of Electric Cars

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

EAST PITTSBURGH, PA., Aug. 28, 1915.

To the Editors:

Referring to recent articles and editorials in the ELECTRIC RAILWAY JOURNAL on the above subject, further consideration may be of some value.

Train resistance depends upon so many variables that it is always more or less an uncertain quantity so far as calculations are concerned. Fortunately, however, in determining energy consumption and motor heating, a number of existing formulas and curves give satisfactory results. In most cases of electric operation, the amount of work done by an equipment in overcoming train resistance is a very small part of the entire duty on the equipment, and the excessive resistance found at the instant of starting lasts for such a short time that the effect on energy consumption and heating is exceedingly small.

In calculating performance from motor curves and train resistance curves it is customary to assume that, from the instant of starting until full voltage is applied to the motors, the train resistance is constant at the value which obtains at the speed corresponding to full

voltage and accelerating current. This practice makes some compensation for neglecting the high initial starting resistance and, by the results of tests compared with calculations, has been proved satisfactory in determining equipment performance and making equipment selections.

The energy consumed by a car depends to a very great extent upon the way in which the motorman handles the car. By improper acceleration and braking, the motorman can easily waste several times as much energy as is required for the sole purpose of overcoming train resistance. Devices used to induce energy saving, such as coasting clocks, depend upon this fact for their effectiveness which is secured by promoting correct acceleration and braking.

While the preceding paragraphs indicate that the starting resistance of cars is relatively unimportant in its effect on heating and energy consumption, yet it must be considered in the application and adjustment of the apparatus composing an equipment. On passenger cars with hand-controlled acceleration, in case a start is not made on the first notch, it is, of course, possible to get under way by going to the second or a higher notch on the controller. With automatic equipments, the conditions of voltage variation, track profile and alignment must be considered in determining the setting of the limit switch in order to secure starting under all normal conditions. For emergencies it is sometimes found advisable to provide a limit cut-out which permits progression of the control until a start is secured.

Locomotives, even of the passenger class, employ acceleration rates which are low in comparison with those of single cars or multiple-unit trains. Consequently, high starting resistance is a more serious proposition on locomotives. Practically all electric locomotives are equipped for hand-controlled acceleration and it is essential that their controllers be provided with a sufficient number of steps to permit smaller variations in the torque developed by the motors during acceleration than is usually found on cars. This serves to insure a smooth start even with a stiff train where the starting resistance is abnormal.

The starting of high-speed passenger locomotives does not in general require the full adhesion of the drivers. Therefore, the maximum starting torque for a given weight of passenger train becomes purely a matter of track characteristics, rate of acceleration and train resistance, and the electrical equipment may be adequate without being powerful enough to slip the drivers. On the other hand freight locomotives, in normal starting, are frequently required to work very close to the slipping point of the wheels. Hence, excessive starting resistance appears more important and apparently should be cared for, not only in the capacity of the equipment, but also by providing sufficient weight on drivers. However, to offset this, it is often feasible, in starting an extra heavy or stiff freight train, to get under way by first bunching the slack; then the application of power serves to start the cars successively rather than simultaneously. On this account, it is rarely necessary to consider the high starting resistance in determining the necessary weight on the drivers of a freight locomotive.

The conclusion from the above considerations is that, while the resistance of cars is undoubtedly high in starting and must be kept in mind particularly when considering automatic equipments, yet the instances where it is a determining factor in equipment selection, locomotive weight determination or energy consumption are relatively few.

F. E. Wynne,
Engineer Railway Section General Engineering Division.

The Ultra-Light-Weight Car

Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa., Aug. 19, 1915.

To the Editors:

The communication appearing in the Electric Railway Journal for Aug. 7, page 234, on the subject of ultra-light-weight cars is timely and attracts attention to a very important question. All railway men, as a rule, appreciate the great value of caution signals in any form, and I am quite sure that others entertain the same views as the writer of the article referred to.

When the wave toward lighter cars swept over the country several years ago, great reductions in the weight of cars were introduced, and unquestionably durability was sacrificed in some instances although these instances were the exception, not the rule. A timely caution should, therefore, preclude such errors in the design of the ultra-light cars.

Of course, it is always more desirable, from the manufacturer's standpoint, to make haste slowly in the matter of new and untried designs and materials. Nevertheless, while these ultra-light cars, together with the electric equipment, materially reduce selling value and volume of work compared with larger and heavier cars, the manufacturers have shown their readiness, even in dull business times, to co-operate with the railways in developing an electric car that could be operated far more economically than the heavier types and thus would enable the railways at least to attempt a solution for the jitney problem.

Under these circumstances, the writer is of the opinion, owing to the great amount of experience in car and equipment design gathered during the past several years together with the close co-operation that exists between manufacturers and the high-grade, well-seasoned engineering talent now employed by many railway companies, that none of the established car builders or equipment manufacturers will be very apt to put out designs that are not consistently durable.

M. B. Lambert, Assistant Manager
Railway and Lighting Department.

Track on Concrete Stringers

Railway Trackwork Company
Philadelphia, Pa., Aug. 27, 1915.

To the Editors:

I noted with considerable interest the article on page 324 of the Aug. 21 issue of the Electric Railway Journal describing standard paved track construction of the Southern Public Utilities Company as used in Anderson, S. C., also your editorial comments on same. In this editorial you state that the "old style" beam type of track foundation has been abandoned by most street railway companies but that improvements therein may effect its revival. According to Mr. Horton's description, the fundamental requirement to success is recognized. It is an absolute requirement in this type of construction that the rail be held down rigidly upon the concrete beam, and this is the keynote of the whole proposition. If the rail is bolted down to an absolute bearing on the concrete, with provision made for taking up for concrete shrinkage during setting, the beam type of construction is successful, and it is this holding down and taking up for shrinkage that marks the difference between success and failure.

This point was recognized and taken into account more than twelve years ago in the construction of the track system in the city of Philadelphia. Its unqualified success in this city is shown by the following facts.

Subsequently the whole of the downtown business

section of Philadelphia has been constructed according to this plan. On Fourth Street and Germantown Avenue nearly 7000 ft. of track was laid in August, 1903, and has been in continuous service since. No repairs whatever have been made on these streets to date. I mention this line in particular, because it was the earliest line so built. The only repairs made on any of this type of construction in Philadelphia have been due to two causes: first, at the outset, anchoring bolts of too small diameter were used and heavier bolts were substituted; second, a short stretch of track was laid on fresh filling over subway excavations and settlement thereby affected the whole street foundation. The fault developed by the light holding-down bolts proves conclusively our contention as to the need for holding down the rail against the cold-rolling action of the wheels and unequal expansion of the rails and preventing the resultant pulverizing and disintegration of the concrete stringer.

I think I may pardonably point to the Philadelphia system as an example of successful concrete beam track construction, and I may further say that its success has been contingent on the observance of the principle that the rail must be held down rigidly against the concrete base, provision also being made for taking up the shrinkage of the concrete in setting.

It is sometimes stated that the cost of this type of track is excessive, but my experience has shown it to be no more costly than the plan of using wooden ties embedded in concrete, and its great advantage (with respect to cost) over the ties embedded in concrete is that the foundation becomes, in this case, a permanent investment and its cost may be in part written off against capital account; because it has been abundantly demonstrated experimentally that new rails may be laid on the old foundation without substantial disturbance to the latter when the adjustable holding-down bolts are employed.

H. B. NICHOLS.

Outjitneying the Jitney

BOSTON, MASS., Aug. 30, 1915.

To the Editors:

The writer has been much interested in the various comments on the jitney which have appeared in your columns, pro and con, chiefly the latter. There seems to be no doubt at all that the swarm of jitneys with irresponsible drivers which has swooped down upon some of our cities with rather disastrous results is going to be considerably thinned out in the future. Nevertheless, it is not altogether clear that, to dignify the thing by its right name, the motor bus, with low fare, is not in the long run going to be a useful addition to means of public transportation. Every street railway man appreciates, when he can forget the sore spots produced by wildcat competition, that there are many places to which, for lack of suitably paying traffic, he would not extend his tracks if he could, and that there are many others to which he cannot gain access on account of the objections of the abuttors. Now the jitney, if it succeeds at all, succeeds in virtue of a short haul and if not legislated out of existence is likely to do some very useful feeding for electric railway lines, perhaps in this way, if properly regulated, helping more than it hurts by direct stealing of passengers. Again, there is much territory rich in passengers for two or three months per year and at other times hopeless. In such places a motor-bus line may succeed where an electric railway, by reason of its overhead charges, would inevitably fail. Opposition to such traffic is going to be futile to say nothing of being foolish.

Left to itself with even a moderate amount of sane regulation the jitney will very soon find its level, abandon much of its direct competition and settle down into doing what may prove to be an extremely useful auxiliary service. And if such is to be the case the electric railways themselves, as custodians of general transportation interests, should go into the jitney game, as they already have successfully in some instances. If the scheme can be made to pay reliably at all it is in working territory which is not directly or at all served by tramways and, in particular, taking advantage of the shifting of traffic from place to place with the seasons or local requirements.

The writer happens to be consulting engineer for a small electric railway, and he has thoroughly made up his mind that if the jitney danger threatens he is going to apply David Harum's golden rule, "Do unto the other fellow as he would do unto you, and do it fust." A watering place not far beyond the end of the line, for example, looks good as a jitney proposition, while it certainly would not pay for all the year round electric service, and the dear city fathers are usually not inclined to permit discontinuing electric cars once they are settled into use. It may be that the bus line will have to be put through by the co-operation of a wicked partner, but it certainly will get busy before the Philistines have a chance to make merry with it.

ENGINEER.

Wants Tramway Catalogs

COMPAÑIA ELECTRICA DE CONCEPCION
CASILLA 99F,
CONCEPCION, CHILE, July 28, 1915.

To the Editors:

Will you please make a note in your (or perhaps I ought to say our) valuable paper that we shall be in the market for supplies for our tramway concern shortly? I shall be pleased to receive catalogs and lists from manufacturers in the States.

HARRY S. THOMAS, Engineer.

Graphite and Asbestos

Two products of increasing importance, particularly in power plants, are graphite and asbestos. The former is useful in preventing the formation of boiler scale and the latter in pipe coverings, packings, etc.

According to Edson S. Bastin of the United States Geological Survey, the production of natural graphite in 1914 in the United States amounted to 4336 short tons, valued at $324,118. Of this quantity, 1725 tons were amorphous, valued at $38,750, and 2611 tons were crystalline, valued at $285,368. The greater part of the crystalline graphite—all the "flake" variety—was produced in New York, Pennsylvania and Alabama. A small quantity of crystalline graphite was produced in Montana.

The entire output of natural graphite in 1914 showed an increase in value as compared with that of 1913 but a slight decrease in quantity. The lessened production was due to the fact that the output of low-grade amorphous graphite did not reach the figures for 1913. The production of manufactured graphite in 1914 by the International Acheson Graphite Company, of Niagara Falls, was 10,455,139 lb. or 5228 short tons. valued at $698,800. This is an average price of $6.68 per ton.

In 1914 the United States produced 1247 tons of asbestos, valued at $16,810, according to the annual report on the production of asbestos just issued by the United States Geological Survey. Copies of the report are now available for distribution.

ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 to 8, 1915

American Association News

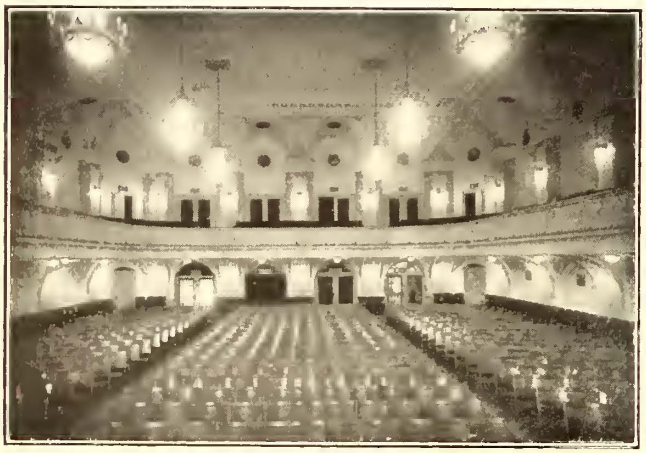
ANNUAL CONVENTION SAN FRANCISCO OCTOBER 4 TO 8, 1915

Changes in the Convention Program Are Announced—Director McConnaughy Gives Further Details Concerning Special Trains—Annual Meeting of Manufacturers' Association—Manila Company Section

CHANGES IN THE PROGRAM FOR THE CONVENTION

The official program of the San Francisco Convention of the American Electric Railway Association and its affiliated associations has now been completed. It will show a few changes from the tentative program published in the last issue of this paper. The principal changes are as follows:

In the Accountants' session on Monday, following the report of the committee on education, there will be an award of a prize of $50 in gold to the author of the best paper submitted on the eighth lecture in the accountants' course. Following the report on passenger, freight and express accounting, there will be an address on "Electric Railway Accounting, a Review," by P. V. Burington, secretary Columbus Railway, Power & Light Company, Columbus, Ohio. The title of the paper to be presented by Prof. H. R. Hatfield of the University of California is, "Some Neglected Problems in Electric Railway Accounting." This paper will be presented on Wednesday afternoon. The paper by Prof. Carl C. Plehn, University of California, is on "Taxation of Electric Railways," and will be presented Tuesday afternoon instead of Wednesday afternoon. Two other papers have been added to the program. One of these is on "Value of Statistics to Executives and Accounting Departments," and will be presented on Tuesday afternoon by George C. Willcutt, secretary United Railroads of San Francisco. The other paper is on "The Importance of Accrued and Accruing Accounts from the Standpoint of the Certified Public Accountant," and will be presented by John F. Forbes, C.P.A., representing Haskins & Sells in San Francisco.



MAIN ASSEMBLY HALL, NATIVE SONS OF THE GOLDEN WEST BUILDING, SAN FRANCISCO

In the convention of the Claims Association the paper scheduled to be presented by S. B. Hare on Monday afternoon will have the title "Prevention of Motor-Vehicle Accidents." On Thursday four written discussions are scheduled to follow the presentation of the paper on "Safety and Its Relation to Conservation," by B. F. Boynton. These written discussions are as follows:

"Financial Benefits Resulting from the Safety-First Movement," by J. S. Harrison, claim agent Jacksonville (Fla.) Traction Company.

"Justification of the Safety-First Movement from a Humanitarian Standpoint," by Alves Dixon, claim agent El Paso (Tex.) Railway.

"Uses and Benefits of Illustrated Lectures," by H. K. Bennett, claim agent Fitchburg & Leominster Street Railway, Fitchburg, Mass.

"Should a Moving Picture Film Exchange Be Established by the American Electric Railway Association?" by F. J. Warnock, chief claim agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

In the program of the American Association the title of the address to be presented by ex-United States Senator Jonathan Bourne, Jr., has been changed to read "Evils of Government Ownership."

TRANSPORTATION AND REGISTRATION

H. G. McConnaughy, director of transportation, announces that the "Red Special" will be oversubscribed and that the prospects are excellent for a full train out of Chicago for the "White Special." As the special train equipment is limited it is most important that the members who contemplate taking any of the tours notify the director of transportation at once regarding their wishes in the matter. From advance registration and requests for hotel accommodations a large attendance for the convention is assured.

Owing to the many details in connection with reservations on the "Red Special," such as baggage arrangements, printing the train directory, etc., members who have not notified the committee of their intention of joining the party should do so at once. Members who have made reservations on the special trains will receive tags for their baggage as well as all information covering the details in connection with special train movements.

The registration of members and guests will be the same as last year, and all badges must be paid for. Member companies of the Manufacturers' Association must have paid their dues before their representatives can secure badges. Representatives of member companies of the Manufacturers' Association who are individual members must have paid their dues to the American Association and must have received from Secretary Burritt numbered cards as receipts. These are white cards printed in brown ink, with brown corners. Individual members must be representatives of company members of the Manufacturers' Association before they can secure badges. Representatives of manufacturers who have not attended previous conventions will be required to pay $5 each for badges at the convention registration office.

The Railway and Manufacturers' Associations have contracts with the Palace, Fairmount and St. Francis Hotels for rooms. Members who contemplate attending the convention should make their reservations through the two associations to protect these contracts. All reservations will be made through Thomas Finigan, vice-president Pierson, Roeding & Company, 118 New Montgomery Street, San Francisco.

Following is a partial list of members who are booked

for the "Red Special," tour de luxe, New York Central Railroad, leaving New York on Sept. 23, en route to the San Francisco convention:

C. Loomis Allen
Mrs. Allen
W. K. Archbold
Mrs. Archbold
Thomas Addison
Mrs. Addison
Edwin H. Baker
Mrs. Baker
H. W. Blake
Mrs. Blake
Howard D. Briggs
C. W. Bender
George A. Barnes
Mrs. Barnes
M. C. Brush
C. P. Billings
Mrs. Billings
E. B. Burritt
John Benham
W. H. Collins
Mrs. Collins
W. J. Clark
Mrs. Clark
Thomas Cooper
H. L. Cooper
L. P. Crecelius
Mrs. Crecelius
Joseph Crawford
Mrs. Crawford
T. S. Dayton
Fred C. J. Dell
Miss Ida M. E. Dell
Warren Dyer
Horton Edmunds
Mrs. Edmunds
George C. Ewing
Mrs. Ewing
F. A. Elmquist
Mrs. Elmquist
Harrison R. Fehr
Mrs. Fehr
A. H. Ford
E. S. Goodrich
Mrs. J. R. Goodrich
Mrs. G. H. Gilman
Frank H. Gale
Miss Lucille Hurd
Howard A. Hartzell
Mrs. Hartzell
William F. Ham
Mrs. Ham
John M. High
Charles L. Henry
E. S. S. Keith
Mrs. Keith
James P. Kineon
Eugene V. Kaplan
Mrs. William B. Lane
John Lindall
Mrs. Lindall
J. C. Meixell
Mrs. Meixell
J. G. McMichael
H. G. McConnaughy
Mrs. McConnaughy
C. S. Mitchell
H. L. Monroe
Mrs. Monroe
C. J. Munton
Mrs. Munton
R. E. Moore
E. H. Martindale
Harry Neal
Mrs. Neal
E. D. Priest
Mrs. Priest
Charles C. Peirce
C. R. Phenicie
Mrs. Phenicie
J. I. Quigley
Mrs. Quigley
Frank Petura
John J. Reynolds
Capt. W. B. Rockwell
Mrs. Rockwell
R. C. Smith
Mrs. Smith
C. W. Stocks
S. B. Severson
J. N. Shanahan
Mrs. Shanahan
Daniel W. Smith
Mrs. Smith
Master Smith
Miss Smith
Elmer Smith
R. M. Sparks
Russell A. Sears
S. E. Sprague
Mrs. Sprague
C. S. Sergeant
Charles H. Thomas
Mrs. Thomas
A. J. Thornley
Mrs. Thornley
Howard Thornley
Miss Alice Thornley
S. W. Trawick
G. S. Vail
W. O. Wood
Mrs. Wood
Martin White
Charles J. Zell

ANNUAL MEETING OF MANUFACTURERS' ASSOCIATION

Secretary H. G. McConnaughy has announced that the annual meeting of the association will occur at the convention headquarters, in Yosemite Hall, Native Sons of the Golden West Building, at noon on Wednesday, Oct. 6.

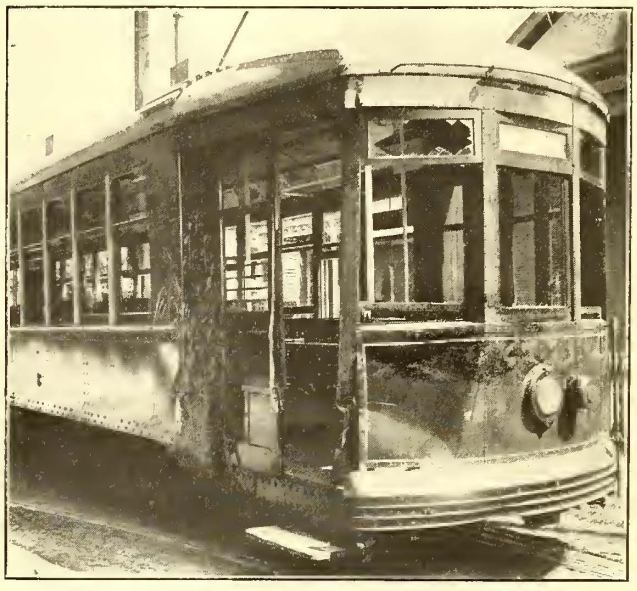
MANILA COMPANY SECTION

The seventh meeting of the Manila joint company section was held on July 6. The paper of the evening was by J. N. Weaver, superintendent of power installations, on "Electric Motors versus All Comers." He described the different kinds of motor drive which are in use and discussed the advantages of electric drive with central station service under local conditions. The paper was discussed by the following: R. Lopez, superintendent of electrical distribution; W. B. Calfee, night carhouse foreman; W. A. Smith, purchasing agent; I. C. Hartigan, city electrician; B. H. Blaisdell, chief engineer of power plant; J. C. Rockwell, manager electric department; E. I. Jeffery, assistant chief engineer of power plant; L. S. Cairns, assistant general manager; C. E. Haywood, superintendent of track; L. L. Vincent, superintendent of electric testing, and C. N. Duffy, vice-president. In addition to the topic of the paper the discussion covered other live topics. Considerable interest centered in the effect of the induction motor on power house operation and the relation of the cost of coal to that of generating energy. Steam railroad electrification was also taken up, and Mr. Duffy pointed out that the controlling factor is the financial one. Were it not for the fact that steam railroads are not in a position to borrow the large sums of money that would be necessary in order to electrify the roads, and also because the railroads do not feel that they can afford to discard the present steam equipment notwithstanding the result in economies and advantages of electricity over steam, it would be only a question of a few years until the electric locomotive would supplant the steam locomotive just as the electric car has replaced the horse car. Referring to the cost of coal, Mr. Duffy said that the largest item of expense the company had was its payroll and next to that was the coal bill, aggregating 400,000 pesos (Spanish dollars) per annum exclusive of the emergency coal tax of 1 peso per ton. Without the emergency tax the coal cost 80 per cent of the bare production cost of energy, and with this tax the cost was 88 per cent.

Steel Cars in City Service

One of the many arguments put forward in favor of all-steel city cars is that the damage to vestibules due to collisions with heavy trucks is much less with steel construction than with wood. The accompanying illustration demonstrates this theory in a rather striking manner, as the car in question withstood an impact at about 7 m.p.h. with a loaded motor truck weighing more than 16,000 lb. and with most of the weight concentrated in the plane of the heavy truck frame. The blow was sufficiently severe to knock the front car-truck off the rails.

The car in question, which was built by the Southern Car Company, has vestibule posts that are made of pressed steel throughout, the two center posts being made in one section of No. 16 gage steel and the corner vestibule posts in two sections of No. 12 gage steel riveted together. These posts are anchored to an angle-



ALL-STEEL CITY CAR AFTER COLLISION WITH MOTOR TRUCK

iron sprung to the proper radius and fastened to the 7-in., channel-shaped anti-climber which serves in place of the usual crown pieces. The vestibule sheathing is made of No. 16 gage steel bolted to the outside of the vestibule posts, and there is also a lining plate on the inside of the vestibule which provides pockets into which the sash may lower.

It will be seen from the illustration that the only real damage was caused by the tearing loose of one vestibule corner post from its anchorage to the anti-climber and that the platform knees and car-body corner post were only superficially injured. The platform knee is made of a flat plate of No. 10 gage steel reinforced by 2½-in. x 2½-in. and 3½-in. x 2½-in. angles. The car-body corner post is included in a pressed steel header of the deep "U" shape sheathed with No. 16 gage steel.

Aside from the necessity for straightening and re-riveting the vestibule post the only repairs were those made necessary by the tearing of the wooden exit door and the breaking of a couple of panes of glass, and the patching of one tear in the side sheathing at the bulkhead, and another further back due to a heavy blow from the hub of the auto truck as it was skidded around after hitting the car. The anti-climber was also bent slightly

at one point. However, as the frame of the car was not injured in any way, the wiring and control were not affected and the car was brought to the carhouse on its own wheels. Not a single passenger was injured, although several men on the front platform were thrown from their feet by the violence and suddenness of the impact, and only one of the women in the car fainted.

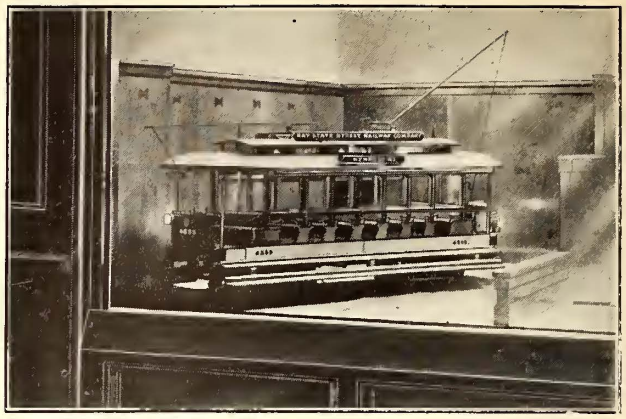
Bay State Passenger Department Moves

New Office Opened in Boston—Animated Sign a Novel Publicity Feature—Model of Bay State Open Car in Window

On April 1, 1915, the passenger department of the Bay State Street Railway moved its headquarters from 309 Washington Street to 15 Milk Street, Boston, Mass., the new offices being on the street floor and on the exact site of the house in which Benjamin Franklin was born on Jan. 17, 1706. The former offices of the department were located on the second floor of a building with inadequate elevator service, and while visited by many tourists yearly, were not on the same plane of accessibility as most of the other railway ticket offices in the district. Since their removal to the new site, within 150 ft. of the old headquarters, the offices have been visited by from two to four times as many persons each week.

The company shares the new offices with a dealer in hardwood floors, the department having about half the display window space and an area immediately behind which is about 16 ft. wide by 45 ft. deep. The office proper includes a counter for the sale of tickets, with time-table rack and grill with two doors, file safe and desks. The staff consists of Ralph M. Sparks, general passenger agent, a chief clerk, two assistant clerks, a stenographer and an office boy, five outside solicitors of passenger traffic also reporting to the head of the department. Henry E. Reynolds, assistant general manager of the company, has general executive charge of the solicitation of traffic. One cash and ticket drawer is assigned to each clerk and each drawer is provided with an independent lock and key for the use of the clerk responsible for its contents. The drawers are removed at night from the counter to the safe.

A novel electric sign has recently been placed in service at the door, which is only a few steps from Washington Street, the busiest thoroughfare in New England. The sign is about 8 ft. long, 6 ft. wide and 2 ft. deep

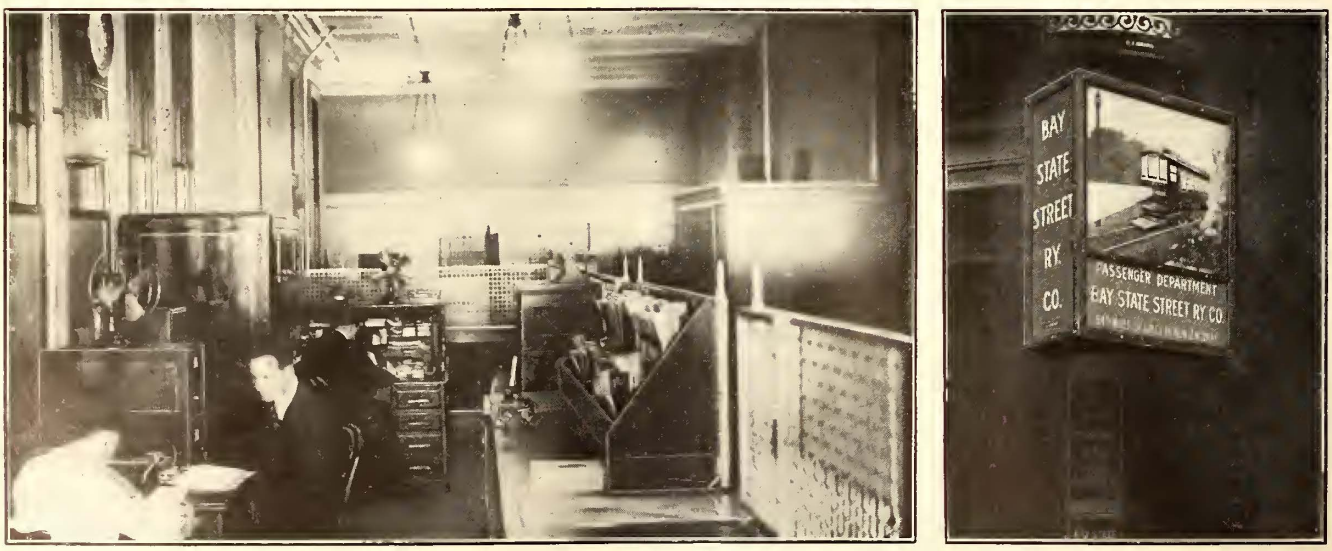


MODEL CAR SHOWN IN WINDOW

and is equipped with a motor-driven flasher wired to lamps behind a transparency simulating a moving car and operating automatic block signal system. In operation the signal in the panel shows a white light and flashes the word "Proceed" on the sky. The wheels then appear to revolve on a fast-passing track, the words "Safety First" appearing in the headlight beam. After a moment the signal displays a red light, and the word "Stop" appears. The wheels cease to turn, the track darkens and the headlight is cut off. The repetition of the clear signal begins the cycle anew. The sign was designed by Mr. Sparks and Howard W. Irwin, inspecting engineer of the company.

In the window is displayed a model Bay State open car 65 in. long, 23 in. high, 14½ in. wide and weighing 186 lb. The car is equipped with miniature head, tail and inside lights and full hand brake system and is wired for single-motor operation. It was recently borrowed for front window display and filled with dolls by a prominent Boston department store, and in this way the company received considerable extra publicity. A model of one of the first horse cars used on the system is now being completed for exhibition in contrast with the open type.

By co-operation with the Boston Historical Society, the company photographed a drawing of Franklin's birthplace and gave away more than 900 lithographs within three weeks after it was finished. Framed views of the house are being posted in fifteen of the principal waiting rooms, and a model 3 ft. high, in wood, has been placed in the office window. The department has good storage facilities for office supplies on an upper floor.



INTERIOR OF BAY STATE PASSENGER DEPARTMENT OFFICE IN BOSTON, AND NOVEL FLASHING TRANSPARENCY

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.)

Card Records of Los Angeles Track Work

BY G. E. CAMPBELL, CHIEF DRAFTSMAN LOS ANGELES (CAL.) RAILWAY CORPORATION

Realizing that engineering records are of value only when available for immediate use, and that availability is entirely a matter of proper indexing, the Los Angeles Railway in 1908 began to use the card index system in its drafting department.

Prior to 1908 all records of drawings were kept on loose sheets on an ordinary letter file hung on to the end of the chief draftsman's desk. These sheets were divided into the general heads of special work, buildings and maps. There were no subdivisions.

As might have been expected, sheets were continually being lost and a great deal of inconvenience resulted. Consequently the start was made here.

All records of special work drawings are kept in a separate index. Each intersection is indexed and cross-indexed under the name of each street appearing on the tracing. Should there be any part or parts that are detailed and likely to be of use at any other time they are indexed separately under a proper heading. Each intersection has a card or cards (Fig. 1) showing all work ordered for that location from time to time.

The company drawing number, a description of the work and the date are given on one line. This is followed by the file number for the key plan and the maker's name. When new work is ordered a new entry is made, leaving a blank line to separate the new and the old.

To avoid error due to lost cards, each one is numbered. When a new one is made a line is drawn under the number on the old one. The three cards (Fig. 1) marked Main and First Streets illustrate this.

All flat drawings other than special work are kept in a so-called "Miscellaneous Index." This is divided into such heads as bridges, buildings, cars, culverts, maps, rails and fastenings, special work (details), tables, etc.

Some subjects have an alphabetical index, culverts is an instance; in this case all culverts are indexed according to street location.

Maps of a large division are subdivided into such subheads as assessment, ballast, circuit breakers, joint track, opening and widening (of streets), right-of-way, etc. Buildings are subdivided according to use, amusement, carhouses, administration, power houses, stables, etc. Rails and fastenings, another large division, has such subheads as chairs, compromise plates, drillings, paving blocks, etc. Compromise joints are further divided according to make and section.

The special work head in this index does not apply to layouts but to material. Crossings are noted according to angle; switches and mates by radii and sections, frogs by angle, radii and section.

A little use confirmed the belief that cards were the proper medium and the system was applied to other records.

The railway system is composed of seventy-one construction divisions, six carhouses, four yards and a gravel pit.

Each division has its profiles and track maps made on white mounted paper to a scale of 30 ft. to 1 in. There are separate drawers, with a separate system of numbers, for each of these. These are shown graphically on wall maps, where the numbers and limits of each piece are shown. For current maps and profiles this is more quickly used than the index.

Each day's field work is recorded in a journal. From this journal two sets of cards are made, one for field and one for level notes. These are filed under divisions and give a description of the work with the book and page.

Each field and level book contains a card on which is recorded the date and by whom taken and the date of return. In this way it is possible to know where each book is.

All deeds, leases and agreements, to and from the company are indexed under the name of the division or

	MAIN & FIRST		1
47	Curves		Oct. '96
48	Details		Oct. '96
49	Details		Oct. '96
542	Crossing		Mar. '04
543			Mar. '04
695	Key Plan	Paige	July '04
744	Special Work		Oct. '05

	MAIN & FIRST		2
785	Special Work		Jan. '06
1044	Key Plan	B. Stock	May '06
1185	Crossing		Nov. '07
1304	Key Plan	B. Stock	Apr. '08
2533	P. E. Layout		May 10

	MAIN & FIRST		3
2534	Special Work		June '11
2701	Key Plan	W.W.Jr	Dec. '11

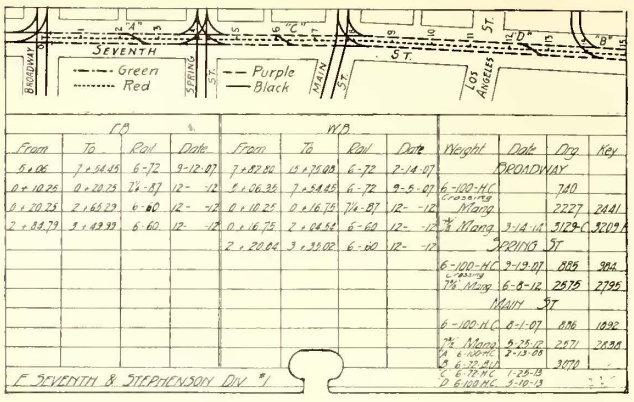
Actual size of card 3 in. x 5 in.

LOS ANGELES TRACK RECORDS—FIG. 1—DATA ON SERIES OF CARDS TO SHOW ALL WORK ORDERED FOR A PARTICULAR LOCATION

the property, and under the name of the other party, whether grantor or grantee.

The company carries mail to and from the various branch post-offices. The name, letter or number of these substations, their location and the distances from the main loading points are indexed in a separate drawer.

Street names are being changed continually. Unless some record of these is kept it is impossible to follow out the routes of old franchises, etc. An alphabetical



Actual size of card 5 in. x 8 in.

LOS ANGELES TRACK RECORDS—FIG. 2—DETAIL RECORD OF RAIL AND SPECIAL WORK LAID AT A GIVEN LOCATION

list of old names with the new one opposite is therefore kept on cards.

All trade catalogs are indexed under the firm name and the goods listed therein. Daily building reports, United States topographical sheets, county record maps for revising our wall maps, are also kept in this way.

Records of all rails laid, section and date, and of all paving were kept on the mounted paper track map. It was found impossible to keep these posted without injuring the maps, consequently 5 in. x 8 in. cards (Fig. 2) were bought.

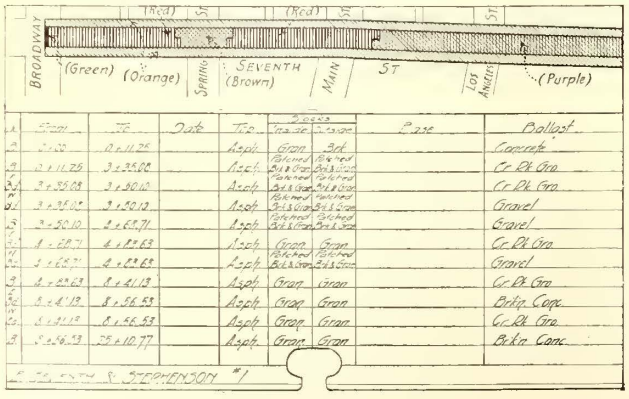
Using the red top line as the center line between tracks, a miniature track map is made on a scale of 200 ft. per inch. The widths are exaggerated to allow more working room. There are two sets of these, one for rail, the other for ballast and paving. Each rail section is shown by a proper color while below is a record of the stations to and from, rail section and date of the report.

On the paving cards parallel lines of wash color are used, the inner one for ballast, the outer one for top paving. The same record of location, date, etc., is kept below as for the rails. On the rail card a record is also kept of the special work at each location, the type and drawing number of the railway's drawing and of the key plan being given.

The cards (Figs. 2 and 3) for the East Seventh and Stephenson divisions are typical.

Wall maps show this graphically for the entire system, a separate map being used for each.

The company is satisfied that it has an index system capable of being enlarged to meet almost any needs, and until some much better system is devised it will continue to use cards.



Actual size of card 5 in. x 8 in.

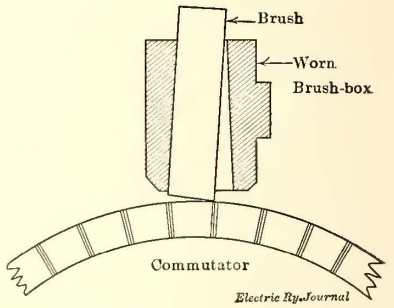
LOS ANGELES TRACK RECORDS—FIG. 3—DETAIL RECORD OF PAVING LAID AT A PARTICULAR LOCATION

Brush-Holder Practice for Single-Phase Motors

BY R. R. POTTER, SUPERINTENDENT OF EQUIPMENT NEW YORK, WESTCHESTER & BOSTON RAILWAY

Brush-holders for railway motors constitute one of the most vital parts of the equipment, as they must be in nearly perfect condition at all times in order to perform their duty, notwithstanding the fact that they are subjected to very severe wear and to exceedingly difficult operating conditions. When it is starting the motor armature requires an excessive amount of current which must be delivered to it through the brush-holders and brushes, and this is often greatly in excess of the capacity of the brush. The result is a relatively rapid electrical erosion as well as mechanical wear on the brush-holder boxes, or guides for the brushes, and also on the pressure fingers. This is especially true of single-phase a.c. motors as they require very large currents on account of the low voltage for which they are generally wound. Also, since the brushes are required to be as thin as possible the current per unit of brush area is very great.

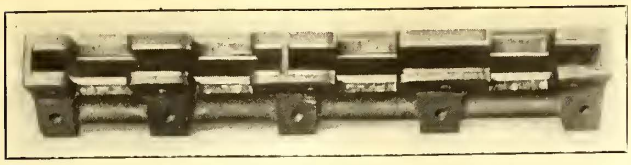
These troubles were in evidence during the early operations of the New York, Westchester & Boston Railway, and tests were made with shunts on the brushes to remedy the difficulty. But while the excessive wear or burning of the brush-holder was thus prevented, it was difficult to develop a shunt attachment to the brush which would stand the load, and the great additional cost of the brushes with the shunts made them uneconomical. The rapid wear was, therefore, accepted as inevitable, and from observations that were made on the motors it was determined that the permissible limit of the wear for the brush-holders was reached when the box or guide had become 1/32 in. larger than the brush, which was 3/8 in. thick.



BRUSH RUNNING ON EDGE BECAUSE OF WORN BRUSH BOX

Practically all of the wear occurs at the lower portion of the box, or that which is nearest the commutator. When the box is badly worn the conditions are such, as will be seen from the sketch, that when the motor reverses after running a considerable time in one direction, the brush moves so that only a line of contact instead of a surface is presented to the commutator. Naturally, such a reduction of contact area causes a very rapid wear of the brush, and sometimes induces the flashing over of the motor, so that the above wear limit had to be established and rigidly maintained. However, with twelve brush-holders per car a heavy expense was involved by maintaining the wear limit in case the brush-holders were scrapped as soon as the slots became worn 1/32 in. large, and in order to minimize the cost the following method of repairing the old holders was devised:

A substantial frame or jig for the brush-holder was made in such form as to support the three sides of the brush box and to hold this casting in shape regardless of the pressure put upon it. A broach having the same length as the slot in the brush box and 1/8 in. greater width than the original size was also constructed. To repair a brush-box the broach is forced through the slots in the brush box, the wheel press being



BRUSH-HOLDER WITH WEAR PLATES IN BRUSH SLOTS

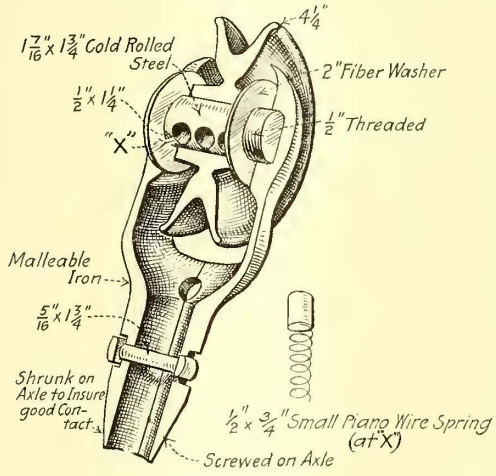
used to apply pressure. Pieces of hard brass of the same length as the slots and 1/16-in. thick are then riveted to each side of the slot, a steel block being inserted in place of the brushes while riveting so that the rivets are headed on the inside. This block also insures that the proper shape of the slot will be maintained. The copper rivets used for the operation are, of course, countersunk on the inside of the slot, each strip of brass being held with four rivets, as this number has been found to be ample.

This work can be accomplished for about 50 per cent of the cost of a new brush-holder, and when the brass wear plates are worn down in turn to the wear limit of 1/32 in. they may be replaced for a very small percentage of the first cost, because no broaching operation will be necessary in renewals of the wear plates.

A Split Self-Lubricating Trolley Harp

BY C. M. FEIST, MASTER MECHANIC SIOUX CITY (IOWA) SERVICE COMPANY

Self-lubrication, perfect contact and an average life of 10,000 miles have been obtained from a trolley harp which is used by the Sioux City (Iowa) Service Company. Essentially this harp is made of malleable iron and in two sections, one of which is shrunk on the axle to insure perfect contact, the other of which is screwed on the axle. This harp is clamped on the trolley pole by a 5/16-in. x 1¾-in. bolt. The axle is made of cold-rolled steel, 1 7/16 in. x 1¾ in. in size with three ½-in. x 1¼-in. holes drilled along one side. In these holes three



SIOUX CITY SELF-LUBRICATING TROLLEY HARP

small piano-wire springs and two ½-in. x ¾-in. graphite lubricating plugs are placed. This combination of the springs and the plugs insures continuous pressing of the graphite against the bearing of the trolley wheel. Fiber washers are interposed between the trolley wheel hubs and the harp to reduce friction at this point and to prevent excessive wear.

Equipped with a 4½-in. trolley wheel which is used in city service, this harp and wheel complete weigh 6 lb. The company does its own machine work in connection with the manufacture of these harps and wheels. The castings, however, are made outside, but their design is furnished by the company. This type of trolley harp has been used on the Sioux City cars for more than ten years, and a number of the axles have been in service four years. As a rule the fiber washers are only applied to take up wear when wheel renewals are made. The graphite plugs provide such perfect lubrication that oiling is never necessary, hence the car roof is always clean. Experience has been that these wheels need no attention so far as lubrication is concerned until a wheel is renewed. At that time new graphite lubricating plugs are provided. This, of course, makes inspection of the bearings unnecessary while the wheels are in service. A sketch of one of these harps is shown in the accompanying illustration.

Helical Springs

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

On many street railway systems the large helical compression springs have given little trouble, whereas on others frequent failures have been experienced; the latter has been the case in many parts of Great Britain where additional weight, caused by covering over the upper decks has been imposed upon the original trucks.

Besides increasing the weight of the car body, the top deck covers raise the height of the car center of gravity, especially when loaded, because the upper decks of such cars commonly attract more passengers than do the lower decks; consequently they are more subject to rolling from side to side than are other cars. Such cars impose a somewhat severe duty on the supporting springs.

On one system which came under the writer's notice this subject had attained considerable importance owing to the excessive number of springs which had been fractured. These were of the usual helical type which support the trucks from the journal boxes. The breakages had reached the figure of many hundreds per annum, and although this meant considerable expense for replacements, of more importance was the fact that broken journal-box springs caused top-covered cars to lean over to an alarming extent.

Of course, the state of the track, which was undoubtedly in extraordinarily bad condition, was blamed, but the real cause of the trouble was that the design of the springs was at fault, which was proved to be the case when new springs of different dimensions were substituted; experience showed these latter to be satisfactory in every way.

The compression of a spiral spring is directly proportional to the load it carries; the stress in the material of the spring is also proportional to the deflection. Consequently when the compression is at a maximum, i.e., when the spring is closed up, the greatest possible stress that the material will ever have to withstand in use will be reached, and the value of this figure should be well within the breaking stress.

It is, of course, an easy matter to keep on the safe side by adopting an excessively strong spring, but in this case the effect on the riding qualities of the car would be equivalent to having no springs at all; the same effect will be produced if the springs are too weak to support the car when stationary, for in that case the coils will close up and rest on each other.

In getting out a new design the object must be to provide a spring which will remain open under ordinary conditions, but which if absolutely closed up by abnormal circumstances will not break under the maximum material stresses then obtaining.

For body or journal-box springs the over-all dimensions are usually not difficult to settle; the diameter of the material of the spring and the spacing of the coils best suited to the situation is not so easy to define. In

many cases the latter dimensions are obtained by trial and error methods. However, this is not a satisfactory process compared with the system of calculation to which the subject is well suited.

The following formula (A) will enable the shear stress in the material of a spiral spring to be found when the steady axial load is known; this, of course, only obtains when the coils remain separated under load:

$$f = \frac{16WR}{\pi d^3} \text{ or } \frac{5.1WR}{d^3} \qquad (A)$$

Where

f = material stress in pounds per square inch maximum working values for which use 70,000 lb. for ¾-in. diameter material, and 65,000 lb. for 1-in. diameter material,

W = steady load on spring in pounds,

R = mean radius of spring in inches,

d = diameter of rod in inches.

To find the compression of the spring under steady load the formula (B) can be used.

$$\triangle = \frac{4\pi f R^2}{Nd} \qquad (B)$$

Where

$\triangle$ = deflection per coil,

f = stress in material, pounds per square inch,

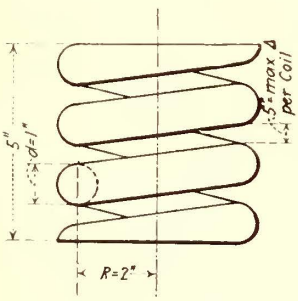
R = mean radius of spring in inches,

N = torsional modulus = 11,000,000 lb. for steel,

d = diameter of road in inches.

In designing a new spring the coil spacing should, of course, be greater than the deflection per coil under a steady load.

We have as yet only dealt with the condition of steady loading, but owing to bad track or to obstructions on the rails, the springs may at times be compressed an amount greatly in excess of the normal, and as the material stress is proportional to the compression, the latter must be limited in some way so that the stress shall under no circumstances reach the breaking point. This is best done by so arranging the spacing of the coils that when the limiting stress is reached, the spring shall be closed up. The maximum allowable compression per coil, or the maximum coil spacing, can be ascertained by substituting for f in formula (B), the limiting stress, which for good steel can be taken as 110,000 lb. per square inch.



HELICAL SPRING

In the accompanying figure is shown a successful journal-box spring for which the following calculations are made by way of illustration. The steady load W on the spring is 2 tons.

By (A)—Steady load stress,

$$f = \frac{5.1 \times 2 \times 2240 \times 2}{1} = 45{,}700 \text{ lb. per square inch.}$$

By (B)—Compression per coil under steady load,

$$\triangle = \frac{4 \times 3.1416 \times 45{,}700 \times 4}{11{,}000{,}000 \times 1} = 0.209 \text{ in.}$$

By (B)—Ultimate material stress when spring is closed,

$$f = \frac{\triangle Nd}{4\pi R^2} = \frac{0.5 \times 11{,}000{,}000 + 1}{4 \times 3.1416 \times 4} = 109{,}000 \text{ lb. per square inch.}$$

Box-Frame Motor Practice

In last week's issue of the ELECTRIC RAILWAY JOURNAL, page 367, R. R. Potter, superintendent of equipment New York, Westchester & Boston Railway, described the methods used in the shops of that company for removing armatures from box-type motor frames. The September issue of the *General Electric Review* contains an article on the same subject by J. L. Booth of the railway motor engineering department. Mr. Booth states that the demand for box frames has increased until at the present time they have almost entirely superseded the split frame, from 80 to 90 per cent of railway motors now being made being of this type. He gives the following advantages of the box frame as compared with the split frame: For a given space and weight a larger output can be obtained. It possesses greater structural strength and durability. The lower half of malleable iron gear cases can be supported more substantially. The elimination of the joint gives an unbroken magnetic circuit and prevents oil from working into the interior of the motor. A greater freedom of design is generally obtained for armature, pole pieces, coils and axle-bearing housings. With a ventilated motor a greater space is available for the passage of the cooling air around the field coils. Better protection is afforded to the field-coil connections, which are inside the frame. The removal of the motor from the truck for repairs results in these being made under favorable conditions. There are fewer parts liable to work upon each other. The greater reliability reduces maintenance costs.

Experience has shown that the removal of the motor from the truck for repairs is not objectionable and repairs upon box-frame motors are to-day being executed just as rapidly as those upon split-frame motors. Some users consider that less time is necessary due to the superior working conditions which exist when the motor is off the truck. The removal of box-frame motors from single-truck cars presents no difficulty. The axle caps and bolts are first removed and the gear case taken down. The motor is then supported from the pit by a jack bearing against the center of the motor frame. The suspension bolts are next taken out (if the suspension is of the bolted-bar type) and the suspension bar is unbolted from the truck. The motor may then be raised by the jack and moved away from the axle sufficiently far to allow the portion of the axle-bearing housing that projects over the axle to clear it. The motor may then be lowered into the pit. If preferred the axle may be used as a fulcrum and the motor swung around the axle until the bearing housings are clear.

No elaborate equipment is required for removing a truck from a double-truck car. In most carhouses two pairs of chain blocks can be arranged to lift one end of the car while the truck is being removed. On a large system in the Middle West, using motors weighing with gear, gear case, pinion and axle lining, approximately 3045 lb., the truck is run out from under the car and the suspension bolts, gear case, axle caps and linings are removed, the dust guard coming away with the axle caps. The motor is then lifted out by means of bails and an ordinary pair of chain swings. The four bolts securing the pinion-end framehead are next removed and the head is started by jack screws. A lever, having a collar at one end which fits over and is clamped to the pinion, is used to support one end of the armature, which is then pulled out sufficiently far to enable a wide lifting strap to be placed in position. The length of the bearing at the commutator end is sufficient to support that end of the armature until the lifting strap is in place. By bearing down on the end of the lever, the weight of the armature

can be balanced while it is being removed from the frame. By this method the time necessary to remove and replace an armature after the truck has been taken out from under the car body is as follows: Removing the axle caps and suspension bolts, and raising the motor frame from the truck, fifteen minutes; removing the framehead bolts, forcing off the frameheads, clamping the lever to the pinion, placing the lifting staff in position, removing the armature and lowering it upon the floor, twenty minutes; picking up the armature, replacing it in the shell, bolting up the frameheads, lifting the motor and placing it on the truck ready for service, twenty-five minutes; time from that at which the truck is taken from under the car until the motor is remounted and the truck ready to be replaced, one hour, which period can, if necessary, be reduced to forty-five minutes.

The method used by another road for removing the armatures from GE-222 motors, which weigh complete 4260 lb., is as follows: The motor is turned on end by slings in the usual manner, the air intake pipe being first removed and a sling with hooks being attached to one of the bails on the motor frame and to an eyebolt screwed into one of the axle-cap bolt holes. For removing the armature the chain swings are replaced by scissors-like clamps which fit under the pinion teeth. The armature is then withdrawn and stood vertically on blocks while the clamps are replaced by a light chain before the armature is laid flat on the ground.

A road operating a large number of GE-200 box-frame motors is using an extension of the armature shaft to support one end of the armature while it is being dismounted. The pinion-end framehead is removed and the head at the commutator end is replaced by a malleable-iron bracket which fits the bore of the frame and is held in place by two tap bolts. This bracket carries a machined roller of such a diameter that the extension of the armature shaft is kept in the center of the frame. This extension is a steel tube, machined on the inside to just slip over the armature shaft. The shaft at the other end is supported by an oak pole 3 in. in diameter, having a steel tube at one end of it that fits over the armature shaft. The armature is moved out horizontally and is supported at one end by the roller until it is clear of the frame.

In another road a somewhat similar method is used, an iron pipe, having one end bushed with brass to avoid injuries to the armature shaft, being used to support one end of the shaft. The armature is lifted by slings and moved out of the frame horizontally by an overhead traveler. On still another road the armature is held stationary and the frame is moved. The armature is supported by jacks, a bushed pipe being used at one end, as previously described. The frame is carried on a truck rolling on rails which is moved along until the armature is clear.

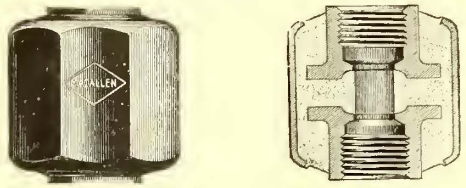
In concluding his article Mr. Booth also described the special machine with centers mounted on a base plate, which was mentioned also in Mr. Potter's article.

Application of Different Welding Processes

As an example of the fact that welding by the electric arc, by electrical resistance and by the oxy-acetylene flame each has a distinct field to which it is most suitable, it may be said that an English corporation which manufactures steel wheels and also specialties in autogenous welding processes makes use of all three methods. The longitudinal joints in the barrels are made by arc welding and the resistance process is used for attaching the heads to the drums. Oxy-acetylene welding is not used in connection with the barrels, but is used for making articles of a more complex character, which are required only in small quantities, the flexibility of the process making it especially valuable in such cases.

Insulating Pipe Joints

The MacAllen Company, Boston, Mass., has recently brought out an improved type of insulating joint to prevent the flow of stray electric current through pipes, conduits or rods. The joint is octagonal in shape, the shell being made of seamless drawn steel and the nipples into which the pipe ends are screwed being machined from steel rods. The insulating material is a vulcanite compound that is not affected by heat or oil and is, in fact, practically indestructible. This surrounds the nipples and is inclosed in the steel shell so that ample physical strength is provided.

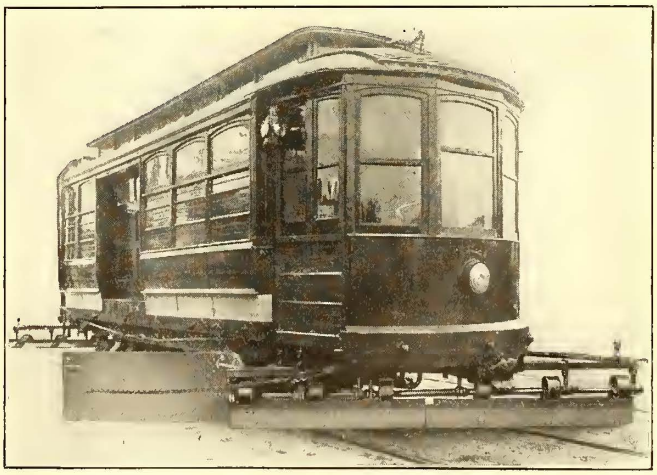


EXTERIOR AND SECTION OF INSULATING PIPE JOINT

These joints have already been used to a large extent by the manufacturers of air-brake equipment as a part of their standard insulation, and recently, they have come into use for insulating steam pipes and rods that are subject to electrolytic influence. The joints are made in standard gas pipe sizes, from ¼ in. to 2 in., all of them being tested to 150 lb. air pressure. High-pressure joints are made to order and these can be tested to any specified pressure, so that they can be used for hydraulic and steam mains as well. The joint that is intended for insertion in lever, stay and brace rods when it is necessary to insulate one part of the rod from the other is, of course, tapped for machine-screw threads and this type is made in standard sizes for rods ranging from ½ in. to 1 in. in diameter.

New Track Scraper

The snow-fighting equipment illustrated in the accompanying engraving is the latest development of the Root Spring Scraper Company, Kalamazoo, Mich., and is known as the No. 6 scraper. It is 12 ft. long and is designed for mounting under the ends of service cars at an angle of 45 deg. to the rails, and to be used in connection with wings. The projection of 3 ft. outside the rails cleans the devil strip, and the blades are made in two sections so that they will accommodate them-



NO. 6 SCRAPER WITH WINGS, ATTACHED TO SERVICE CAR

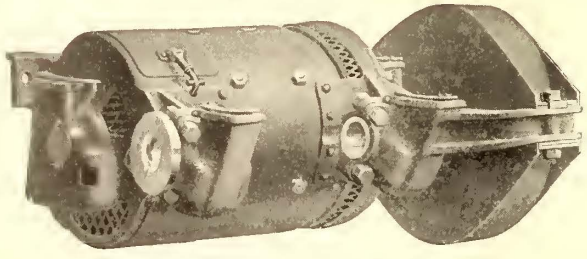
selves to the crown of the pavement. The same scraper is also designed for use on interurban cars, and for this service blades 9 ft. long are recommended.

The scraper is designed to replace revolving broom sweepers, and several important railways which tried this equipment last winter report that the new scraper is much more effective than sweepers. The advantages claimed for it by the manufacturer are that a car so equipped will do much more work than a sweeper because it can be run faster with safety. The scraper will handle wet, packed snow that would be overridden by a sweeper. It can be run at normal car speeds without frightening horses in the street. The blades are so designed that they will adapt themselves to the contour of the pavement and will permit backing up when the blades are down. It is possible to keep the level of packed snow below the level of the motor shells, and thus a good practical job is done from a railway track standpoint. At the same time the scraper does not clean the pavement as thoroughly as a sweeper and therefore does not leave so good a path for the jitneys. The first cost and the operating cost of the scraper are much less than that of sweepers. The maintenance cost is claimed to be 75 per cent less than that for sweepers.

The height of the scraper above the track is regulated by a staff and wheel on the front platform, or, if desired, lever regulation is provided.

New Motor for One-Man Cars

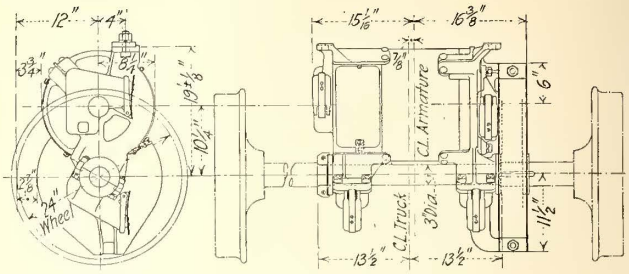
The Westinghouse Electric & Manufacturing Company, realizing the necessity for a motor to fulfill the requirements of light-weight car operation, has made a thorough investigation of the requirements which would have to be met under the varying conditions and has developed an entirely new motor of extremely light weight but of sufficiently rugged construction to perform such service. It would have been possible to modify existing designs of industrial or electric vehicle motors for this service, but the company believed that small-car operation had come to stay and would be successful only if a motor designed to meet the specific conditions could be applied. The expense of developing and building the No. 505 railway motor, popularly designated as the "Wee" (Westinghouse Electric Efficiency) motor was therefore undertaken.



NEW MOTOR FOR ONE-MAN CARS

This motor has a rating of 17.5 hp. at 600 volts, and weighs, complete with gears, gear case and axle bearings, 800 lb., so that it is the lightest motor for railway service ever placed on the market. The motor alone weighs 660 lb. The design includes all of those features which have proved so successful in larger sized motors which have been on the market for some years, only such changes being made as are necessary to adapt it to the service requirements. Gear ratios range between 14:68 and 20:62.

The Corpus Christi (Tex.) Street Railway, which was the pioneer in working out this phase of the light-weight car problem, has purchased eight double equipments of this motor for immediate delivery to operate on a city line 3 miles long, with cars weighing 14,000 lb. and making eight stops per mile with a maximum speed of 30 m.p.h. The Albuquerque (N. M.) Traction Company also purchased seven double equipments for city service, the cars weighing 11,800 lb., seating twenty-



GENERAL DIMENSIONS OF NEW MOTOR

eight people, and making a schedule speed of 9 m.p.h. with eight stops per mile. The Rio Grande Railway Company, Brownsville, Tex., has adapted two single equipments of No. 505 motors for use on its cars. The existing road is operated by mules and it will be noted that one of the "Wee" motors will satisfactorily perform the service requirements, a special economy being effected through the elimination of the mule's kick.

Universal Armature Machine

The Electric Service Supplies Company, as exclusive selling agent, has placed on the market a new tool called the Peerless heavy-duty armature machine. This is universal in character, consisting of a banding machine for handling the lightest or the heaviest railway motor or locomotive armature with a self-contained tension carriage for band wire, a commutator slotting machine with independent motor, a commutator truing or grinding attachment with independent motor and a field and armature coil plate mounted on the main spindle suitable for all classes of form coil winding. It may be furnished either complete, or else as a heavy-duty banding machine only.

After an armature has had the coils placed in the slots and the leads soldered to the commutator, it may be placed in this machine and the work completed without removing the armature from the machine. As a banding machine the tool is capable of extremely heavy duty, the speed of rotation being under perfect control of the operator, and when the machine is stopped it automatically locks and absolutely prevents slack accumulating on the band wire by any backing motion of the armature. An even and uniform tension on the band wire is secured by means of a portable type tension machine mounted on a carriage, which is adjusted along rails provided back of the machine, so that it may be readily brought into position by changing from one band to another.

The commutator slotting attachment is supported from a bracket on the tailstock and is removed by loosening two cap screws. Two vertical rods support a casting, from which two rods project over the commutator. These two rods carry a sliding head on which is bolted the bearing for the milling saw arbor, and on top of the sliding head a ⅛-hp. motor is mounted for driving the saw. The casting supporting the projecting rods is adjustable vertically to suit different diameters of commutator and to regulate the depth of the saw. Provision is made to skew the travel of the saw in order to follow the mica slots when the latter are out of line. The sliding head carrying the saw is moved across the commutator by means of a lever,

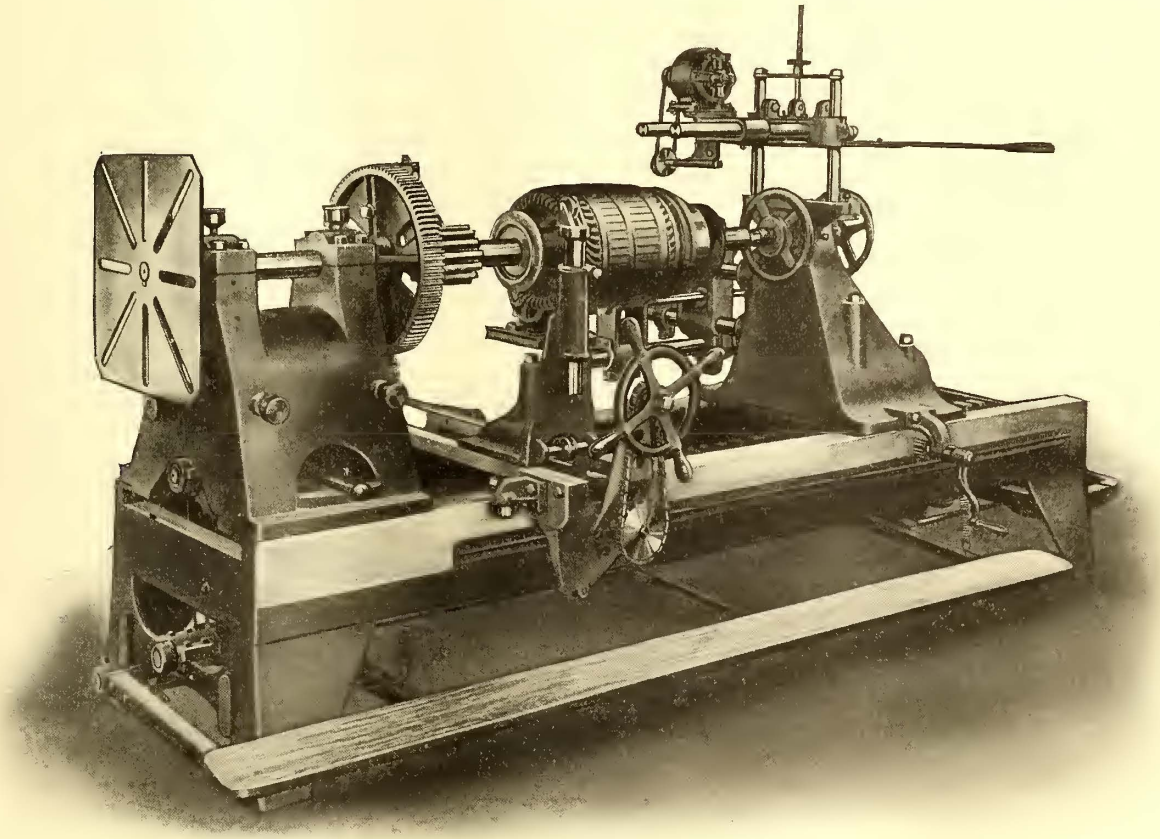
which can be adjusted to suit the convenience of the operator.

The commutator truing or grinding attachment consists of a traveling grinding wheel, supported by the tailstock and direct motor driven. Two steel rods project backward from the tailstock, and sliding on these rods is a casting which supports two other rods parallel with the face of the commutator which carry a ½-hp. motor and the grinding wheel. These rods are adjustable in or out to suit the length and location of the commutator. The grinding wheel is moved along the rods by means of a screw and handwheel and is fed against the commutator by a screw. Cutting is done in both directions of travel of the wheel. When this attachment is not in use it is simply moved back out of the way and no part is disturbed. The rods and all other parts are made heavy to prevent springing and chatter.

A coil-winding plate is mounted on the outer end of the spindle and this is arranged to take all standard sizes of armature and field coil forms. As its speed is under instant control of the operator, it is suitable for all classes of work from the lightest to the heaviest.

The machine is heavily built throughout, all castings being thoroughly ribbed, and the bed consisting of a heavy steel section, planed true on the bearing surface and mounted on legs which support the main drive shaft. The machine is stopped and started by foot treadle which runs the full length of the machine, so that control is possible from any location. When the treadle is depressed to stop the machine, a locking brake is automatically applied to the drive shaft. The treadle is connected to an automobile-type, leather-lined cone clutch for controlling the machine by connecting to the main drive shaft. This type of clutch is simple and will positively not jerk when engaging, a smoothly operating clutch being absolutely necessary for successful banding or coil winding. The exterior part of the clutch is free to revolve upon the shaft and is crowned ready to receive a belt from the line shaft direct, no countershaft being necessary. For direct motor drive, a gear is bolted to the loose member of the clutch and the motor is placed upon a suitable support at the proper height to suit the pinion used with the motor. The motor capacity required is 1½ hp., 900 to 1200 r.p.m.

The headstock is a massive casting and contains all the reduction gears, which are thus thoroughly protected. Power is transmitted from the lower driving shaft by a steel chain to a double set of gears of different diameters in the headstock, either one of which may be thrown into engagement by a lever. This lever may also be thrown into a neutral position, in which case the main spindle is free to revolve independently, a valuable feature in coil winding or in case any special work is to be done on the armature.



HEAVY DUTY UNIVERSAL ARMATURE MACHINE

The two gears on the first shaft above mentioned engage with two corresponding gears on a second shaft, giving two instantaneous changes of speed while the machine is running. This second shaft on the outside of the headstock carries a driving pinion which engages the face-plate gear. Self-contained with this gear is the driving dog, which is clutched between the teeth of the pinion on the armature, all extra attachments for this purpose being eliminated.

The *Mechanical World* states that the Swiss Federal Railway authorities have decided on the construction of a large new hydro-electric station at Massaboden, near Brigue, to supply energy for the trains operating through the Simplon tunnel. The station will replace the temporary power station now established at the north end of the tunnel.

LONDON LETTER

Petrol-Electric Car for Dublin—Service on Electrified London & South-Western Lines—Problems Presented by Depletion of Ranks of Tramwaymen

(From Our Regular Correspondent)

A novel combination of the petrol-electric principle is being applied to the Dublin-Blessington Tramway, which runs for 20 miles in the environs of Dublin. The road traverses an interesting residential, resort and scenic district. For certain reasons the overhead trolley, which has been adopted on a part of the line, could not be used throughout its length. The cars are so designed that they may be self-propelled by the combination of petrol-electric power when on parts of the line not equipped with overhead trolley. On the lines where the trolley can be used the petrol engine will be cut out. Double-deck cars mounted on double trucks will be employed. The bodies will be divided inside into two compartments, for first-class and third-class passengers respectively. The entrance will be in the center of the car. The driving axle of each truck will carry a 65-hp. Westinghouse motor. The self-contained power unit will be a 65-kw., 500-volt, compound wound direct-current generator, direct driven by a six-cylinder petrol engine developing about 105 b.-hp. This generating set will be mounted in a compartment at one end of the car. The control apparatus will be in duplicate so that the car can be run from either end.

The self-propelled car for Dublin is much the same type of car as that supplied by the British Westinghouse Company to the London & North-Western Railway for its branch line from Penygross to Nantlle. In the North-Western car the petrol motor is of 90 hp., connected direct to a 600-volt dynamo. A battery is provided and charged from the dynamo for lighting purposes, and also to drive the electric starter for the petrol engine, which is kept running while the car is at rest at the stopping places.

In connection with the electrification of the suburban section of the London & South-Western Railway it is announced that the circular route by Kingston will be put in service this month. As soon as the trains are running on this section the others will be completed in quick succession. These are the Barnes to Twickenham (via Hounslow), Thames Valley line to Shepperton, Malden to Hampton Court, and Hampton Court Junction to Claygate. The Kingston loop line includes all stations from Waterloo to Kingston via Wimbledon, and back to Waterloo through Richmond, Mortlake, Barnes, etc. Direct current at 600 volts will be supplied to the trains from a third-rail at the side of the track. The power station is near Earlsfield Station, and the current will be distributed at 11,000 volts to substations by insulated cable, of which 76½ miles have been laid on the section now in hand. Altogether, 140 single-line miles of track will be electrified. Each train will consist of units of three coaches permanently coupled together, the trains to comprise three, six or nine coaches, according to traffic requirements. Each unit is fitted with four motors, mounted in pairs on the bogie beneath the driving compartment. The coaches will be heated by electricity.

The details of a light railway scheme, intended as a first step toward the planning of a new seaside resort for Lancashire, were recently inquired into by the Light Railways Commission sitting at Formby. The proposal is to carry a line of electrified railway to Formby headland, the most seaward point of West Lancashire, and to make that district, which comprises an unusual stretch of firm beach backed by undulating sandhills, accessible to Lancashire holiday-makers. The Lancashire & Yorkshire Railway has been induced to take the matter up. The proposed Formby Light Railway is to be constructed by the addition of a loop to the existing electric line running between Liverpool and Southport. The new line at its most southerly point will join the existing line at Hightown Station, and branching to the west will skirt the Altcar Rifle Range and War Office new encampment, and thence follow the contour of the coast line, coming round in a loop and rejoining the present line almost on the Southport borough boundary. Its total length will be nearly 7 miles, and the estimated cost is £62,650.

The annual conference of the Tramways & Light Railways Association discussed the growing difficulty which tramway undertakings throughout the country are experiencing owing to the increasing number of men who are leaving for war service. The reduction in the number of drivers and conductors can be met by running fewer cars or by employing women conductors, but the steady departure of skilled workmen from the repair shops for the army and for munition factories presents a more serious problem. J. Devonshire, managing director of the London United Tramways and the Metropolitan Electric Tramways, said that the council of the association had come to the conclusion that the companies must try to get for the men employed in the repair shops the special form provided for munition workers. This form would be stamped with the words "public utility service." The council had succeeded in arranging with the Minister of Munitions that if this arrangement was carried out these men would be regarded as sacrosanct. The conference decided not to take any steps to secure exemption for drivers and conductors. It was announced that the Board of Trade had agreed to the inclusion in one Parliamentary bill of all applications for extension of time for the completion of authorized lines. This should be a considerable advantage, because under the present war restrictions a great deal of new work is being delayed.

At the same conference a paper was read by J. W. Dugdale, general manager and engineer of the Oldham Corporation Tramways, in which he said:

"Workshops, railways and motor cars appear to have been paced to the uttermost limit, but the military authorities have never once thought of taking into their confidence any principal connected with any of our undertakings, except, of course, for free riding upon tramcars. There is, in my opinion, plenty of scope to which our vehicles could have been put. The transport of the wounded, for instance, the removal of convalescent soldiers from various hospitals to convalescent homes, and the carrying of munitions in their various stages of production from one firm to another. The number of tramway employees who have given their services for the war reaches a total of 18,057 men, which is about 30 per cent of the total number of men employed on tramway undertakings. The cost to the departments mentioned for allowances or grants per week at the present time is very high. For the London County Council it is £1,568; Glasgow, £1,000; Liverpool, £520, and Manchester, £1,360."

As regards present and future prices of materials, Mr. Dugdale pointed out that "tramway concerns are now handicapped in obtaining quick deliveries of material, such as car wheels, axles, tires, etc., and this has been brought about by the makers not being able to execute orders promptly on account of pressing Government work." He said:

"There is no doubt that tramway concerns will be called upon to pay inflated prices for materials of every description. There will be a great rush for tram rails in the very near future, as the life of those laid on many systems in the year 1900 will become exhausted. This is a very important factor, which will have to be closely watched, as the prices per ton will increase considerably. Already tram rails have advanced in price to £9 5s. a ton."

The Birmingham Corporation tramways committee has engaged about twenty women to act as conductors on the Pershore Road route. A letter has been received by the committee from the Tramwaymen's union stating that the men are willing to work with the women and to render them every possible assistance.

Some interesting figures are contained in the report of the London County Council tramways for the year ended March 31, last. The length of lines in operation was 145¾ miles, of which 5¾ miles was worked by horse traction. The total revenue was £2,400,847, and the working expenses, £1,658,362, leaving a surplus on working of £741,485. The number of car miles run was 58,978,792, and the number of passengers carried 550,497,993, and the average fare per passenger was, for electric traction, 1.02d., and horse traction, 0.76d. The average number of cars was 1384, and the average car miles per day per car was, for electric, 117, and horse, 77. The average speed of the electric cars was 8.95 m.p.h. and of the horse cars 5.85 m.p.h. The total debt incurred up to March 31 was £13,744,806. Allowing for debt repaid and sinking fund balances and for surplus land valued at £122,216, the net debt on March 31 was £9,836,186. A. C. S.

News of Electric Railways

RAPID TRANSIT EQUIPMENT CONTRACTS

More Than $1,800,000 of Track Material Contracted for in New York

The Public Service Commission for the First District of New York has awarded the following contracts for track materials to be used upon various lines of the dual rapid transit system:

Untreated ties and timber—J. H. Burton & Company, $1,273,856.

Treated ties and timber—Long Leaf Pine Company, Inc., $100,362.

Special work, Order No. 3—Ramapo Iron Works, $54,960.

Special work, Order No. 4—William Wharton, Jr., & Company, $41,907.

Cast iron—American Brake Shoe & Foundry Company, $10,528.

Screw spikes—American Iron & Steel Manufacturing Company, $25,741.

Felt pads—Q & C Company, $9,957.

Malleable iron—Foran Foundry & Manufacturing Company, $36,118.

Tie plates, Type "A"—Herbert W. Lockwood, $123,975.

Tie plates, Type "B"—L. D. Rockwell, $13,267.

Tie plates, Type "C"—L. D. Rockwell, $5,140.

Tie plates, Type "D"—Herbert W. Lockwood, $8,239.

Tie plates, Types "E," "F," "G" and "H"—Herbert W. Lockwood, $17,139.

Tie plates, Types "E-2," "W" and "X"—Ramapo Iron Works, $2,901.

Bolts and nuts—Oliver Iron & Steel Company, $117,910.

Cut track spikes—Herbert W. Lockwood, $34,338.

The differences between the Public Service Commission for the First District of New York and the Board of Estimate & Apportionment in regard to the terms of construction contracts, which threatened to involve delay in the completion of the Broadway subway in Manhattan, have been settled and the work will proceed. The point in question was a clause in the contract for the construction of that portion of the Broadway subway between Thirty-eighth and Fifty-first Streets, which permitted the chief engineer of the commission to agree with the contractor either upon unit prices or a lump sum for extra work not provided for in the schedule of unit prices upon which the contractor made his bid. This contract was awarded to the Holbrook, Cabot & Rollins Corporation, the lowest bidder, for $3,740,913. The law requires that the Board of Estimate & Apportionment consent to such contracts and appropriate the money to pay for them.

In this case the board consented to the contract on condition that the lump sum clause for extra work be stricken out. The contractors objected and the commission, under advice from its counsel, declined to amend the contract to comply with the Board of Estimate's condition, holding that it had no right to alter the terms of the contract and that its action in consenting to the contract with conditions amounted to disapproval. Holbrook, Cabot & Rollins applied to the Supreme Court for a writ of mandamus to compel the Board of Estimate to give its consent without conditions. This application was allowed by Justice Clarence J. Shearn, who issued a writ during the week. His decision sustained the position taken by the Public Service Commission. At its meeting following the decision by Justice Shearn, the Board of Estimate acted in accordance with the decision of the court and gave unconditional approval to the contract upon the understanding that the commission will confer with the Board of Estimate as to any lump sum extra allowance in excess of 5 per cent of the value of the contract before allowing the same. This understanding was in conformity with a suggestion made by Chairman Edward E. McCall of the commission to the Board of Estimate. That board is still of the opinion that it has the power to alter the terms of contracts made by the commission and expressed its intention of testing the question in the future. Not wishing to delay the construction of the dual system, however, it yielded the point as to this contract and two contracts in Brooklyn having similar clauses. This action clears up the situation and the Public Service Commission will now proceed to execute all the contracts as to which the Board of Estimate made objection so that work may begin at once.

PHILADELPHIA COMMISSIONER REPORTS

An Outline of Some Features of the Report Issued by Transit Director Taylor for 1914

Transit Director Taylor of the City of Philadelphia, Pa., has issued the annual report of his department for 1914. In his letter submitting the report to the Mayor, Director Taylor reviews his recommendations and the work accomplished by his department, paying particular attention to the relocation of sewers. He goes at length into the legislative and legal features of transit work. All the aspects of the transit plans, constructive, legal and financial, are explained in detail. The report contains exhaustive tables giving the expense of the undertaking and the estimated returns to the city and the operator. The entire transit program as outlined at the conferences between Director Taylor and the officials of the Philadelphia Rapid Transit Company is included.

A feature of the report is the director's description of the methods employed in conducting his investigations into the transit problem. In the first place, he made a detailed study of the population and of its location. From the records of the County Commissioners was obtained the number of assessed voters in each ward for December, 1909, and December, 1911. Then the increase in population by dwellings was obtained. Next came the problem of determining how the population traveled, and a traffic survey was conducted. Passengers on every car out of five were counted on about four lines each day. Two men were placed on each car, one handing an identification slip to each passenger, the second collecting it and asking the passenger's destination.

The survey extended over a period of five weeks, from Oct. 14, 1912, to Nov. 18, 1912. Information was thus obtained of the volume of traffic flowing to all sections and the capacity of existing facilities to move it. This information, together with the probable increase of population, showed the general channels which require relief by high-speed transit. Following these calculations came the selection of routes, the estimation of the number of cars which would be required to move the population, the time which would be saved and the cost of the work.

After the selection of routes, profiles and detail drawings were made on which to base estimates of the cost of the work. A large number of estimates were then prepared, a general design was adopted, a time was set for construction, and unit prices of construction cost were taken from bids on similar classes of work in other cities. Estimates of earnings and operating costs were then made in great detail.

In submitting his report to the Mayor, Director Porter reviews and emphasizes the importance of the recommended subway delivery loop. In effect, he holds such a loop to be necessary to the commercial success of the Broad Street subway, because, he contends, the North and South Broad Street line will collect traffic from twenty-seven stations outside the business district. Without the loop, virtually all of this traffic would have to be handled in two stations, while with the loop seven additional stations would be provided. The director estimates the number of persons who will use the Broad Street line at 500,000.

In reference to the much discussed tube under the Delaware River, the director says:

"In any arrangement made by the city with a private corporation for operating the city-built rapid transit lines it should be required that such corporation secure the construction of and equipment of a tube under the Delaware River to Camden, connecting with either or both the existing Market Street subway and the recommended Chestnut Street subway."

RHODE ISLAND ARBITRATION HEARINGS

Hearings are being continued at Providence, R. I., in connection with the wages arbitration on the system of the Rhode Island Company. W. D. Wright, superintendent of equipment and maintenance, a recent witness, testified as to working conditions in the shops. Differences in the work of machine hands were responsible for variations in the hourly rate of pay, and in the cases of two shop foremen the different rates were due to the increased responsibility in one case as compared with the other. Painters who got 23 cents an hour did no varnishing, while those who were paid 25.5 cents performed this work. The maximum number of men in the department was 225. At present only 159 were at work. Relative to work in the paint shop, Mr. Wright said that while apparently the men were performing the volume of work previously handled by a larger force fancy lettering and certain other refinements had been eliminated. Counsel Swift for the company brought out the point that a recent layoff for eighteen weeks of a number of men was ordered by the management and, in his opinion, was caused by jitney competition.

During the hearings in the week ended Sept. 4 the point was brought out that in certain cases men for whom no work was available at the rate of $2.25 a day were given the opportunity to work for $1.75 rather than to be laid off entirely. The work of switchboard operators was again reviewed. A witness contended that the duties of a lineman in the company's service were more severe than on the system of the Narragansett Electric Lighting Company, Providence. Under cross-examination, the point was brought out that a first-class man could learn to do the witness's work in two or three days. The compensation for this work was 30 cents an hour. Evidence bearing upon the cost of living was presented on Sept. 1 on behalf of the union by Arthur Sturgis, Boston, an electric railway engineer formerly employed by the Bay State Street Railway. The witness cited the well-known views of Prof. Irving Fisher of Yale University, relative to the purchasing power of the dollar and contended that while wages had increased 14 to 15 per cent in the last fifteen years on the Rhode Island system, the cost of living had risen to a degree which made wages lag 19 per cent behind purchasing power. Mr. Sturgis contended that a minimum wage of about $1,000 a year should be established in order to enable employees to maintain a proper standard of living.

ANOTHER STRIKE AT HOLYOKE

Employees of the Holyoke (Mass.) Street Railway went on strike for the second time within a month on Aug. 27. The strike followed a conference with officials of the company upon the establishment of a working agreement defining the duration of the period to be covered by a previously arranged arbitration of differences in dispute. The men desired a working agreement to expire June 1, 1916. The company called for a three-year agreement. At a conference prior to the strike vote, the company offered first to submit this difference to the board of arbitration recently appointed, with a second proposition that if this were unsatisfactory to the men to submit to the arbitration committee the question whether the time-limit of the working agreement was a proper one to be handled by this committee. Representatives of the union stated that the objection to signing an agreement extending beyond the date named previously arises from the fact that the wages and conditions in Holyoke have for years been governed by those prevailing at Springfield, Mass., where a new scale will be brought up for consideration on June 1, 1916. It was stated that the union has no objection to Attorney James E. Cotter, of Boston, who was recently appointed by Governor Walsh as the third member of the arbitration board. L. D. Pellissier, president of the Holyoke Street Railway, said that the agreement of Aug. 15, which was prepared just prior to the end of the last strike, provided that matters in dispute were to be submitted to the arbitration board. The company desired a three-year agreement to avoid a yearly discussion of working conditions, but was willing to submit the question to arbitration.

Soon after the stoppage of cars jitney service was inaugurated between points in Holyoke and the Brightside district, reducing the rate from 25 cents as applied in the previous strike, to 10 and 15 cents. Extra car service was also run on the suburban line of the Boston & Maine Railroad out of Springfield to Connecticut Valley points north. After spasmodic efforts in various quarters to establish a basis for a settlement, Governor Walsh proffered his good offices in the case, and an informal conference was held on Wednesday to enable the facts and viewpoints to be presented to the chief executive of the commonwealth.

CLEVELAND COUNCIL MEETING

A Summary of Action Taken on Important Railway Matters Recently

By unanimous vote the City Council at Cleveland, Ohio, has agreed to submit the franchises granted the Cleveland & Youngstown Railroad and the Cleveland, Akron & Canton Terminal Railroad to a referendum vote on Nov. 2, the regular election date. Previous to the Council meeting Peter Witt, street railway commissioner, had expressed his purpose of opposing the Cleveland & Youngstown Railroad grant on the ground that the New York Central Railroad was heavily interested in it. Mr. Witt said he favored the improvements this company wished to make, but believed the railroads should agree to build a union station before a proposition was accepted by the city in which any or all of the companies were interested.

The Council has passed the long-pending ordinance giving the Cleveland Railway the right to build a line on 123rd and 125th Streets, connecting the Superior and St. Clair Avenue lines. This will furnish partial cross-town service in the extreme east end of the city and at the same time serve thirty-one streets that are remote from any of the present lines. Construction work on this line will probably be begun at once.

Councilman Meyers offered an amendment to the city traffic code which would limit the speed of street cars to 20 m.p.h. Mr. Witt opposed this, but offered to reduce the speed of cars in Mr. Meyers' ward to 20 m.p.h. if he desired the change. The offer was not accepted.

Councilman Moylan asked for a rearrangement of the schedules on Lorain Avenue on the ground that many of the motormen and conductors were compelled to be at the carhouses most of the day in order to secure a few hours' work. Mr. Witt also opposed this step.

Because of the opposition of Mayor Baker and Mr. Witt to the plan of requiring the Cleveland Railway to pay rent for the use of the proposed subways to the Superior Avenue bridge across the Cuyahoga River, the County Commissioners have agreed to enter into a contract with the company that it shall have the use of the subways free of rent as long as the Tayler grant with its municipal control provisions and 6 per cent dividend clauses are in effect. At a recent conference Mr. Witt contended that the patrons of the street railway would be paying this rental and that they are under no more obligation to do so than those who cross the bridge in carriages, automobiles and taxicabs.

TOLEDO FRANCHISE NOT TO BE INITIATED

Negotiations With the City Are Not to Be Resumed at the Present Time

After the special franchise committee of the City Council at Toledo, Ohio, makes a report of its work during the past year on Sept. 20, it will be discharged. This was agreed upon at a meeting of Council on Aug. 23. Several members opposed delay in discharging the committee and argued that no report is needed.

Councilman Dotson, a member of the committee, told the Council that the committee had done good work and had taken the only course that will ever result in municipal ownership of the street railways. This work might have proved very valuable, as a draft of a franchise had been formed, when negotiations were finally broken by Henry L. Doherty, who would not agree to the plan unless the committee would recommend that action be taken by Council on the draft. Mr. Dotson said that reports that negotiations had been conducted for the purpose of defeating municipal ownership of the road were false.

When Mr. Doherty was in Toledo on Aug. 26 to attend the farewell dinner to F. G. Berge, manager of the light and power department, he told the newspapers that no franchise would be initiated at once by the Toledo Railways & Light Company and that there was no intention of resuming negotiations with the City Council. Further than this he gave no details of plans for the future. Mr. Berge has been appointed chief engineer of the Doherty interests with headquarters in New York.

WASHINGTON POWER HEARING CONCLUDED

Hearings were held before the Public Service Commission of the District of Columbia on Aug. 26 and 27 to inquire into the intercorporate relations of the Washington Railway & Electric Company and the Potomac Electric Company with respect particularly to the terms under which the Potomac Electric Company furnishes power to the railway. Among the witnesses were Clarence P. King, president of the Washington Railway & Electric Company; William F. Ham, vice-president of that company, and L. E. Sinclair, superintendent of the Potomac Electric Company. A previous contract between the companies is said to have provided that the railway pay the power company 6 per cent interest on the value of the plant used in the production of power for railway service and a profit on such power as was used by the railway. Extension of the plant of the electric company being deemed advisable, the railway guaranteed the interest on certain improvement bonds of the electric company, and the power contract between the companies was accordingly modified. The railway load had enabled the power company to generate on a large scale and the cost of production had as a result been reduced more than half, while the number of consumers had increased from about 6000 to 20,000. The commission has taken the case under advisement.

As previously stated in the ELECTRIC RAILWAY JOURNAL E. W. Bemis is now engaged in appraising the public utility properties in the district. This work it is expected will be completed in November.

THE NEED FOR PUBLICITY

In an editorial, "Good-Will and the Public Utility," in a recent issue, *Printers' Ink* said in part:

"The position of a public service corporation has sometimes been characterized as 'between the devil and the deep sea'—with the Public Service Commission restricting its profits on the one hand, and on the other the pressing need to secure private capital for plant extension and betterments. But how often is the consuming public told those facts? How often is the man in the street taken to one side and shown in the spirit of reasonableness that the service he gets for his nickel or his dime or his dollar depends upon the ability of the company to find purchasers for its bonds? How often is he shown that there is a direct relationship between the good will the public bears to the company and the service the company is able to give the public? Not so often as might be.

"The railroads which serve the towns in Westchester County, New York, have spent in the last three years many thousands of dollars to fight a rate reduction ordered by the Public Service Commission. The Court of Appeals has finally declared that the order is unreasonable, and it shall not stand. The railroads won their case—but at what cost in counsel fees, rebate slips, contingent liability funds, and all the rest! That sort of drama is being enacted over and over again. Sometimes it is necessary. More often it is not.

"One-tenth of the cost of such a legal struggle invested in an advertising campaign of education (before, not after public opinion has been adversely aroused), would often obviate the necessity of spending the other nine-tenths. The public is not unreasonable; it is not hopelessly biased against the railroads or any public utility whatsoever; it is only ignorantly devoted to what it conceives to be its own interests. What the public needs is to be shown the facts, and the best way, and the only effective way, is through advertising. And there never was a better time than right now, while the public mind is beginning to react from its over-indulgence in corporation-baiting."

Amalgamated Convention in Rochester.—The Amalgamated Association of Street & Electric Railway Employees of America will hold its annual convention, beginning Sept. 13, 1915, at Convention Hall, South Clinton and Monroe Streets, Rochester, N. Y. The hotel headquarters will be Hotel Eggleston and the headquarters of the executive committee in the Reynolds Arcade, Rochester.

New Haven Authorizes $600,000 Signal Expenditure.—The New York, New Haven & Hartford Railroad has authorized an expenditure of $600,000 for the installation of automatic block signals on its line, four-track, from Stamford, Conn., westward to the New York Central connections at Woodlawn, New York City, 20 miles. The controlled manual block system is now in use on this part of the road.

Ottumwa Company Praised.—In an editorial in the issue of Aug. 25, the Ottumwa *Daily Review* said: "Ottumwa has a great street railway service. There is none that can compare with the Ottumwa convenience of street transportation in cities of this size and not entered by interurbans. Ottumwa is justly proud of the Byllesby Company (Ottumwa Railway & Light Company) and its traction identity with our people."

Water Power Bill and Land Leasing Recommended.—Passage of a general water-power bill and a measure to create a national leasing system for coal, oil and other resources on public lands will be recommended to Congress in the annual report of Secretary Lane of the Interior. Mr. Lane announced on Aug. 31 that he expected both measures would be enacted. They were passed by the House in the last Congress, but the Senate failed to act upon favorable reports of the bills.

West Penn Division Strike.—The West Penn Traction Company, Pittsburgh, Pa., is operating its Allegheny Valley Division, the trainmen on which went on strike recently. The officers of the company are reported to have told Patrick Gilday of the State Board of Arbitration that the company had nothing to offer the men and nothing to arbitrate, as the contract in force was understood by both the company and the men. Arrests have been made promptly following the recent isolated cases of disorder.

Restoring Service in Galveston.—The first street car service in Galveston, Tex., after the storm of Aug. 17 was resumed on Aug. 26 on several lines of the Galveston Electric Company. The power plant was ready for operation several days prior to that time but owing to the fire hazard the current was not turned on until the water main under the bay, which brings the city's supply from the mainland, could be repaired. Damaged motors is now the most serious obstacle to the rapid restoration of normal service. As fast as the cars can be repaired they are put into service.

City Engineer to Value Minneapolis Street Railway.—The City Council of Minneapolis, Minn., has instructed the city engineer to begin the valuation of the Minneapolis Street Railway as a step preliminary to negotiations for a renewal of franchise. The present franchise still has eight years to run. In general outline the plan proposed for renewal closely resembles the one which has been in operation in Cleveland for four years and is known as the "transportation at cost" plan. An outline of the proposal was contained in the ELECTRIC RAILWAY JOURNAL of July 24, page 161.

Bus Service to Tie Isolated Municipal Lines.—The public utilities committee of the City Council of Seattle, Wash., has recommended for passage by the Council, the bill authorizing the Board of Public Works to enter into a contract with F. M. Peterson for the operation of an automobile bus service between Thirteenth Avenue West and Nickerson Street, the north terminus of Division "A" of the Municipal Street Railway, and Ballard Avenue and Market Street. Mr. Peterson proposes to operate buses to connect with all the cars on the municipal line, and to receive 3 cents for each adult, and 1½ cents for each school child that he carries.

Services for Mr. Graham. — Funeral services over the remains of the late John R. Graham, president of the Bangor Railway & Electric Company, Bangor, Me., were held at Mr. Graham's late residence in Bangor on the afternoon of Aug. 26. As a mark of respect to the memory of the dead man, all electric cars on the system were stopped for five minutes. The burial was from Christ Episcopal

Church, Quincy, Mass., on Friday afternoon, where a large and representative attendance of public utility men expressed the desire of many workers within the electric railway and central station industries to pay their last respects to their distinguished friend and co-laborer.

Los Angeles Board to Urge Track Elevation.—The Los Angeles Public Utilities Commission has ordered the Pacific Electric Railway to show cause why it has not complied with the terms of a franchise granted more than a year ago for the construction of elevated tracks to San Pedro Street to minimize traffic congestion in the business district of Los Angeles. The franchise provided for the extension of the company's elevated tracks from the rear of the depot at Sixth and Main Streets to San Pedro Street, and the operation of all the cars of the company over these tracks. The franchise specified that construction should begin one year from the date of its approval, July 10, 1914. The company has three years in which to complete the work. The hearing was set for Sept. 2, 1915.

The Quarter-Century Span of the Electrical Industry.—The first annual outing of the Quarter Century Club of the General Electric Company factory at Schenectady, N. Y., to Lake George, Aug. 28, emphasized the fact that many of the members of the company have been connected with the company since the very beginning of the period of rapid development of the electrical industry, that is, in 1890. Two hundred and six of the 500 members of the Quarter Century Club made the excursion to Lake George. The average age of the members of the party was fifty-two years, the youngest member was thirty-eight and the oldest seventy-four. G. E. Emmons held the record for longest continuous service, thirty-four years. C. A. Coffin, chairman of the board, and President E. W. Rice, Jr., are both members of the Quarter Century Club.

Railway Mail Pay Facts.—Business men in every state are asked in a bulletin, "Railway Mail Pay and Public Opinion," to study the question and take it up with senators and congressmen. The document is published by the Railway Business Association, the national organization of manufacturing, mercantile and engineering concerns dealing with the railroads. The "space method" advocated by the Post-office Department is vigorously opposed. In ten years, according to this bulletin, the post-office receipts increased 100.5 per cent and total railway mail pay only 27.7 per cent. George A. Post, president of the association, says: "It is our earnest hope that the government which requires that rates of transportation to private shippers shall be reasonable and that practices of commercial corporations shall be fair, shall free its own procedure from all suspicion of unreasonableness and unfairness." The association urges that mail pay shall not again be made a rider on an appropriation bill or dealt with at the crowded end of a session.

PROGRAMS OF ASSOCIATION MEETINGS

Mississippi Electric Association

At a meeting of the executive committee of the Mississippi Electric Association, held in Jackson on Aug. 25, the tentative dates set for the Hattiesburg convention were Nov. 11 and 12. It was definitely decided that there would be no papers at the convention. The meeting will be given over to discussions of subjects to be of interest to all, as it is thought that by the elimination of long papers the convention could be made of much more general interest.

American Institute of Electrical Engineers

The Panama-Pacific Convention of the American Institute of Electrical Engineers will be held in San Francisco, Cal., on Sept. 16, 17 and 18. The hotel headquarters of the Institute will be at the St. Francis. The convention sessions will be held in the Native Sons of the Golden West Building. The papers of perhaps the most direct interest to the electric railway industry will be presented at the session devoted to the valuation of public utilities. There will be a symposium on inventories and appraisals of properties, Part I by C. L. Cary, Part II by W. G. Vincent and Part III by W. J. Norton. These papers will be supplemented at the session by contributions from other members of the committee on inventories and appraisals of properties.

Financial and Corporate

MILD OPTIMISM PERMISSIBLE

Electric Railways Have Felt Nation's Depression, but Present Improvement and Wider Appreciation of Utility Problems Cause Brighter Outlook

The record of 950.2 miles of track built or put in operation during 1912, 1018.9 miles in 1913 and 946.38 miles in 1914, and of 6001 cars purchased in 1912, 5514 cars in 1913 and 3010 cars in 1914 tends on close analysis of the details involved to confirm the general impression that the electric railway industry is not keeping so much abreast of the growth of the country as it did in preceding years. Without a doubt electric railways have felt the depressing influence of the nation-wide curtailment of business that has been evidenced with increasing force since the middle of 1913. Yet indications are not lacking that this condition will be mitigated in the future.

We cannot here make a composite analysis of all the factors involved in the present electric railway business situation, but a few points are worthy of note. Electric railway earnings for 1913 and 1914 as compared with steam railroad earnings, building permits, bank clearings, steel and iron production, agricultural products and the cotton crop, show the highest relative stability, and it is to be expected that under normal circumstances they would respond most quickly to the business rejuvenation that is now presaged by the increasingly favorable foreign trade balance, the lack of a marked tendency toward prohibitive prices for capital and the exceedingly propitious crop reports. The full response of electric railway earnings to these influences, however, is likely to be retarded by the factors peculiar to this industry, such as the special problems of rates, wages, regulation and now jitney competition.

While such special factors as these have a certain effect upon the relative stability of electric railway earnings, they influence more the relative profitableness of the industry and are the more dangerous thereby. In spite of the stability of earnings, the problem of furnishing continually more and better service under constantly increasing costs at a depreciated rate of fare has in recent years become one of serious moment, but we believe that daily there is now growing a wider appreciation of the economic service performed by electric railways, their right to protection against unfair and unregulated competition of jitneys and their needs for successful operation. Various decisions, such as those in the Schenectady Railway, Manchester Street Railway, Middlesex & Boston Railway, Blue Hill Street Railway, and Eastern and Western rate cases, indicate that at last the courts, the commissioners and even the public seem to be taking a more rational view of the urgency of relief to common carriers.

In the present, therefore, we find a promise of improvement in regard to the special problems of electric railways. When this is considered in connection with the present propitiousness of general conditions there is warranted a letting up of pessimism and even a mild optimism in the electric railway field. The prospect should encourage purchasers, for in the shadow of the receding depression prices should be low, construction work cheap and long-time loans fairly moderate-priced.

DEPRECIATION ACCOUNTING POSTPONED

The California Railroad Commission in a supplemental opinion has ordered the United Railroads of San Francisco to begin the accumulation of its depreciation account as of July 1, 1915, and to continue it until $1,650,000 is accumulated by June 30, 1918, this amount being the same as originally directed. This order virtually postpones the time for beginning the account by a year. The original order provided that the depreciation account should be established so as to show an appropriation from earnings of $550,000 not later than June 30, 1915. This amount was to accrue in equal monthly installments of $45,833. The company applied for a rehearing and directed the attention of the commission to various matters concerning its accounts. The commission now finds no merit in the contentions.

ANNUAL REPORTS

Brazilian Traction, Light & Power Company, Ltd.

The statement of income, profit and loss of the Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., for the year ended Dec. 31, 1914, follows:

Revenue from securities owned and under contracts with subsidiary companies	$7,523,696
Interest on advances to subsidiary companies	535,117
	$8,058,813
General and legal expenses, administration charges and interest on loans	392,281
Surplus available for dividends	$7,666,532
Dividends on 6 per cent preference shares at 1½ per cent each	$600,000
Dividends on common shares at 1¼ per cent each	6,257,119
	$6,857,119
Surplus carried to profit and loss	$809,413

The year's operations of this company, which includes among its controlled properties the Rio de Janeiro Tramway, Light & Power Company, Ltd., Rio de Janeiro, Brazil, and the Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, were not so satisfactory as anticipated. As a result of the monetary stringency and other adverse conditions in Brazil, the factories began to run on short time or suspended business completely, and with the large number of employees thrown out of work, the earnings of the tramway systems were seriously affected. Notwithstanding such bad business conditions, however, the gross income of the combined companies in Brazilian currency showed an increase over the previous year, but the revenue in gold was unfavorably affected by the drop in exchange.

After payment of the regular dividend of 6 per cent per annum on the ordinary shares, a credit balance of $3,822,410 was carried forward to the profit and loss account. In view of the serious financial conditions developing in Brazil, and later the much more serious financial situation throughout the world, all possible expenditures on capital account in connection with the development of the property were suspended, but there was a large amount of work under way which it was necessary for the different subsidiary companies to complete. A considerable amount of construction work had also to be carried out in order to comply with the obligations of the different concessions. The different companies performed all such necessary work, both for capital account and as regards maintenance and renewals.

One interesting practice during the year arose in connection with the effect of the European war in stopping the usual method of remittances by means of bills of exchange. For several months it was practically impossible to remit money from Brazil for the purpose of the payment of coupons and dividends, and as this situation did not improve, the board decided in October to remit its funds—which by that time had accumulated to a very large amount—in coffee. As the Rio de Janeiro company has under charter a fleet of steamers for transporting coal and other required materials, the board employed such steamers on their return journeys for freighting the coffee to the New York and European markets. Up to the end of the year there had been purchased and shipped from Rio de Janeiro and Santos 278,400 bags of coffee, all of which have since been disposed of in New York at prices materially in excess of the average exchange prices obtainable during the same period. The company now carries in its balance sheet coffee in store and in transit valued at $2,810,215.

During the year a few of the outstanding shares of the Rio de Janeiro Tramway, Light & Power Company, Ltd., and the Sao Paulo Tramway, Light & Power Company, Ltd., were acquired, and a large controlling interest was secured in the Companthia Rede Telephonica Bragantina, a telephone company carrying on business throughout the State of Sao Paulo. This is said to be a very desirable acquisition, in view of the telephone business carried on by the Rio de Janeiro company.

According to a report for 1914 prepared by F. S. Pearson, the late president of the company, the only department of the Rio de Janeiro division which failed to show an increase of earnings in Brazilian currency was the tramways. There was little extension of the tramway lines, but during the year thirty-two cars were completed and put into operation. The total passengers carried in 1914 were 192,103,645 as compared to 195,783,634 in 1913, while the car-miles totaled 24,815,078 in 1914 and 24,814,760 in 1913. In Sao Paulo a small trackage of 1.72 miles and four freight cars were added. The passenger total in 1914 was 53,732,292 as compared to 56,776,702 in 1913, with a car-mile record of 9,496,091 in 1914 and 9,344,880 in 1913.

General Gas & Electric Company

On account of the acquisition of the properties of the Atlantic Gas & Electric Company on April 29, 1915, the General Gas & Electric Company, New York, N. Y., has issued a comparative interim report showing the combined earnings of all controlled companies for the twelve months ended May 31, 1914, as follows:

	1915	1914	Percentage Increase
Operating revenues	$2,260,171	$2,132,422	6.0
Operating expenses and taxes	1,462,246	1,361,120	7.4
Operating income	$797,925	$771,302	3.5
Other income	18,338	16,977	8.0
Gross income	$816,263	$788,279	3.5

This increase in income was produced in spite of extraordinary expenses necessarily attending a change of management, widespread business depression and, during last winter, exceptionally unsatisfactory conditions for the waterpowers of the company, caused by an unprecedented drought now thoroughly broken.

The General Gas & Electric Company controls the Rutland Railway, Light & Power Company, Rutland, Vt., and the Northwestern Ohio Railway & Power Company, Toledo, Ohio, while the Atlantic Gas & Electric Company properties include no street railways. The proportion of street railway earnings to the total earnings has been reduced by the extension of control from 34½ per cent to less than 16 per cent.

During 1914 the cars of the Rutland Railway, Light & Power Company ran 610,388 car-miles and carried 2,877,235 passengers, these figures comparing with 551,855 car-miles and 2,976,692 passengers in 1913. The Northwestern Ohio Railway & Power Company carried 834,107 passengers in 1914 and 849,989 in 1913, while the car-miles operated in 1914 were 742,609 as compared to 735,771 in 1913.

Commonwealth Power, Railway & Light Company

The condensed comparative statement of income, profit and loss of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., for the twelve months ended June 30, 1914 and 1915, follows:

	1915	1914
Earnings on stocks owned in subsidiary companies	$2,382,175	$2,463,861
Interest and other earnings	500,516	517,823
Gross earnings	$2,882,692	$2,981,684
Expenses and taxes	$104,317	$114,508
Interest charges	602,699	659,842
Total deductions	$707,016	$774,350
Net income available for dividends, replacements and depreciation	$2,175,676	$2,207,334
Dividends on preferred stock*	960,000	960,000
Balance	$1,215,676	$1,247,334

*Includes dividend requirement since May 1, 1913, on the $10,000,000 of additional preferred stock issued as of that date.

During the last fiscal year the earnings on stocks decreased $81,686 and the interest and other earnings $17,306, giving a decrease of $98,992 in gross earnings. Expenses and taxes, however, decreased $10,192 and interest charges $57,143, so that the net income available for dividends, replacements and depreciation decreased only $31,657. Of the amounts standing to the credit of surplus accounts of subsidiary companies there are accruing to the holding company as of June 30, 1915, undistributed earnings of $2,695,672.

Bay State Street Railway, Boston, Mass.—The Massachusetts Public Service Commission has granted its permission for the Bay State Street Railway to issue $1,281,900 of 6 per cent cumulative first preferred stock at $112 to provide for the company's floating debt.

Binghamton (N. Y.) Railway.—The Public Service Commission for the Second District of New York has authorized the Binghamton Railway to issue $90,000 of equipment trust certificates, maturing serially in semi-annual periods and bearing 6 per cent interest. The proceeds will be used to purchase twenty new double-truck steel cars to cost $118,503, the company paying $28,503 in cash.

Birmingham, Ensley & Bessemer Railroad, Birmingham, Ala.—On Aug. 24 Judge W. I. Grubb at Birmingham ordered a foreclosure sale of the Birmingham, Ensley & Bessemer Railroad. The amount due for principal and interest on the company's bonds is said to be $2,831,230. Previous reference to the receivership of this company was made in the Electric Railway Journal of Sept. 19, 1914.

Boise Valley Traction Company, Boise, Idaho.—The Boise Valley Traction Company, recently incorporated in Maine with a capital stock of $1,000,000, is said to be the holding company of the Idaho Traction Company properties in Boise, Caldwell, Nampa and other cities in western Idaho. It is expected that as soon as possible all of the properties of this company will be transferred to the Boise Valley Traction Company.

Burlington County Transit Company, Hainesport, N. J.—The total passenger receipts of the Burlington County Transit Company for the year ended June 30, 1915, were $67,939 as compared to $64,905 in the preceding year, an increase of $3,034. Other income decreased from $5,839 in 1914 to $5,161 in 1915; while the expenses for operation, repairs and renewals were $66,940 in 1915 and $72,735 in 1915, a decrease of $5,794. The balance on hand June 30, 1915, was $7,284, of which $5,000 was for the depreciation and surplus account and $1,000 for tax reserve.

Cleveland (Ohio) Railway.—The operating report of the Cleveland Railway for July shows a deficit of $17,531, the first deficit since the penny charge for transfers has been in effect. This reduces the interest fund to $487,811. June, the first month that the company's increased operating allowance of 6 cents per car mile was in operation, showed a surplus of only $2,939.

Halifax (N. S.) Electric Tramway, Ltd.—The total earnings of the Halifax Electric Tramway, Ltd., for the calendar year 1914 were $645,241 as compared to $605,933 in 1913. Of these totals street railway receipts made up $319,880 in 1914 and $301,771 in 1913. The operating expenses and taxes were $375,123 in 1914 and $337,010 in 1913, with bond interest $30,000 each year, leaving net earnings applicable to dividends of $239,818 in 1914 and $238,924 in 1913. The number of passengers carried increased from 6,876,003 in 1913 to 7,316,727 in 1914, and the car-miles from 1,275,527 in 1913 to 1,370,430 in 1914. The expenditures for capital purposes during 1914 amounted to $41,864. Dividend payments totaled $112,000.

Interborough Rapid Transit Company, New York, N. Y.—The board of directors of the Interborough Rapid Transit Company has declared a quarterly dividend of 5 per cent, payable on Oct. 1, to stock of record on Sept. 22, making a total of 20 per cent for the fiscal year. This is equivalent to last year's payments, but in that year there were regular dividends of 10 per cent and two extra dividends of 5 per cent each. It is understood that the dividend hereafter will be on a regular 5 per cent quarterly basis. At the meeting of the board of the new Interborough Consolidated Corporation, the holding company for the subway corporation, a quarterly dividend of 1½ per cent on the preferred was declared, payable on Oct. 1 to stock of record on Sept. 10. This is the second quarterly dividend paid by the new company. The preferred stock of the old Interborough-Metropolitan Company still outstanding can share in the dividend.

Kansas City Railway & Light Company, Kansas City, Mo.—The managers of the Kansas City Railway & Light Company reorganization, noted in the Electric Railway Journal of Aug. 21, have issued a statement regarding the new street railway franchise and the valuation and the earnings of the street railway and lighting properties in Kansas City. This statement gives a report on the earnings of the Metropolitan Street Railway, the Kansas City Elevated Railway and the Kansas City & Westport Belt Railway, made by P. J. Kealy. The earnings of these railways for the fiscal year ended May 31, 1915, were $6,805,163 as compared to $6,974,815 for the preceding year. This decrease, less than 2.5 per cent, is said to be caused by the general industrial depression existing throughout the country, which affected all public utilities, and by the jitney competition. Such competition in Kansas City is rapidly disappearing and should affect the earnings slightly, if at all, during the remainder of the current year. Mr. Kealy says that the net earnings, after payment of operating expenses (including taxes, maintenance and renewals), will continue to be sufficient to pay 6 per cent on the capital value of the property, both in Missouri and Kansas, and leave a substantial surplus for the city under the new franchise.

Kentucky Traction & Terminal Company, Lexington, Ky.—The gross earnings of the Kentucky Traction & Terminal Company for the year ended June 30, 1915, were $811,628 as compared to $782,271 for the preceding year. Other figures of earnings follow: Net earnings—1915, $379,225; 1914, $369,762; other income—1915, $28,288; 1914, $32,022; bond interest—1915, $203,805; 1914, 201,934; sinking fund and taxes—1915, $33,424; 1914, $43,249; surplus—1915, $170,284; 1914, $156,600.

Macon Railway & Light Company, Macon, Ga.—The Georgia Railroad Commission on Aug. 24 denied the petition of the Macon Railway & Light Company to increase its rates for electric light and power service in Macon. The commission calculated a return of 6.32 per cent on the estimated value of the property and working capital after the deduction of depreciation.

New York (N. Y.) Railways.—The directors of the New York Railways have taken action on the semi-annual interest on the 5 per cent adjustment income bonds for the six months ended June 30. It has not been announced what the statement of income submitted to the board showed available for the income bonds, because the matter has been referred to an arbitration committee for final adjustment. The men appointed as arbitrators are H. H. Porter, of Sanderson & Porter; James Marwick, of Marwick, Mitchell, Peat & Company, and W. G. Ross, of Montreal. This is the third time that this matter has gone to a board of arbitration. In the corresponding six months last year, 1.288 per cent was paid. It is reported that the amount for the first six months of 1915 may be in the neighborhood of 1.75 per cent.

Otsego & Herkimer Railroad, Cooperstown, N. Y.—Judge G. W. Ray on Aug. 21 in the United States District Court at Norwich appointed C. H. Lewis, Syracuse, and James J. Bayard, Cooperstown, as receivers of the Otsego & Herkimer Railroad. The appointment was made on the application of Babcock & Wilcox, Philadelphia, Pa., creditors. This company operates 65.66 miles of single track connecting Oneonta, Cooperstown, Richfield Springs, Mohawk and Herkimer.

Philadelphia & Western Railway, Upper Darby, Pa.—It is reported that almost the entire holdings of the Sheldon-Kobusch interests in the Philadelphia & Western Railway have been taken over by a syndicate which believes the company has a promising future. These holdings included orignally all the $2,000,000 of preferred stock and $1,600,000 of the $4,000,000 of common stock, being a majority of the total $6,000,000 of stock issued. For some time there has been increased activity at advancing prices in the stock of this company. It is said that Edward B. Smith & Company and Brown Brothers & Company are interested.

Public Service Corporation of New Jersey, Newark, N. J.—The gross increase in total business of the Public Service Corporation of New Jersey for July was $119,972, or an increase of 4 per cent. The balance available—after payment of operating expenses, fixed charges, sinking fund requirements, etc.—for amortization, dividends and surplus was $267,201. The increase in surplus available for dividends over the corresponding period in 1914 was $37,150. For the seven months ended July 31 the gross increase in total business was $751,808, an increase of 3.7 per cent. The balance available for amortization, dividends and surplus was $1,864,643. The increase in surplus available for dividends was $186,746.

Winnipeg (Man.) Electric Railway.—The London Stock Exchange has listed an additional £400,000 of 4½ per cent perpetual consolidated debenture stock of the Winnipeg Electric Railway, making a total listed of £900,000.

DIVIDENDS DECLARED

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1½ per cent.

Connecticut Valley Street Railway, Greenfield, Mass., 3 per cent, preferred.

Frankford & Southwark Pasenger Railway, Philadelphia, Pa., quarterly, $4.50.

Second & Third Streets Passenger Railway, Philadelphia, Pa., quarterly, $3.

Washington Railway & Electric Company, Washington, D. C., quarterly, 1¼ per cent, preferred; quarterly, 1¾ per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June,	'15	$15,409	*$8,766	$6,443	$2,169	$4,274
1 " "	'14	15,603	9,590	6,013	2,069	3,944
12 " "	'15	180,955	*110,823	70,132	25,226	44,906
12 " "	'14	175,937	*114,882	61,055	25,286	35,769

DALLAS (TEX.) ELECTRIC COMPANY

1m., June,	'15	$133,277	*$87,213	$45,364	$30,541	$14,823
1 " "	'14	177,620	*105,888	71,732	32,313	39,419
12 " "	'15	1,968,304	*1,145,474	822,830	366,608	456,222
12 " "	'14	2,279,271	*1,342,137	937,134	290,455	646,679

EASTERN TEXAS TRACTION COMPANY, DALLAS, TEX.

1m., June,	'15	$58,585	*$31,325	$27,260	$8,714	$18,546
1 " "	'14	58,251	*34,201	24,050	8,352	15,698
12 " "	'15	672,518	*385,290	287,228	104,567	182,661
12 " "	'14	602,879	*381,490	221,489	78,160	143,329

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., June,	'15	$165,029	*$106,185	$58,844	$28,639	$30,205
1 " "	'14	221,694	*110,281	111,413	28,146	83,267
12 " "	'15	2,185,512	*1,241,232	944,280	346,519	597,761
12 " "	'14	2,457,051	*1,374,886	1,082,165	362,068	720,097

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

1m., June,	'15	$444,458	*$193,753	$250,705	$213,061	$37,644
1 " "	'14	456,181	*215,873	240,308	210,519	29,789
6 " "	'15	2,768,623	*1,165,495	1,603,128	1,269,690	333,438
6 " "	"14	2,841,111	*1,198,482	1,642,829	1,250,688	391,941

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., June,	'15	$50,517	*$35,921	$14,596	$14,593	$3
1 " "	'14	59,531	*40,570	18,961	12,492	6,469
12 " "	'15	645,283	*444,568	197,715	166,043	31,672
12 " "	'14	730,804	*423,422	267,382	154,503	112,879

KEOKUK (IOWA) ELECTRIC COMPANY

1m., June,	'15	$18,957	*$12,854	$6,103	$1,824	$4,279
1 " "	'14	21,381	*13,549	7,832	2,185	5,647
12 " "	'15	241,219	*161,576	79,643	22,448	57,195
12 " "	'15	248,846	*154,123	94,723	31,391	63,332

KEY WEST (FLA.) ELECTRIC COMPANY

1m., June,	'15	$9,259	*$6,690	$2,569	$2,564	$5
1 " "	'14	10,837	*6,918	3,919	2,556	1,363
12 " "	'15	122,637	*87,223	35,414	30,711	4,703
12 " "	'14	139,808	*83,587	56,221	30,709	25,512

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1m., July,	'15	$371,736	$219,703	$152,032	$51,804	$100,228
1 " "	'14	351,658	206,169	145,489	50,848	94,640
7 " "	'15	2,128,387	1,321,350	807,037	360,269	446,768
7 " "	'14	2,073,359	1,265,804	807,554	352,683	454,871

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., June,	'15	$134,484	*$89,537	$44,947	$24,868	$20,079
1 " "	'14	181,432	*97,551	83,881	23,179	60,702
12 " "	'15	1,819,725	*1,057,071	762,254	291,378	470,876
12 " "	'14	2,161,691	*1,211,551	950,140	276,002	674,138

REPUBLIC RAILWAY & LIGHTING COMPANY, NEW YORK, N. Y.

1m., June,	'15	$246,691	*$155,948	$90,743	$57,550	‡$33,634
1 " "	'14	247,828	*152,256	95,572	56,838	‡39,091
6 " "	'15	1,456,919	*916,303	540,616	341,836	‡199,545
6 " "	'14	1,495,732	*929,107	566,625	336,025	‡231,307

SAVANNAH (GA.) ELECTRIC COMPANY.

1m., June,	'15	$63,750	*$41,848	$21,902	$21,305	$597
1 " "	'14	73,014	*49,122	23,892	20,980	2,912
12 " "	'15	813,075	*526,557	286,518	257,344	29,174
12 " "	'14	848,180	*564,169	284,011	253,782	30,229

*Includes taxes. ‡Includes non-operating income.

Traffic and Transportation

JITNEY JOTTINGS

Public Service Commission of the District of Columbia Decides Buses Are Common Carriers

In the matter of the jurisdiction of the Public Utilities Commission of the District of Columbia over motor-bus lines and similar common carriers the commission on Aug. 28 issued the following order:

"Under authority of the law and regulations relating to street traffic in the District of Columbia and of licenses duly issued by the commissioners of the District of Columbia, certain persons, firms and corporations have undertaken the operation of motor buses and other motor vehicles along certain defined routes in the District of Columbia for the transportation of persons for hire.

"It now appears to the commission that the motor bus and motor vehicle service has become established as an important means of transportation to the public. The Public Utilities Law defines the term common carrier as follows:

" 'The term "common carrier" when used in this section includes express companies and every corporation, street railroad corporation, company, association, joint-stock company or association, partnership, and person, their lessees, trustees, or receivers, appointed by any court whatsoever, owning, operating, controlling, or managing any agency or agencies for public use for the conveyance of persons or property within the District of Columbia for hire.'

"The commission is of the opinion that this provision of law includes any person, firm or corporation operating any public motor-bus or motor vehicle for hire or for the transportation of passengers in the District of Columbia with sufficient regularity to enable the public to take passage therein at any point intermediate to the stable or stand of such vehicle or operating such vehicle over a route sufficiently definite to enable the public to ascertain the streets and avenues on which such vehicles can be found en route.

"In pursuance of this opinion and of all the facts developed the commission decides that the following named persons, firms or corporations, operating motor buses or motor vehicles over defined routes in the District of Columbia are engaged in the business of common carriers within the meaning of the Public Utilities Law and are therefore within the jurisdiction of the Public Utilities Commission: Arlington Barcroft Auto Company, Baltimore & Washington Boulevard Motor Company, Inc., Employees of Southern Railway at Potomac Yards, Va., Mrs. C. M. Singleton Jack, Jitney Bus Company, Inc., Thomas M. Nolan, Mrs. Agnes W. Maher, James M. Swain, Stein, Harris & Dulcan, Virginia Auto Service Company, Inc., and Selina M. Wright.

"It is therefore ordered:

"(1) That the above named individuals and corporations and such other individuals and corporations as now or may hereafter engage in the business of common carriers described above shall comply with all the requirements of the Public Utilities Law applicable to them.

"(2) On or before Sept. 10, 1915, the said persons shall submit the following reports: (a) A statement of the number of vehicles operated and the make, type and seating capacity of each vehicle so used. (b) A statement of the route or routes covered in each case. (c) A copy of the schedule on which the buses are operated.

"(3) That the said individuals and corporations shall submit such other reports, special or periodic, as may now or hereafter be required by law or by the orders of the Public Utilities Commission."

The first step in the new legal fight against the jitney ordinance in Philadelphia, Pa., was taken when counsel representing the South Philadelphia, the Philadelphia Jitney Associations and the Union Motor Bus Company filed a bill in Common Pleas Court No. 4 asking an injunction to restrain Director of Public Safety Porter and the Police Department from enforcing the jitney ordinance. If the jitney men succeed in getting a new injunction they will be able, they say, to furnish the $2500 bond to keep it in

force. This they failed to do when Judge Sulzberger suspended enforcement of the ordinance until Sept. 20, resulting in the preliminary injunction being vacated by the court. City Solicitor Ryan has sent two opinions to Director of Public Safety Porter clearing up the legal status of two new matters the jitney situation has brought to light. These opinions, prepared at the request of the Department of Public Safety, established the following:

That motor companies which claim exemption from the requirements and restrictions of the July ordinance regulating the operation of jitneys, on the ground that they are running omnibuses and not jitneys, are subject to all the terms of the omnibus ordinance of 1907, and can be prosecuted for any violation thereof; that the operations of the Cottar Motor Bus Company, which runs four large cars in Germantown and other points, largely over routes not traversed by trolley or other transportation lines, are not in violation of any existing ordinances, and hence are not being favored, as some of the jitney men have charged.

The City Council of Camden, N. J., has received a communication from the granges at Moorestown, Medford and Marlton, N. J., protesting against conditions at the Pennsylvania Railroad ferries at Camden, due to the large number of jitneys that occupy the highways there. They say this congestion interferes with the teams on their way to Philadelphia markets. The communication has been referred to the Street Committee.

E. F. Seixas, general manager of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., Can., with lines from the north to the sound end of Niagara Falls, Ont., has filed a protest with the city authorities against the jitney service inaugurated over the same route by private individuals. The City Council is now preparing a jitney ordinance to deal with this new form of transportation.

An ordinance regulating the use of jitneys in Emporia, Kan., has been passed by the City Commissioners. The ordinance gives the city power to revoke drivers' permits if any provision is violated. The ordinance prohibits the drivers from smoking when carrying women passengers, from excessive overloading of cars, and permits may be revoked for drunkenness or for any misconduct that in the judgment of the commissioners renders the drivers unfit to operate a car.

An interesting turn has been given to the jitney in Elwood, Ind., where some drivers of jitney buses petitioned the City Council to fix an annual license fee for all drivers of jitneys, taxicabs or other vehicles for hire, and for placing each driver under a $2,500 bond. This ordinance has been passed, with the support of the jitney operators, who, it is said, favored it because it will tend to lessen competition from farmers who come into town on Saturdays and hang jitney signs on their cars. Elwood is in Madison County, Indiana, on one of the electric railway lines.

Provisions of the city ordinances in pamphlet form as to operation of jitney buses are being distributed to jitney operators by the traffic police of Nashville, Tenn. A delegation of jitney owners which complained to Mayor Ewing was informed that the city could do nothing but enforce the law as it stood and that the owners should petition the city commission for such relief as they desired.

Jitney buses are on the decline in Louisville. One concern, which fitted up elaborate cars, appears to have quit operation as several of the cars have been hauling lumber. Louisville's Board of Public Safety has undertaken to determine whether such of the jitney buses as are in operation there are carrying more passengers than capacity. One provision of the ordinance which governs the operation of these carriers limits the number of passengers which may be carried to the seating accommodations. It is stated that the practice of overloading is common with the few machines still in the service.

E. W. Allen, Assistant Attorney General of the State of Washington, has ruled that a company which has written a bond for a jitney bus may be released from liability on the same terms and conditions as prescribed by law for the release of individual sureties upon any bond or undertaking. Should such bond be cancelled the permit of the jitney bus operator would be automatically revoked until a second bond has been filed.

INQUIRING INTO NIAGARA FALLS ACCIDENT

Nothing which would tend to show criminal negligence on the part of E. J. Dickson, vice-president of the International Railway Company, Buffalo, N. Y., was brought out on Sept. 1 at the first day's hearing before Magistrate Campbell in the Police Court at St. Catharines, Ont. Mr. Dickson is under bonds of $10,000 charged with criminal negligence as the result of the fatal accident at Queenstown, Ont., on July 7. Mr. Dickson was represented by M. J. McCarram, St. Catharines, Ont., and Frederick A. Chormann, Niagara Falls, N. Y., of counsel for the railway. The prosecution was presented by Crown Attorney Michael Drennan of the Province of Ontario, Canada.

On the first day of the hearing about a score of witnesses were called, among them being members of the car crew and other motormen and conductors, who testified that the brakes on the car were in good working order on the day of the disaster and that the accident was due to slippery rails caused by the heavy rain and the overcrowded condition of the car. E. H. Henning, superintendent of interurban lines of the company, identified certain drawings of the scene of the wreck and the fatal curve. He said the car had been in constant use on the day of the accident and never before gave any trouble on the steep incline leading from Queenstown Heights to the lower level of the Niagara Gorge. He was asked if there was any device which might have been placed on the track at the dangerous curve which would have tended to lessen the danger from disaster in case a car left the tracks. He replied in the negative and explained that probably nothing could be done to check the speed of the car or prevent it from leaving the tracks if the motorman in charge had lost control. Replying to the question if there was a safety switch at the point in question, Mr. Henning said that because of the great speed of the car the chances are that the accident would still have happened even if a derail had been installed. Other witnesses who were called testified that the roadbed was in perfect condition at the point of the accident and that there were no apparent defects in the rails.

It was expected the hearing would continue for several days. The court has no jurisdiction to punish the defendant, but merely to decide whether or not there is sufficient evidence to show criminal negligence to hold Mr. Dickson for the grand jury.

On Sept. 3 Mr. Dickson was absolved from blame for the Queenstown accident by Magistrate Campbell.

Fare Increase Petition Withdrawn.—The Berkshire Street Railway, Pittsfield, Mass., has withdrawn its petition to the Public Service Commission of Massachusetts for permission to increase the fares on its system. According to C. Q. Richmond, general manager, the company is studying various electric railway fare systems and will ultimately file another petition.

Railway in Safety-First Exhibit at State Fair.—The Columbus Railway, Power & Light Company, Columbus, Ohio, is well represented in the safety-first exhibit at the Ohio State Fair. Among other things the company has on display a series of photographs, showing how easily injuries may be received in boarding and alighting from cars, in crossing the tracks both before and behind cars and in many other ways.

Night Freight Service in Cleveland.—The Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, is planning to begin hauling freight next spring in a limited way, under an ordinance passed on Dec. 9, 1912, in Cleveland, which allows freight cars to pass over the streets between the hours of 10 p. m. and 3 a. m. The service has not been established heretofore because of the financial depression which followed shortly after the ordinance was enacted.

Accident Responsibility in Fort Wayne.—According to a report of the safety-first committee of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., 50 per cent of all accidents are due to the negligence of the persons injured. During the last five months eighty-two persons have been injured in automobile accidents on the lines of the company. In forty-two of these cases the automobiles ran into the street cars and in forty cases the street cars ran into the automobiles.

New Seattle Publication Christened.—The Puget Sound Traction, Light & Power Company, Seattle, Wash., has announced that *Electrogram* has been selected from thousands of names submitted in a contest recently closed, to supplant the original title, *What's Its Name*, adopted temporarily for the new weekly publication of the company. As stated in the ELECTRIC RAILWAY JOURNAL of Aug. 28, page 371, the paper will be devoted largely to street railway news and general items of interest to the travelling public.

One-Man Cars in New Albany.—Inroads made on the company's earnings by the jitney buses in New Albany, Ind., are assigned by the Louisville & Northern Railway & Lighting Company as the reason for taking off the conductors on the cars of the Main Street line. Fare boxes have been restored to the forward ends of the cars as they were before the Insull interests took over the local property. The company hopes to be able to continue the conductors on the other lines of the city. At least thirty jitneys are operating in New Albany, a town of about 25,000.

The Augusta-Aiken Fare Increased.—According to the decree of the Railroad Commission of South Carolina, the order authorizing an increased passenger rate on the line of the Augusta-Aiken Railway & Electric Corporation between Augusta and Aiken was to become effective on Sept. 1. The order, increasing the fare between Augusta and Aiken from 25 cents to 40 cents was granted in December, 1914, by the Railroad Commission, and it was to go into effect on Jan. 1, 1915. However, a postponement was granted until June 1 and at that time the Railroad Commission ordered that the new rates be further postponed for three months—making Sept. 1 the date on which the order was to become effective.

Safety First at Kentucky State Fair.—The safety-first propaganda will be carried directly to the Kentucky people who attend the Kentucky State Fair during the middle of September by the Louisville Railway. The company will erect a signboard adjoining the pay-as-you-enter inclosure. The signboard, 6 ft. x 10 ft. in dimensions, will be illuminated with reflectored lights which will make it and its contents useful night and day, an important feature inasmuch as there are night sessions at the fair grounds. At the top of the board will be painted the two words, "Safety First," and underneath will be tacked the various poster cards which the company has been making use of for a year or more in its cars and elsewhere.

Suppressing the Rowdy in New York.—Chief Inspector Max Schmittberger has reported to Police Commissioner Woods of New York City regarding the arrests this summer of rowdies on the street, elevated and subway trains. The report shows an increase in the number of arrests over last summer, but it is pointed out that this is really due to the increase in the number of policemen engaged in suppressing rowdies. During the summer, up to Aug. 30, 1071 arrests were made for disorder in public conveyances, against 622 in 1914. In every inspection district there are now at least four men assigned to plain clothes duty on days when travel is heavy, to arrest disorderly persons. Inspector Schmittberger says that in connection with the efforts to suppress the rowdy, the magistrates are giving every support and rarely are prisoners discharged without a fine.

Retaliation Threatened in Boise.—The separation of the lines of the Boise Railroad and the Idaho Traction Company and the refusal of the Boise Railroad to honor transfers of the other company have resulted in complications which may be followed by resort to the courts. According to an opinion handed down by the assistant attorney general of the State there is no authority in the act creating the Public Utilities Commission for that body to compel the companies which have been segregated to honor transfers issued by each other. Despite this the chairman of the commission announced that he would entertain a complaint on behalf of the city. As a consequence the city officials have entered a complaint with the commission. Mayor Robinson is even reported to have said that if the city fails by this measure to secure the transfer privileges which it is set on exacting from the companies the city will as a last resort modify the stringent jitney ordinance passed some time ago and throw the city open to the jitney operators on a basis so liberal as to insure competition by jitneys with both companies.

Personal Mention

Mr. O. A. Waller has been appointed to succeed Mr. James L. Adams as superintendent of the North and East divisions of the Denver (Col.) Tramway.

Mr. U. E. Coons has succeeded Mr. A. E. Anderson as chief engineer of the power station of the Oskaloosa Traction & Light Company, Oskaloosa, Ia.

Mr. K. R. Hobbe has been elected secretary of the Centralia & Central City Traction Company, Centralia, Ill., to succeed Mr. John Langenfeld, who continues with the company as treasurer.

Mr. John C. Mac Bean, Philadelphia, Pa., has been elected president of the St. Petersburg & Gulf Railway, St. Petersburg, Pa., to succeed Mr. William C. McClure, Peoria, Ill., who has been elected vice-president.

Mr. A. C. Flint has been appointed superintendent of transportation of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, to succeed the late J. C. Espy. Mr. Flint was formerly superintendent of the eastern division of the company, which office will probably be discontinued.

Mr. M. F. Flatley, formerly with the Empire United Railways, Inc., at Newark, N. Y., was recently appointed master mechanic of the Northwestern, Martinsville and Crawfordsville divisions of the Terre Haute, Indianapolis & Eastern Traction Company to succeed Mr. L. W. Hayes, now connected with the Mesaba Railway, Virginia, Minn.

Mr. John Fleming, storekeeper of the Capital Traction Company, Washington, D. C., since January, 1909, has been appointed purchasing agent of the company. Mr. Fleming was born in Reading, Pa., on Nov. 10, 1876. He attended the public schools in Philadelphia, Pa., and Washington, D. C., and entered the machine shop of the Capital Traction Company, then the Washington & Georgetown Railroad, in 1893. A year later he was transferred to the general offices as stenographer and clerk. In January, 1909, he was appointed storekeeper of the company.

Mr. Howard A. Loeb, chairman of the executive committee of the Pennsylvania Lighting Company, Shamokin, Pa., and of the Kentucky Traction & Terminal Company, Lexington, Ky., has been elected to the presidency of the Tradesmen's National Bank, Philadelphia, Pa., succeeding his father, the late August B. Loeb. The new president is only forty years old. After his graduation from the engineering department of the University of Pennsylvania, Mr. Loeb accepted a position with a contracting engineering firm. In 1907 he went to the Tradesmen's National Bank as vice-president.

Mr. James L. Adams, superintendent of the North and East divisions of the Denver (Col.) Tramway, has resigned to assume the vice-presidency and management of the Crown Hill Cemetery Association, which includes the Denver & Crown Hill Railway. Mr. Adams entered the employ of the Denver Tramway on June 15, 1890, as a clerk under Mr. John C. Curtis, then auditor. In 1893 he was appointed to a clerkship under the North division superintendent. From there he was transferred to the South division and thence to the West division. He then took charge of the clerical work at the East division carhouse. After spending some months at the East division, he was called to the auditing department, and became general timekeeper. Here he remained for three years, and until he was appointed superintendent of the West division. From December, 1900, to October, 1901, he continued in this capacity, when he was placed in charge of the East division. In November, 1902, Mr. Adams was transferred to the North division.

OBITUARY

Dr. Joseph J. Higgins, attending surgeon of Fordham Hospital and former surgeon of the Metropolitan Street Railway, New York, N. Y., is dead. Dr. Higgins was born in Terryville, Conn., in 1868.

Jacob G. Metcalfe, former president of the Mexican International Railway, a director of the London Underground Railway, London, England, and recently consulting railway expert for Speyer & Company, bankers, New York, died on Aug. 31 at Pocono Summit, Pa., in his sixty-seventh year.

Construction News

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

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

RECENT INCORPORATIONS

Nashville & Eastern Electric Railway, Nashville, Tenn.—Incorporated in Tennessee to construct a line from Lebanon to Smithville, via Watertown, Alexandria and Liberty, about 35 miles. It is reported that the Nashville, Chattanooga & St. Louis Railway will build the line. Capital stock, $10,000. Incorporators: Charles Edwards, Dibrell Dinges, Guy Davis, G. C. Puckett and T. W. Wade. [Aug. 28, '15.]

FRANCHISES

Los Angeles, Cal.—A franchise for electric railway lines on San Pedro Street from Thirtieth Street to South Park Avenue, on South Park Avenue to Slauson Avenue and on South Park Avenue to Manchaster Avenue will be offered for sale by the Council on Sept. 8.

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a franchise to construct and operate a single-track line on certain portions of Figueroa Street, Denver Avenue, Hoover Street, Menlo Avenue and Vermont Avenue. The sale of this franchise has been advertised for Sept. 8.

Forest Park, Ill.—The village of Forest Park, Ill., acting under the commission form of government, has granted a franchise to the Chicago & West Towns Railway, subject to the approval of the voters at a special election to be held on Sept. 7. The franchise covers the streets which are in use by the company with the addition of Harlem Avenue between Madison and Sixteenth Streets. The franchise includes the usual paving requirements, and all new poles must be of iron and steel. No provision is made for a 5-cent fare beyond the limits of the company's own lines. A bond of $50,000 is required of the company for its faithful execution of the franchise.

Lincoln, Ill.—The Council has set Sept. 21 as the date for a special election to submit to the voters the franchise for the Lincoln Railway & Heating Company.

Peoria, Ill.—The Peoria Railway has received a franchise from the Council to lay a double track on Frye Avenue from Wisconsin Street to Pacific Street, Peoria.

Shreveport, La.—The Shreveport Railways has received a franchise from the Council to double-track its Highland Avenue-Fair Grounds line from Marshall to Creswell Streets on Stoner Avenue and from Stoner Avenue to the end of the present double track on Herndon Avenue, Shreveport.

New Bedford, Mass.—The Board of Aldermen of New Bedford has adopted an order to revoke the franchise of the Union Street Railway to construct a railway on Union Street from Second Street to Front Street, New Bedford, on account of the failure of the company to construct and operate such railway. A public hearing on the revocation of the franchise will be held on Sept. 22.

Westfield, Mass.—The Springfield Street Railway has asked the Council for a franchise to relocate its tracks on Mill Street, Westfield, from West Silver Street to Court Street.

Buffalo, N. Y.—The Public Service Commission of the Second District has approved the franchise of the International Railway granting permission to lay tracks on Michigan Avenue and Ohio Street, Buffalo.

Columbus, N. Y.—The Columbus & Mayville Railroad has received a franchise from the Council to construct a railway through Columbus Township. This is part of a plan to build a line from Jamestown to Clymer. C. P. Northup, Corry, Pa., president. [May 1, '15.]

Linnton, Ore.—O. M. Clark and associates have received a franchise from the Council to operate electric passenger trains between Portland and Linnton on the St. Helen's road. [June 19, '15.]

TRACK AND ROADWAY

***Jasper, Ala.**—Plans are being considered to construct an interurban railway from Jasper to Birmingham, via Ensley, about 35 miles. L. B. Musgrove, Jasper, is interested.

Argenta (Ark.) Railway.—A notice of the surrender of its charter has been filed by this company in the office of the Secretary of State. The company has been consolidated with the Inter-City Terminal Railway, the incorporation of which was noted in the Electric Railway Journal of July 10. C. C. Kavanaugh, president.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to build a loop line in Upland. According to the plans, the line would start from the Mountain Avenue crossing of the San Bernardino-Los Angeles line extending north on Mountain Avenue to the San Antonio Park line.

Marin County Electric Railway, Mill Valley, Cal.—This company has filed with the California Railroad Commission an application for a supplementary order extending the time in which it may sell its stock until April 1, 1916. [July 17, '15.]

Connecticut Company, New Britain, Conn.—Work will be begun at once by this company on the construction of an extension through the northwest section of New Britain. All material for the construction has been ordered. The company will pave between the rails and 2 ft. outside with amiesite, except in Myrtle Street, which will be permanently paved next year.

Boise Valley Traction Company, Boise, Idaho.—The Boise Valley Traction Company, for which articles of incorporation were filed with the Secretary of State of Maine showing a capital stock of $1,000,000 is reported to have been organized to be the holding company of the Idaho Traction Company properties in Boise, Caldwell, Nampa and other cities in western Idaho. Franklin B. Ferguson, Brooklyn, N. Y., president. [Aug. 28, '15.]

Alton, Granite & St. Louis Traction Company, Alton, Ill.—New ties and rails will be laid by this company on the south end of its Second Street line and new rails on the north end of the line, following the repairing and repaving of the street.

Lee County Electric Railway, Amboy, Ill.—This company plans to change the location of its tracks in Amboy and abandon its line on Main Street in favor of a line from Binghamton to Blackstone Street parallel to the tracks of the Burlington Railway & Light Company. This new line will give the company direct connection with both the Illinois Central Electric Railway and the Burlington Railway & Light Company.

East St. Louis & Suburban Railway, East St. Louis, Ill.—This company has been ordered by the Council of Belleville to raise its tracks on East B Street, North Charles Street and North Illinois Street and to replace its rails on West Main Street, Belleville.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—This company is repairing its track on Columbia Street, Fort Wayne, between Clinton and Calhoun Streets. Cars are being routed on other streets while this work is in progress.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—This company has asked the supervisors of Wayne County, Ind., to allow it the responsibility of building a temporary bridge at Main Street, Richmond, which will cost approximately $6,500, the company to pay one-third of this amount.

Tri-City Railway, Davenport, Iowa.—Residents of Colona Avenue, Moline, Ill., have asked for an extension for that thoroughfare. A committee has been appointed to take up the matter with the railway company.

Cumberland Traction Company, Edmonton, Ky.—Cars which will operate on the line of this company, on which construction has been begun in Metcalfe County, Ky., will be of the motor-driven type, each generating its own electricity by means of an oil engine and a dynamo to supply the motors. The track, for a portion of the distance in Metcalfe County, will be laid in the center of the

Glasgow and Edmonton road, conditional rights-of-way having been granted by county officials, pending action of the Fiscal Court. The line will be of standard gage throughout and will connect Edmonton with one of the lines reaching down into that section. Though work has been begun, the definite route has not been determined for the whole distance and will, it is stated, depend upon the amount of stock subscribed by the sections through which various routes are projected. An engineer has been engaged to direct the operations which are being begun under L. J. Metcalfe, Elizabethtown, president. George H. Greenup, Elizabethtown, is vice-president and L. L. Greenup, secretary and treasurer. [Aug. 28, '15.]

New Orleans Railway & Light Company, New Orleans, La.—Residents of upper South Claiborne Avenue have presented a petition to the Council asking that the New Orleans Railway & Light Company be permitted to proceed with the extension of the South Claiborne Avenue line from Broadway Street to Carrollton Avenue, New Orleans.

Bay State Street Railway, Boston, Mass.—The Massachusetts Highway Commission has issued an order approving the new location and relocation of the tracks of the company in Washington Street, from Hanover Street to Lloyd Street, Lynn, and the relocation of the tracks of the company in Myrtle Street at Parker's turnout, Winter Street at Willis Street and Howard Street at Penny's turnout, Saugus.

Boston & Worcester Street Railway, Boston, Mass.—Work has been begun by this company relaying rails and ties on Mechanic Street, Marlboro. The present 60-lb. rail is being replaced with 75-lb. rail.

Massachusetts Northeastern Street Railway, Haverhill, Mass.—Work has been begun by this company repairing its tracks on Plum Island.

Worcester (Mass.) Consolidated Street Railway.—This company is repairing its roadbed on Cameron Street, Clinton. The company is replacing its ties and installing new rail joints.

Detroit, Almont & Northern Railway, Detroit, Mich.—A meeting has been held by Yale and Sandusky business men to urge the extension of this company's lines to these two cities.

Twin City Rapid Transit Company, Minneapolis, Minn.—Work has been begun on the construction of this company's extension of the Snelling-Minnehaha line to the new Twin City motor speedway.

St. Paul Southern Electric Railway, St. Paul, Minn.—Operation has been begun by this company from Hastings through the business district of St. Paul. The cars run over the lines of the St. Paul City Railway inside the city limits of St. Paul.

Springfield (Mo.) Traction Company.—This company has ordered 176 tons of 60-lb. rail to be used on the relaying of its track on Booneville Street. An additional order provides for the installation of new joints. It is stated that the new track will cost approximately $60,000. The company expects to have the track laid by Oct. 1.

Public Service Railway, Newark, N. J.—Work has been begun by this company on the construction of a 1½-mile extension to Carteret. The American Bridge Company has received a contract for a 700-ft. viaduct in connection with this work.

Salem-Pennsgrove Traction Company, Salem, N. J.—It is expected that the necessary funds to build this proposed electric railway between Salem and Pennsgrove will be obtained within a short time and work begun at once. While the du Pont Powder Company will not build the road, a number of the individual members of the company will take stock in the concern and it will be controlled by these men and merchants and business people in Salem. It is believed that the line, which will be 13 miles long, will carry considerable freight. Arthur B. Smith, Salem, is interested. [Aug. 28, '15.]

International Railway, Buffalo, N. Y.—E. G. Connette, president of this company, announces that the directors of the system have decided to provide trolley service along Bailey Avenue on the east side. Tracks will be laid for part of the distance next year. The company has a franchise in the street and a year's extension was granted by the last Legislature.

Jamestown, Westfield & Northwestern Traction Company, Jamestown, N. Y.—This company has been ordered to remove the tracks on West Eighth Street across Fairmount Avenue, Jamestown. This track was laid by the Chautauqua Lake Railroad Company twenty-three years ago for temporary purposes to obtain materials for constructing that line.

Interborough Rapid Transit Company, New York, N. Y.—The contract for the construction of Section No. 2 of Route 29, the Nostrand Avenue branch of the Eastern Parkway subway in Brooklyn, has been awarded to the Dock Contractor Company, New York, for $1,692,371.

Durham (N. C.) Traction Company.—This company's extension on Halloway Street, Durham, has been practically completed and it is expected that cars will soon be operating on the new line.

Goldsboro (N. C.) Street Railway.—Plans are under consideration by this company for the extension of its line from Goldsboro to Seven Springs.

South Fork-Portage Railway, Johnstown, Pa.—Work has been begun on the construction of this company's line from South Fork to Portage, 7 miles. The road has been graded almost the entire distance, rails are being laid at several places along the line and the work of constructing bridges at various points along the right-of-way is now in progress. Robert Pearce, Portage, president. [May 15, '15.]

Shenandoah, Frackville & Pottsville Railway, Pottsville, Pa.—Considerable progress has been made on this company's line to connect St. Clair and Frackville. Over half of the line has been graded and the largest part of it has been completed with the exception of building several concrete bridges. It is expected that the road will be completed this fall. [Aug. 7, '15.]

***Brownsville, Tex.**—It is reported that upon the subscription and guarantee of a bonus of $75,000 by Brownsville citizens, A. A. Browne, president, and J. A. Browne, vice-president, Rio Grande Railway Company, have agreed to standard-gage its line from Brownsville to Point Isabel, 22 miles. It is also planned to connect the Brownsville Street Railway with this interurban railway.

Houston, Richmond & Western Traction Company, Houston, Tex.—The board of directors of the San Antonio Chamber of Commerce has indorsed a proposition for the construction of an interurban railway between San Antonio and Houston, Tex. The proposition was laid before the Chamber of Commerce by E. Kennedy, president of the Houston, Richmond & Western Traction Company on Aug. 26, asking for the indorsement of that body. The existing charter of the company, Mr. Kennedy said, would be amended to include San Antonio and the capital stock increased to $250,000. [Aug. 28, '15.]

Lynchburg Traction & Light Company, Lynchburg, Va.—Construction has been practically completed on this company's extension from the Fair Grounds to Fort Hill and it is expected that cars will soon be placed in operation.

Seattle-Tacoma Short Line, Seattle, Wash.—Owing to the failure of the promoters to complete this line, for which a franchise was granted to Merle J. Wightman and C. E. Muckler in 1907, the city of Seattle may attempt to forfeit three deposits, aggregating $13,500, made by the promoters. Some work was done on the proposed line several years ago but the promoters have not complied with the provision that the line be completed within a certain time. The franchise covers Fourth Avenue and Fourth Avenue South from Jefferson Street to Spokane Street, Seattle.

SHOPS AND BUILDINGS

Pekin (Ill.) Municipal Railway.—The City Council has awarded the contract for the erection of the new carhouse at Glenwood Avenue in the Rosedale addition to Pekin to Fred Helfenstein for $1,796, and work will be begun at once.

New York, N. Y.—The contract for the construction of station finish on Section 2 of Routes Nos. 36 and 37, the Astoria elevated railroad in Queens, has been awarded by the Public Service Commission for the First District of New York to Charles Meads & Company, New York.

Manufactures and Supplies

ROLLING STOCK

City Railway, Pekin, Ill., just received three new cars which will soon be placed in service.

Cleveland (Ohio) Railway has submitted a request to the City Council for authority to purchase eighty cars of the front-entrance, center exit type.

Interborough Rapid Transit Company, New York, N. Y., has been authorized by the Public Service Commission of the First District of New York to use on its elevated lines the 478 composite car bodies ordered by the commission to be withdrawn from service in the subway. The car bodies with new trucks and electrical equipment will be placed in service on the Second and Third Avenue lines of the elevated system, now being third-tracked and reinforced.

TRADE NOTES

M. B. Chase, formerly New York manager of the Sangamo Electric Company, will represent the Stuart-Howland Company, Boston, in the New England territory.

Cincinnati (Ohio) Car Company writes that the weight of 16,800 lb., given for the Marshall (Tex.) steel car in the issue of July 10, pages 72-73, is for the car without electrical equipment. With electrical equipment the weight is 23,885 lb.

Westinghouse Electric & Manufacturing Company, Westinghouse Machine Company and Westinghouse Lamp Company announce the removal of their Chicago offices to the twenty-first floor of the Conway Building, Clark and Washington streets.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" headlights, has received an order for sixteen SE-95 "Golden Glow" headlights from the Granite City Railway Company, St. Cloud, Minn., which makes a complete equipment for the cars on this property.

Hoeschen Manufacturing Company, Omaha, Neb., maker of highway crossing alarms, has recently been reorganized and has moved its factory and office into larger quarters with the Paxton & Vierling Iron Works, at Seventeenth Street and Union Pacific tracks. This change has greatly increased the capacity of the factory and will facilitate the handling of future orders. F. K. Davis, until recently office engineer in the signal department of the Grand Trunk at Montreal, has been appointed general manager, with headquarters at Omaha.

Fibre Conduit Company, Orangeburg, N. Y., has recently received through its New England representatives, S. B. Condit, Jr., & Company, Boston, Mass., orders for the following conduit installations: Worcester (Mass.) Consolidated Street Railway, 150,000 ft. of 3½-in. socket joint; Manchester (N. H.) Traction Company, 210,000 ft. of 3½-in. Harrington joint; Hartford Electric Light Company, Dutch Point, Hartford, Conn., for feeders and interior work, 20,000 ft. of 3½-in. Harrington joint; Charlestown Gas & Electric Company, Charlestown, Mass., for underground service, 20,000 ft. of 3½-in. Harrington joint, and Bangor Railway & Electric Company, Bangor, Me., 3200 ft. of 3-in. Harrington joint.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y., has issued "Novalux Street Lighting Units for Mazda Series Lamps" and "Constant Current Transformers for Mazda Street Lighting Systems."

Trussed Concrete Steel Company, Youngstown, Ohio, has issued a folder describing its line of products, including Hy-Rib, Rib lath, Diamond lath, pressed steel studs, corner beads and base screeds, for roof sidings, partitions, ceilings, interior and exterior plastering, stucco, etc.

Hubbard & Company, Pittsburgh, Pa., have issued a folder describing and illustrating their new product, the Peirce "presteel" bracket. The company announces that the entire line of Peirce channel steel brackets will be duplicated in the "presteel" construction as soon as the dies can be produced.

General Bakelite Company, New York, N. Y., has issued a booklet, "Oxybenzylmethylenglycolanhydride, or Modern Magic," dealing with the production of Bakelite. The publication is 6 in. wide by 3 in. high and halftones are used to illustrate some of the many uses to which Bakelite is being put, among them for electrical instrument covers, terminal blocks, commutators and armatures.

NEW PUBLICATIONS

Purchasing. By C. S. Rindfoos. McGraw-Hill Book Company, New York, N. Y. 165 pages. Cloth, $2.

Electric railway purchasing agents should find in this volume a store of valuable and useful information. While the examples cited and the forms exhibited do not often apply with much force to electric carriers, the principles underlying all are clear and are applicable to purchasing in this field. Important chapters deal with the questions of how to obtain the right article, the lowest price, prompt delivery and favorable terms, and with the subjects of personal qualifications, strategy and departmental organization. Of particular value is the chapter on the legal aspects of purchasing, for it outlines lucidly and succinctly the fundamental legal principles with which all purchasing agents should be familiar, but which for lack of legal training they too often know only in a haphazard way. The author has not done wisely in omitting or treating only briefly the allied subjects of advertising, accounting, traffic and stockroom management. The importance of these subjects in modern purchasing certainly makes them rank far above the question of a separate company for purchasing, on which subject we suspect the writer has an ax to grind. Still the book has a good feature in its being the first extended work in the field, if one can make himself oblivious to the overweening egotism of the author.

Public Utilities—Their Fair Present Value and Return. By Hammond V. Hayes. D. Van Nostrand Company, New York, N. Y. 207 pages. Cloth, $2.

This valuable and comprehensive treatise is a companion to the author's "Public Utilities—Their Cost New and Depreciation," which deals with the methods to be used in appraisals and the general principles underlying the determination of fair present value as enunciated by courts and commissions. The present volume takes up the question of rates, fair value and fair return, and discusses the relation that should exist between public utilities and their patrons. Mr. Hayes states that the mutual obligations of these two parties have been recognized only during recent years, but that it is time for the radicals of each side to give way for a settlement of valuation controversies.

The most general conclusion that Mr. Hayes draws is to the effect that the fair present value must be measured, as far as is possible, by the actual investment made in good faith in property useful to the public. He notes, however, that the ascertainment of this fair present value is complicated by the necessity of finding such a value at the present time for new as well as for old enterprises. When he first suggests in the case of the old companies a compromise value established by investigation as a basis for the future, he seems to be avoiding the real obstacle in finding a suitable valuation method, for only in the case of the old companies now being first considered is there great difficulty in making valuations satisfactory to both parties. Yet later he explains fully the problems that arise in connection with the application of clear-cut methods of valuation to old enterprises of various types, and one of the chief merits of the book is the earnest and impartial effort to show how rigid valuation methods must be reconciled in some details to particular cases in order fairly to satisfy the mutuality of interests concerned.

Besides the discussions on the above-mentioned topics, Mr. Hayes presents two valuable chapters—one on going value, in which he explains an interesting method of calculation and argues for the grouping of preliminary or promotion expenses, costs connected with the physical property and going value, instead of simply using percentages of physical costs; and the other on depreciation, in which he presents a critical discussion of the need of annual reserves for renewals with the best accounting methods therefor. The book is readable and thorough—a sane analysis of existing theory in a vexatious field.