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LIABILITY FOR DEFECTIVE MATERIALS

Up to last week our state courts and the United States Circuit Courts have followed the rule that manufacturers were not liable for injuries resulting from defective materials except in cases where the article concerned was "inherently dangerous," such as a firearm, poisons, etc. The New York Court of Appeals has now reversed this rule, and its decision is of considerable interest in the electric railway industry. The case was one in which the owner of an automobile sued the manufacturer for injuries resulting from the collapse of a wheel after the car had been in use for a year. The motor-car manufacturer showed that he did not make but had bought the wheel from a reliable concern. But the court has now decided that as the "manufacturer of a finished product" the motor-car company is responsible for all defective parts and "was not at liberty to put the finished product on the market without subjecting the component parts to proper test." The collapse of the wheel was shown to have been due to defective wood, and this appears to have been conclusive to the court. The layman is likely to wonder how the manufacturer could be expected to discover a defect in a wheel which did not develop until after a year's constant use. Nevertheless the Court of Appeals of New York decides that such a responsibility rests upon the manufacturer—"the duty of vigilance exists whether you call the danger inherent or imminent," and thus a new terror for manufacturers—and a new safeguard for the public—is established.

THE "SAVING" BY TICKETS

Every once in so often the suggestion is put forward that a railway company can save a great deal of money if it issues tickets at reduced rates, because if passengers do not have to stop to receive change, their ingress into prepayment cars will be facilitated and they will not delay others wishing to board the car. We notice that this idea is again being exploited in the pages of one of our engineering contemporaries. The theory is based, however, on a false premise. A few reconverted cars may have inadequate storage space for passengers, but with the modern prepayment car there is rarely serious delay to car movement caused by a blockade of passengers waiting for the conductor to make change. But if there was much more time lost than there is, the remedy would usually be worse than the disease. With six tickets for a quarter, there would be a direct reduction of 16 per cent in gross receipts for all passengers who buy tickets, and there would be the additional expense of the tickets and

the danger of their being counterfeited. When prepayment cars were first introduced there was a fear that there would be some trouble from this cause, but experience has shown that it was unfounded. People get used to presenting the exact fare when they have it, or, if not, a small coin that can quickly be changed. Indeed, the tendency is to give up the use of tickets even for elevated and subway service where they can be sold in quantities even at no reduction from the standard price. The case of the Boston Elevated Railway, as was described in the ELECTRIC RAILWAY JOURNAL for Jan. 8, is an example.

STANDARDS SHOULD CHEAPEN COST

Communications by H. H. Adams and W. G. Gove, published on another page of this issue, show plainly that the ultimate price-reducing influence of Association standards has been at least an important reason for their introduction. The mere establishment of standards, however, does not complete the operation. To be effective, standards must be used, and this fact, apparently, is one that many member companies fail to grasp. They are neglecting an opportunity, although their way is not barred by any real physical difficulty. By the time an association standard is established, it has run the gauntlet of literally unrestricted criticism and has been subjected to revision from a dozen different sources. Even "those who can never look beyond the confines of their own properties," as Mr. Gove puts it, can exert an effective restraining influence merely on the peculiar grounds of their own alleged "local conditions," and when a proposed standard finally acquires a place in the Engineering Manual, it is truly susceptible of universal application. In its final form it is a compromise between many conflicting ideas, and if the conflict has been too great for generally satisfactory adjustment the standard never gets beyond the committee. Back of the whole procedure there has obviously been the idea that when the electric railway industry can stand as a single unit on matters of common practice its buying strength is increased enormously and the conception of something on which the various companies could get together solely for commercial purposes appears in more than half the items composing the association's list of standards and recommendations. However, without co-operative action the efforts devoted to establishing such compromises are wasted. The standard brakeshoe, for example, is doubtless no better than one that is a half inch shorter or longer, and a master mechanic may be perfectly justified, on technical grounds, in saying that his own particular design

is just as good. Where he is not justified is in overlooking the fact that a universally-used standard would permit the manufacturers to base their production practice upon the normal demands of the whole industry rather than upon the fluctuating activities of their salesmen, and the resultant cheapening of cost would inevitably come back to the railways through the action of competition. That it should be the larger properties with their wealth of engineering talent who are obstructing this well-conceived plan to aid the electric railways, is not alone distressing. It is a reflection upon the common sense of the whole industry.

THE ANNUAL MAINTENANCE NUMBER

While the annual maintenance number issued last week is fresh in the minds of the readers of the *ELECTRIC RAILWAY JOURNAL*, the editors wish to summarize very briefly a few salient features of some of the leading articles which contain so much data of immediate and permanent value. In view of the alarming increase in the up-keep cost of track, line and rolling stock in recent years the men who are responsible for the physical equipment of a railway property have every incentive to eliminate unnecessary elements of expense. They will, therefore, appreciate the radical character of the articles in last week's issue, using the word radical in its true sense of getting at the root of things. Take, for example, the discussion of a shop planning system by F. P. Maize, which describes a successful attempt to reduce both labor and material costs by merely eliminating losses.

Again, the analysis of Cleveland Railway track costs on a unit basis furnishes interesting data of a different character, but having the same fundamental value in that it permits comparison which cannot but suggest means of cost reduction. The study of maintenance costs of the Detroit River tunnel locomotives add to the meager but growing store of information in the electrification field and furnishes a basis for future estimates.

Mr. Harte's article on overhead construction puts at the disposal of overhead men the results of the extensive and varied experience of the Connecticut Company. The summary of gas-welding practice on several railways brings together a remarkable collection of information in this important field. In the special department on "Equipment and Its Maintenance," nearly eclipsed by the more pretentious articles, there are several of excellent value. Under the simple but striking caption "Why Trolley Wire Wears Out," S. L. Foster inferentially suggests the ways in which it can be prevented from wearing out so fast. G. H. McKelway describes an ingenious device for use in drawing current from a trolley wire without interrupting traffic, and H. H. Buchman tells how he "killed two birds with one stone" by sheathing some old cars with steel. All of these articles, and others which have not been specifically mentioned, taken together form an epitome of current maintenance practice which, it is believed, will be of real and practical service to the electric railway industry.

CO-OPERATION BETWEEN CLAIM AND TRANSPORTATION DEPARTMENTS

In the important task of accident prevention close co-operation between the claim and transportation departments is clearly invaluable. This is generally appreciated. Without any intention of throwing cold water upon enthusiastic team-play between such departments, however, it is well to consider the field in which each can be of the greatest usefulness in work of this kind.

The main service of the claim department naturally concerns itself with the settlement of accident cases, and, so far as practicable, outside the courts. By reason of exceptional facilities for accident analysis, this department is always in a position to supply the transportation branch of the company organization with information of the utmost interest and worth to the operating man, to say nothing of the benefits to the mechanical department resulting from the investigations of the claim agent and his assistants. Then too, the claim department's knowledge of accident causes renders its staff helpful to the public at large in a good many cases. These conditions qualify a well-conducted department of this kind to submit expert advice to the transportation department, and through a very wide range of operating practice.

As the importance of prevention has become appreciated, the broad knowledge of the claim department is being turned to account more and more in campaigns against the occurrence of accidents. Some of the best work in this field has been done by claim agents. Their experience with the public specially fits them to understand the point of view of the individual patron and unquestionably enables them to appeal for "safety first" in terms which the average man and woman find thoroughly familiar. The claim agent's point of view is also more detached than that of the operating man as he travels about the system, and this, combined with the minute study of accidents which falls to the claim department, make its conclusions and recommendations worthy of the most serious consideration by the transportation department.

These recommendations, however, should practically always be put into effect through the proper channel, not only to maintain the highest standards of discipline in the transportation department but also to enable the latter to pass upon the submitted views and suggestions of the claim agent and his subordinates before they are turned over to the operating organization for service trial. Whenever a representative of the claim department, for example, gives an illustrated talk on safety before a body of platform men, inspectors, etc., the announcement of the meeting should be made by the appropriate transportation official, who should be present in person or represented by another transportation executive of standing in the eyes of the men when the lecture is given. Everything of this sort should be handled under the auspices of the transportation department.

The giving of direct advice and suggestions by claim department representatives to men actually engaged in car service at the moment is liable to disturb the

smoothness of operation, although of course an important exception should be made in connection with advice offered to prevent an immediate accident. One difficulty about such informal advice is that it often develops the fact that the giver has never operated a car himself or is not familiar with all of the conditions in the transportation department facts which go far to nullify the usefulness of the advice in the eyes of the unformed employee. Exigencies of which the claim department is not aware sometimes dictate the use of rolling stock or the handling of traffic under unfavorable conditions, and where the transportation department has an opportunity to weigh the ideas of the claim department and is with the rarest exceptions the sole channel for putting operating practices into effect, the efficiency of inter-departmental co-operation is sure to run higher than where the lines of mutual activity are less clearly defined.

COST OF STOPPING A CAR

Recently two of our readers, apparently interested in the matter of the economies that accompany the skip stop, have asked us to state the cost of stopping and starting a surface car. We would feel fortunate if we were able to make a direct answer, but the problem, like that of the proper size for a cart wheel, involves by far too many variables to be definitely solved even for a special case, let alone a general one.

Even at the very beginning of such an investigation there arises the question as to whether the problem is to be limited to the cost of any one particular stop, or whether it is to be expanded to include the results that would be attained if a large number of stops were either introduced or eliminated, thus affecting schedule speed. The latter alternative, of course, would have to be accepted in case the answer to the problem is to be applied in a discussion of the merits of a skip-stop scheme. Yet in this case the actual stops are no more than a contributing cause; the real cost of making them is submerged in the far-reaching effect that their elimination may or may not have upon schedule speed, and one enters into a maze of contradictory and absurd conclusions just as soon as an attempt is made to express the result of higher speed in terms of expenditure per stop.

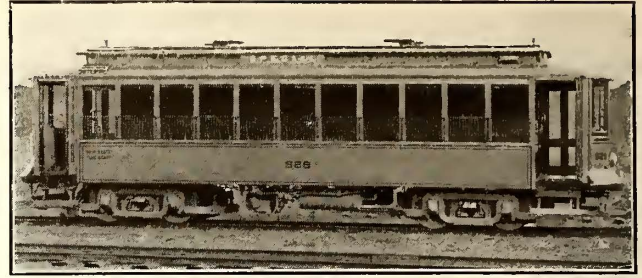
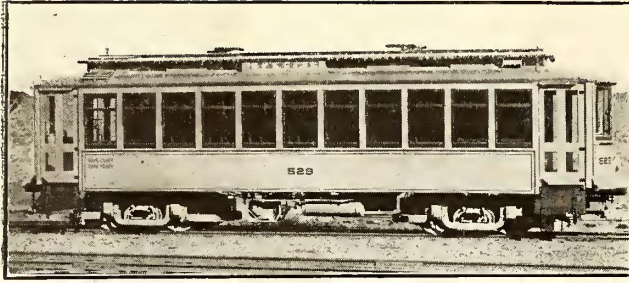
Any single stop, for example, involves a loss of time, but its elimination would not mean that all the consequent expense would be saved. The time loss for one stop, amounting to, say, fifteen seconds, could hardly affect schedule speed even on the shortest of runs. On the other hand, when a large number of stops are eliminated, an increase of 10 per cent and more may occur in the speed, and this in turn effects a corresponding reduction (or its equivalent) in two-thirds of the operating expenses, as pointed out by B. F. Wood in the *ELECTRIC RAILWAY JOURNAL* for Jan. 1, 1916. The potential expenditure involved in a stop may, therefore, be large, yet the proportion of this expenditure that may be saved by eliminating the stop depends altogether upon the number of favorable factors that may be introduced by the surrounding circumstances.

For this reason the phases of the question dealing with the transportation department cannot be considered unless particular cases are selected and every detail of the operating conditions is known. If a number of stops are to be eliminated the saving must be considered only with regard to the resulting increase in schedule speed, and if this problem is worked out by the method that was followed by Mr. Wood in his article—an analysis of all operating expenses—the direct expenditure due to each stop would be included in the general figures and would not require a separate investigation. There remains, in consequence, only the possibility of determining the expense that is directly involved when a car is stopped and started. This includes consideration of only power and mechanical wear and tear and must of necessity be no more than the roughest of approximations. However, on this basis a generalization may be made.

For the cost of power in d.c. form a unit value of 1 cent per kilowatt-hour may be assumed. This is based upon a liberal estimate of actual cost at the car on a railway of moderate size, overhead charges being not included for arbitrary reasons. Assuming a 26-ton car with four 40-hp. motors, the current input during acceleration on resistance would be of the order of 150 amp. for, say, four seconds and 300 amp. for five seconds. After all resistance is cut out there will be a draft of current averaging, say, 160 amp. for about five seconds more, by which time the car would be well under way. At 500 volts this would total approximately 400 watt-hours, having a value of 0.4 cent.

With regard to wear and tear due to stops it may be said that this affects almost every item in maintenance, which should amount to some 2.5 cents per car-mile altogether. Motors, control and air-brake equipment do work, in city service, that is practically in direct proportion to the number of stops. Even trucks and car bodies are affected largely by the racking that comes from rapid acceleration and braking. Some items, wheel wear and axle wear for example, are not influenced greatly, but each is generally small in amount when compared with the whole, being of the order of, say, 0.05 cent or 0.1 cent per car-mile. It is thus possible to say that, generally speaking, wear and tear due to stops should amount to some two-thirds of the whole cost of maintenance, or, say, 1.6 cent per car-mile. If the average car makes ten stops per mile, including those necessitated by vehicular interference, and the cost of wear and tear is distributed over all stops, the cost per stop would be 0.16 cents.

When this figure is added to the previously estimated cost of power, the total direct cost per stop would become 0.56 cent. Since this is the roughest kind of an approximation, however, the figure of 0.5 cent per stop might perhaps be more convenient to use, and this is presumably close enough to the truth for purposes of generalization. However, it should be emphasized, as mentioned previously, that this represents only the direct cost, and that the figure makes no allowance for the losses in time, which may have a very much larger cumulative value.



REBUILT CARS—VIEWS SHOWING CARS AT WORCESTER, REBUILT FROM TWELVE-BENCH OPEN CAR; ONE VIEW SHOWING CAR ARRANGED FOR WINTER SERVICE, THE OTHER AS ARRANGED FOR SUMMER SERVICE

Open Cars Changed to Prepayment

Features of Remodeled Rolling Stock on the Springfield and Worcester Systems Provide for Rapid Handling of Traffic, Entire Freedom from Boarding and Alighting Accidents, Convenience of Access and Satisfactory Service at All Seasons

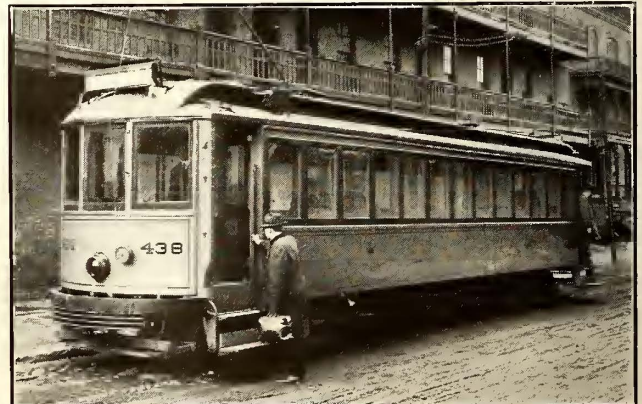
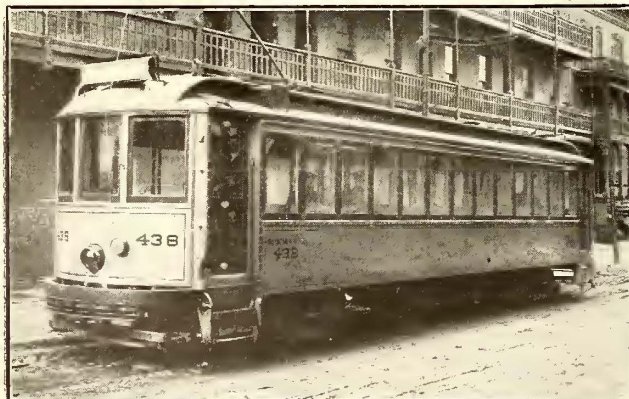
FIFTY-THREE open cars are being remodelled for all-the-year-around prepayment service by the Springfield (Mass.) Street Railway and Worcester (Mass.) Consolidated Street Railway, and as far as the Equipment has been placed on the local lines, it is giving excellent satisfaction from the standpoints of the public and of the operating organizations. The endeavor has been to secure a commodious car, safety in boarding and alighting through the use of folding doors and steps, adaptability to all weathers, easy access and the advantages of prepayment service. The change is being made at a cost, including all new equipment, not exceeding \$1,500 per car, the work for the Springfield lines being done by the Wason Manufacturing Company, Brightwood, Mass., and that for the Worcester lines by the Osgood-Bradley Car Company, Worcester, Mass.

Thirteen of the Springfield cars are being rebuilt from fourteen-bench and fifteen from twelve-bench opens. All the Worcester cars are being converted from twelve-bench units. The general redesign of the cars is the same for both roads, the equipment all being of the double-truck type, with four motors, straight air-brakes, 33-in. wheels and without interior bulkheads. The doorway entrance is 32 in. wide, compared with a frequent allowance of 21 in. to 23 in. in a prepayment platform car with center post or stanchion. The platform is on the same level as the floor of the car, and both cross and longitudinal seats are provided. The converted fourteen-bench cars seat fifty-two passengers each and the smaller units forty-four passengers. The

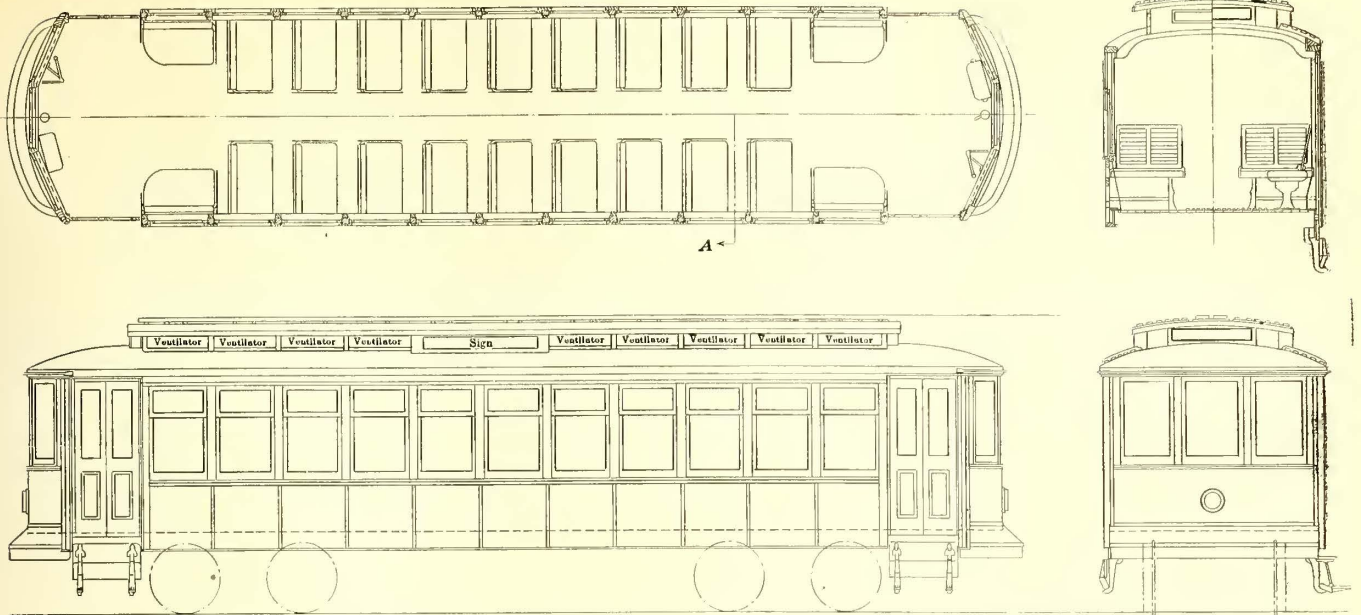
fourteen-bench cars when rebuilt are about 44 ft. long over all, the converted twelve-bench units being about 39 ft. long. All are equipped with GE-80 motors, with 19.67 gear ratio, Standard 050 trucks, Pfingst fenders, Gold electric heaters, Perry ventilators, GE air brakes, Murphy sand boxes, Crouse-Hinds headlights, Wilson trolley catchers and International registers and fare boxes. A 7-in. Hedley anti-climber, 5 ft. long, is installed on each end, extending below the present buffer and braced by 3-in. x 3/4-in. irons.

The provision of a common level for vestibule and car flooring, with an unusually wide entrance tends to increase the speed of loading and unloading somewhat, and the step heights are favorable to the free movement of traffic. A maximum of 14 in. is allowed between the top of the rail and the first step, the riser heights on the two steps being 13 1/2 and 12 1/2 in., including a 1/4-in. safety tread 3 in. wide at the edge of each. The aisles are 27 in. wide between cross-seats, giving a desirable freedom of movement within. The fare box and door-operating handle, which also controls the movement of the entrance steps, are mounted on a 1-in. pipe frame stanchion inside the vestibule, as shown in the accompanying interior view looking toward the conductor's post.

Passengers leave by the front door, another feature contributing to prompt handling of traffic. Slightly less time is required for loading than on the latest types of prepayment cars used at Springfield, the unloading time being about the same. The vestibule doors are



REBUILT CARS—CAR FOR SPRINGFIELD REBUILT FROM FOURTEEN-BENCH OPEN CAR; ONE VIEW SHOWING DOORS CLOSED AND STEPS FOLDED, THE OTHER SHOWING DOORS OPEN AND STEPS DOWN



REBUILT CARS—GENERAL ARRANGEMENT OF 39-FT. CONVERTIBLE CAR FOR WORCESTER, REBUILT FROM AN OPEN CAR

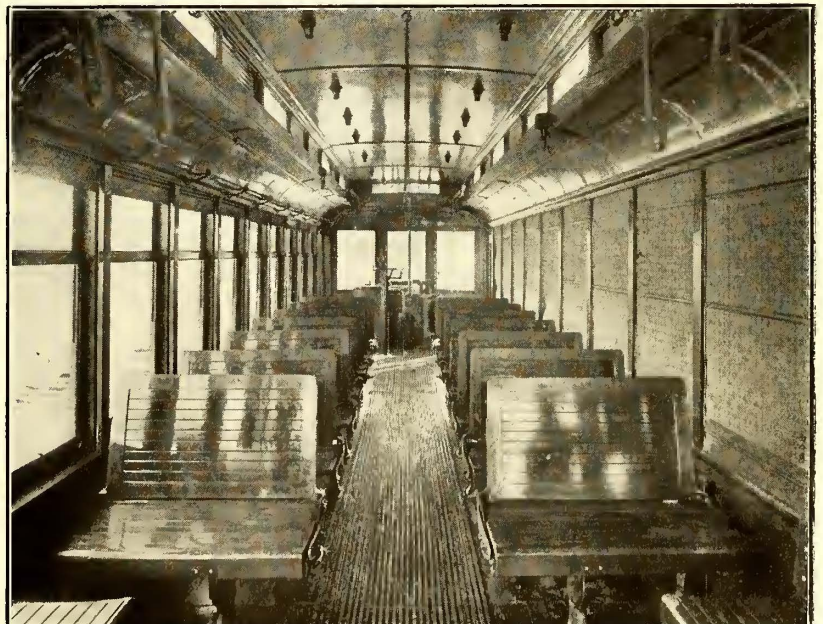
provided with wired-glass sashes carried nearly to the floor, and the step risers and vestibule head linings are marked to guide the movement of passengers forward from the time of boarding to the time of alighting. The width of the car inside at the usual bulkhead location is 7 ft. 1 in., and the steps are 32 in. long. The step hanger with steps folded extends only 1½ in. beyond the car.

In rebuilding, the former cross-seats are dismantled, but the main framing is left intact. The sills are furred out even with the side posts and the necessary strips applied to straighten the posts so that they will receive the panels, which are of sheet steel and carried to a point 26¾ in. above the floor. The top edge is finished with a pressed steel stool which receives the curtains and sash, these being applied from the outside. In the Wason cars the space between the underside of the letterboard and the stool is filled with mahogany sash, carrying one light of double thick glass. The

sash are fastened to the side of the car with iron battens over the joints and bolted through the posts with nuts set in flush on the inside of the post, the bolts being arranged so that, when the sash are removed, they can be screwed in tight against the post to stop the holes and make the finish, the inside of the post being covered with a 2-in. x ½-in. strip screwed upon the post and painted to match the interior finish.

All four corners are provided with double folding steps, both steps on each side of each platform being worked as a unit in connection with the double folding doors. The left-hand steps are arranged to work from the conductor's control staff, which is placed at a point approximately under the end plate, the steps on the opposite side being worked from the motorman's control staff. The steps are provided with a spring balance to facilitate easy working.

New flooring is laid as required in rebuilding, and the previous underframing is utilized, together with the



REBUILT CARS—CAB OF SPRINGFIELD CAR LOOKING TOWARD CONDUCTOR'S POSITION AND SHOWING DOOR, STEP-OPERATING HANDLE, FARE BOX AND REGISTERS; INTERIOR OF WORCESTER CAR CONVERTED FROM TWELVE-BENCH OPEN CAR

posts and roof structure. Corrugated floor matting is provided in the aisles between the cross-seats, and the latter are of the Walkover type, eighteen being provided in the case of the fourteen-bench cars and fourteen in the case of the twelve-bench cars. All seats are of birch slats without other covering, and the cross-seats are 36 in. long and 18 in. wide, spaced 14 in. apart in the clear, with curved backs 15 in. high. The seats are provided with concave surfaces, but have no foot rests. There are four longitudinal seats in each car at the ends, 5 ft. 1 in. long by 2 ft. 4 in. wide, the backs being 12 in. high. The "Faraday" push button signal system is provided, and the cars are equipped with a row of 23-watt tungsten lamps along each side and supplemented by three similar lamps in a central row, there being nine lamps per side in the larger cars.

The side curtains of the former open cars are removed, cut off and rebound with a flap 2½ in. wide at the bottom so as to prevent water from beating in over the stools. The motorman is provided with a curtain 33 in. wide which is made of old curtain material taken from the end panels of the open cars and which drops to within 28 in. of the floor. Straps are attached to the monitor sill by a 2-in. x 2½-in. iron plate screwed to the sill. A heater is located under each seat and "Utility" automatic temperature control is provided.

All the wiring except that between motors and controllers, and other circuits beneath the car is done by the builders. All cars will shortly be equipped with a line switch governed by the door opening, so that it will be impossible to start a car in case the doors are open. In general, the builders are made responsible for the superstructural wiring.

The Worcester cars are provided with a smaller top sash which can be opened by releasing appropriate locks, the Springfield cars being equipped with single sashes which are fixed in position and removable only for summer service. Two grab handles are provided at each entrance door and one at each exit door. The weights of the fourteen-bench car before and after rebuilding are approximately 45,900 and 50,000 lb. respectively.

Montreal Recruiting Car

That the Montreal (Que.) Tramways are taking an active part in the Canadian recruiting campaign is evidenced by the accompanying illustration of a single-truck car which is being used at the present time



MONTREAL RECRUITING CAR

by the 148th Battalion for recruiting purposes. This car is placed in the park space on Victoria Square at St. James Street directly in front of the Queen Victoria monument.

The Siemens-Schuckert Works in Germany have introduced a controller handle and reverser handle made of iron and wood with which to replace the copper and brass handle now used on tram cars, so that the latter may be "mobilized" for army use.

Purchasing Agents Organize

General Objects and Subjects of Discussion for Columbus Association Are Outlined—Office Hours for Salesmen Are Utilized by One Member

THE membership of the Columbus Purchasing Agents' Association, the organization of which was briefly described in the *ELECTRIC RAILWAY JOURNAL* of Jan. 15, page 140, consists of the purchasing agents, buyers and other persons having authority to specify and buy, but not primarily engaged in sales, in the city of Columbus. The association is now a branch of the National Purchasing Agents' Association. The main objects of the body are the promoting of friendly relations among the members, the interchange of ideas, the familiarizing of the members with the products they buy, the securing of more uniform purchasing methods, the standardization of specifications, classifications, etc., the gathering and the dissemination of data on buying, and the improving of existing methods for the diffusion of market information. From time to time specialists will be secured to address the members on topics and problems of importance.

One of the points that should be emphasized, in view of the erroneous views of some persons in this regard, is that no prices are divulged in the meetings of the association. The discussion will cover such topics as the "order blank," with the idea of producing a more uniform blank with all necessary information, but with unnecessary printing eliminated; the standardization of all forms, with necessary data such as f.o.b. point, time of delivery, etc., included; methods of making requisitions; follow-up methods; filing systems, etc.

In cases where any members have unfavorable experiences with manufacturers which would reflect upon the standing of the latter, the incidents will be related at meetings that are for members only. On the other hand, when manufacturers show themselves to be above the average in handling their business transactions, this fact will also be brought to the attention of the association. Thus there will be a decided tendency to eliminate unscrupulous dealers and make the way easier for firms maintaining high standards of service and material.

One of the charter members of the association, W. V. C. Bulkeley, purchasing agent Columbus Railway, Power & Light Company, has in his department a practice that will undoubtedly come up for discussion and probably for emulation. This is the practice of having office hours for visiting salesmen between 9 a. m. and 11.30 a. m., and of showing this fact on all forms that pass outside of the company, such as bid, order and tracer forms and all letterheads. With a large number of salesmen passing through Columbus, and with a convenient location in the downtown section, Mr. Bulkeley has found it decidedly to his advantage to maintain these office hours so that he can have the afternoon to take care of his office work and also that of the store-rooms, which are under his control. Moreover, it is of decided advantage to the salesmen to know that there is a definite time when they can see the official with whom they desire to transact business. The plan causes all of the salesmen for the day to visit the office in the period of two and one-half hours, which naturally shortens the time consumed by the purchasing agent in seeing them, and furthermore makes it possible for him to set special appointments for afternoon meetings, which are not interrupted. If salesmen from out of town passing through Columbus happen to arrive in the afternoon, and it would not seriously inconvenience the work of the department, they would, of course, be seen, but inasmuch as the office hours are well advertised they are generally understood.

Determining the Actual Length of Ride

Description of a Traffic-Count Method to Show the Average Length of Ride in Urban Electric Railway Service, and Relative Proportions of Passengers Taking Long, Short and Average Rides

By D. J. McGRATH

Research Assistant Massachusetts Institute of Technology

IN spite of the occasional traffic counts and investigations that have been made in various American cities, there is almost no information available as to the average length of ride taken by passengers on the urban electric railways, and with one trifling exception, nothing as to the relative proportions of the passengers taking long, short and average rides. Many claims have been advanced by railway operators that they are carrying passengers too far for the 5-cent fare, and, on the other hand, some people claim that a large proportion of the patrons have to pay 5 cents to ride a very short distance.

For the purpose of obtaining some positive data upon this subject and to develop and test a method for ob-

Elevated Railway. James A. Emery of the Department of City Transit, Philadelphia, furnished some valuable suggestions from his experience with traffic investigations in that city. The agreeable attitude of the general public of Boston was, of course, the one most essential factor in the success of this work. That out of about 10,000 persons questioned only an occasional refusal to give information was met with, speaks well for the attitude of the public and the spirit of the students who were conducting the work.

The inbound traffic on six representative lines of the surface system was studied, as well as the outbound traffic from the center of Boston on the north and south-bound rapid transit line. The amount of data thus obtained came from only a comparatively small portion of the total passenger traffic in and about Boston, and to make a thorough investigation of this system would require a somewhat more extensive campaign. The main object of this particular investigation was to prove that it is both possible and practicable to determine with some accuracy the proportions of passengers taking rides of various lengths on a complicated city electric railway system.

The results as presented in the following discussion are valuable in that they demonstrate these important points:

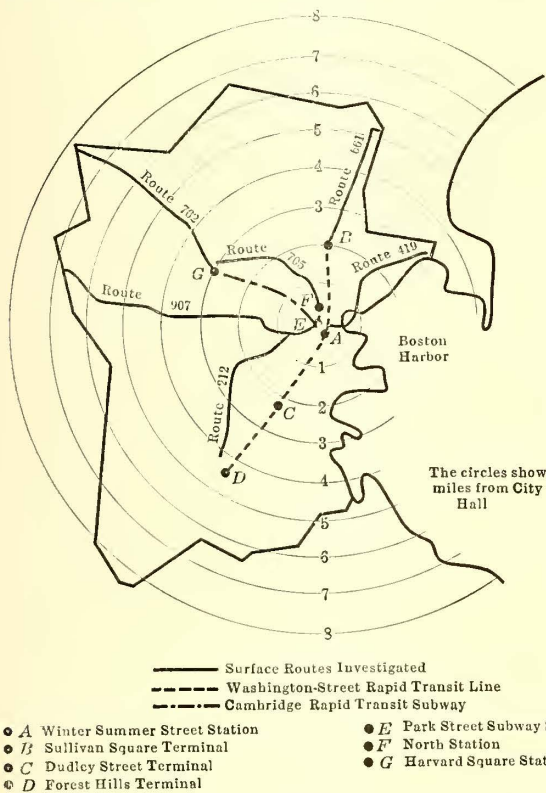
1. That there is a very considerable amount of passenger traffic throughout the city riding 5 miles or more for 5 cents.
2. That the amount of extremely long riding, such as from one suburb through the center of the city out to another suburb, is appreciable but not abnormally large.
3. That there is a considerable amount of short riding of 2 miles or less for the same fare, 5 cents.
4. That it is evident on all the lines studied that the average transfer-passenger rides further than the average non-transfer passenger, and, moreover, the average length of ride is still further increased for those passengers using double and triple free transfers, as is possible on the Boston system.
5. That the average length of ride, from start to ultimate destination, of passengers originating on the lines studied, is as follows:

| | |
|---|-----------|
| Route 212, Jamaica Plain to Park Street, Subway..... | 2.9 miles |
| Route 419, Orient Heights to Scollay Square..... | 3.0 miles |
| Route 661, Linden to Sullivan Square*..... | 5.4 miles |
| Route 705, Harvard Square to Subway via North Station | 2.7 miles |
| Route 762, Arlington Heights to Harvard Square*..... | 5.8 miles |
| Route 907, Newton and Brighton, Park Street to Subway | 4.3 miles |
| Route 907, Newton and Brighton, Park Street to Subway | 4.5 miles |

*At these points, passengers transfer (free) to the rapid-transit trains, which take them in to the center of Boston.

The two counts on the last-named line were made on different days of the week and on a different running schedule for the observers, the results checking remarkably well.

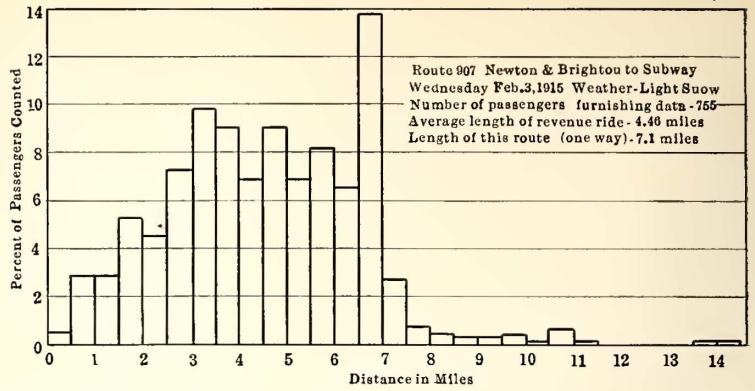
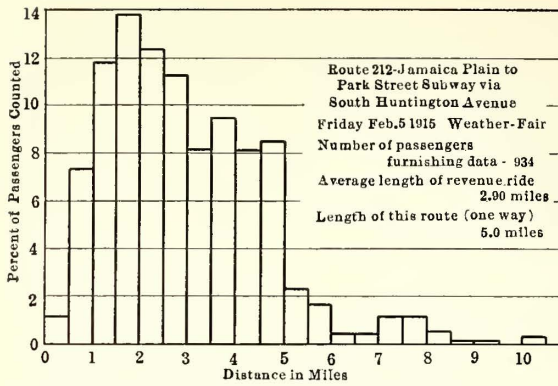
The map, Fig. 1, shows the whole single-fare area of the Boston Elevated Railway system in which universal free transfers are offered between surface, subway and elevated lines. The map also shows the various locations of the six different surface lines which are named above.



TRAFFIC COUNT—FIG. 1—SHOWING SINGLE-FARE UNIVERSAL-TRANSFER AREA OF BOSTON ELEVATED RAILWAY AND REPRESENTATIVE LINES

taining such data, the research division of the electrical engineering department of the Massachusetts Institute of Technology secured permission from the Boston (Mass.) Elevated Railway to conduct an investigation upon its lines in the spring of 1915. A party of eight senior students in the electrical engineering course at the institute volunteered to perform the work of securing and tabulating the data as their thesis.

That their efforts were successful and the results so satisfactory was due in no small measure to the assistance and friendly interest of Matthew C. Brush, vice-president, Edward Dana, superintendent of traffic, and the transportation employees generally of the Boston



TRAFFIC COUNT—FIGS. 3 AND 4—SHOWING THE PROPORTION OF PASSENGERS TAKING VARIOUS LENGTHS OF RIDE ON BOSTON SURFACE ROUTES 212 AND 907

In order to obtain data in the matter under inquiry, it was necessary to determine in some way the origins and destinations of a representative number of passengers on representative lines of the whole railway system. After formulating and discussing a number of possible plans, it was finally decided to place two observers on inbound surface cars of the lines chosen, these men to note the street where each passenger

sengers. The reasonable assumption was made that outbound traffic on the lines studied would probably be substantially the reverse of the inbound.

A sample of the form of traffic-count slip used in the surface-line work is shown in Fig. 2. An individual slip was presented to each cash-fare-paying passenger as he boarded the car, one of the observers being stationed at the prepayment entrance of the car for this purpose. In the upper space on the slip, marked "boarded," this observer wrote a number designating the street at which the passenger boarded and then handed the slip to the passenger, who carried it to his seat. The second observer went back and forth through the car, collecting the slips, asking the necessary questions, and recording the answers on the slips.

| | | | | | |
|---|--|--|--|--|---------|
| | | | | | BOARDED |
| | | | | | No 6258 |
| PLEASE KEEP THIS CARD FOR THE COLLECTOR | | | | | |
| <p>The Boston Elevated Railway is co-operating with the Massachusetts Institute of Technology which is making a study of transportation in a number of cities.</p> <p>Your co-operation is desired and will be appreciated.</p> <p>Please inform the collector where you are going on the cars, that is, your final destination, and if change of cars is to be made state the route you intend to use.</p> | | | | | |
| Boston Elevated Railway Co. | | | | | |

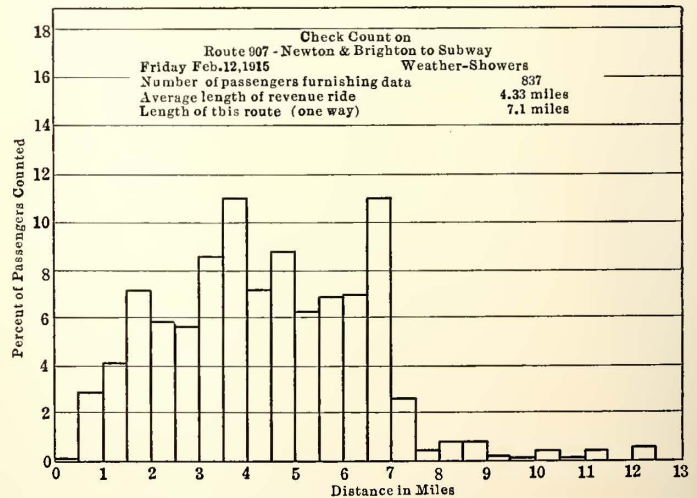
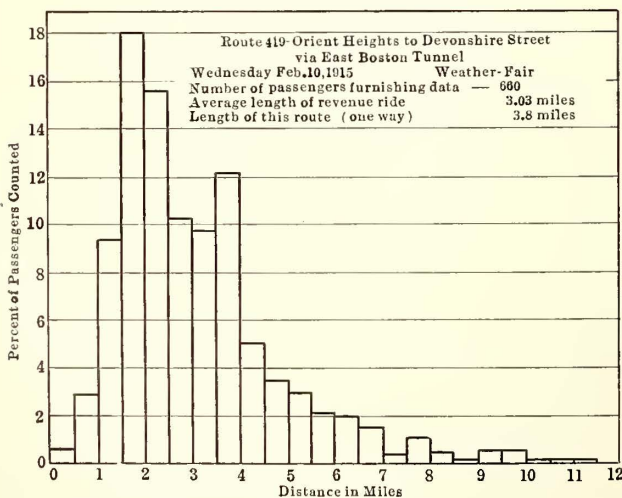
Two pairs of observers were assigned to each line, and they worked practically continuously from 7 a. m. to 7 p. m. on a schedule prepared in advance. Although only a portion of all the trips were covered on any one line, it is confidently believed that sufficient data were obtained to be representative of average conditions, and this belief is supported by the close correspondence of the results obtained on the two different days chosen on the Newton-Brighton line to check the accuracy of the method.

TRAFFIC COUNT—FIG. 2—SHOWING FORM OF SLIP USED IN SURFACE-LINE INVESTIGATION

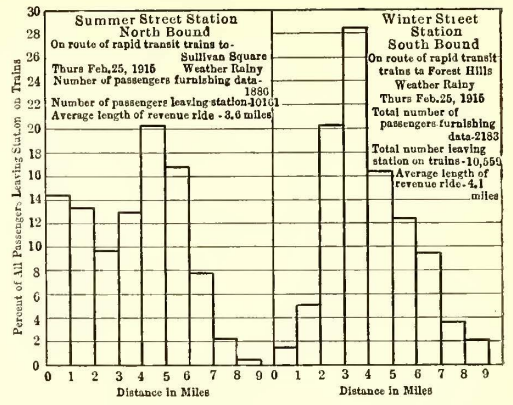
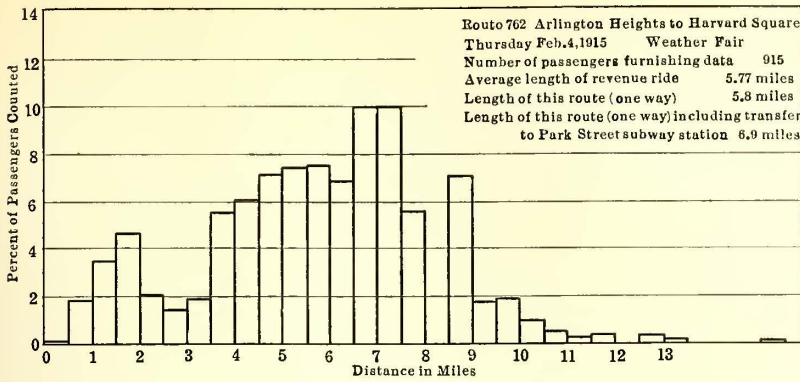
boarded the car and to learn by directly questioning the passenger his intended ultimate destination route.

As the traffic on these lines is quite heavy and the number of men available for the work was limited, only a part of all the trips run on a given line on the day of the count could be covered. Only inbound traffic was studied, as the fare and transfer system in the intown stations is so complicated that it would require a second question to learn the point of origin of outbound pas-

engers. In the investigation of the traffic outbound from the center of the city on the line of the Washington Street tunnel a different procedure was followed. The Winter Street station (at point A, Fig. 1) was chosen for questioning southbound traffic and the Summer Street station (also at point A, Fig 1) for northbound. These two stations are located at practically the same point in the very center of the downtown shopping and business



TRAFFIC COUNT—FIGS. 5 AND 6—SHOWING THE PROPORTION OF PASSENGERS TAKING VARIOUS LENGTHS OF RIDE ON BOSTON SURFACE ROUTE 419, WITH CHECK ON SURFACE ROUTE 907



TRAFFIC COUNT—FIGS. 7 AND 8—SHOWING THE PROPORTION OF PASSENGERS TAKING VARIOUS LENGTHS OF RIDE ON BOSTON SURFACE ROUTE 762 AND ON RAPID TRANSIT LINES

district. Observers worked at these two stations continuously from 7 a. m. to 11 p. m. on Thursday, Feb. 25, 1915.

On this work, no riding was done on the trains, but the passengers were questioned as to their ultimate destinations while they waited on the platforms for their trains. Practically all the passengers entering these stations were cash-fare ones—that is, they began their ride at this point. This was, of course, before the present Cambridge Subway extension was opened at Washington Street. The interval between trains was generally sufficient to permit the observers to approach and question a considerable number of waiting passengers. No attempt was made to question all the passengers, only a representative number being desired. The results showed that the observers succeeded in obtaining information from a total of about 20 per cent of all the people entering these particular stations throughout the day.

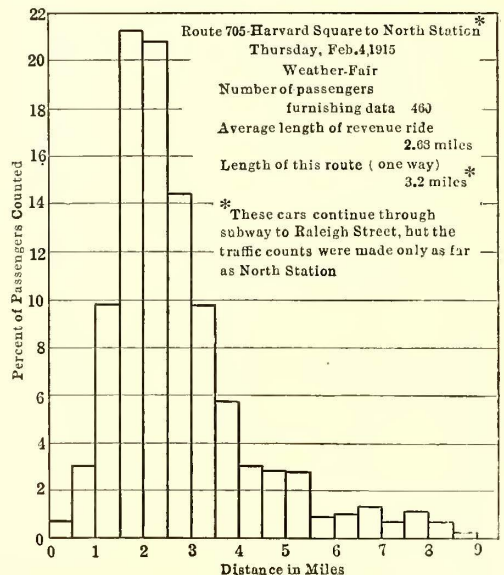
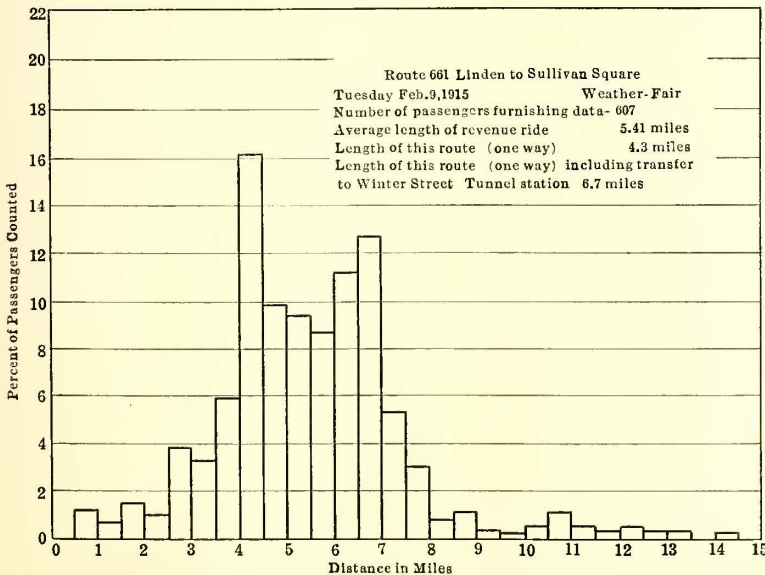
As the trains operated in this subway run to the Sullivan Square and the Dudley Street and Forest Hills terminals of the rapid transit lines and as free transfers are given to all surface lines radiating from these terminals, the data obtained in this way covered the passenger traffic from the business district to a large part of the suburban territory served by the Boston Elevated Railway north and south of Boston.

HANDLING THE PUBLIC

It did not seem feasible to give any advance publicity to the proposed traffic counts, and consequently the ob-

servers were obliged to rely on the printed slips and their own initiative for approaching passengers. In the tunnel stations slips were not used. Here in conspicuous places a large number of printed signs were hung announcing that a traffic count was being made and explaining in a few words what was wanted. The signs were not placed until the day of the count. The observers in the stations recorded the data furnished by passengers on large blank sheets instead of on slips as used in the surface counts. Each observer wore a nickel-plated badge, bearing the title "Traffic Checker" and an identification number.

The majority of riders questioned gave the desired information without undue discussion or explanation, but some, of course, desired to know all the history, reasons for, and purposes of the investigation. The observers soon became accustomed to this and had some brief stereotyped answer ready. A few refused outright to give any information, and an occasional foreigner was encountered who could not understand the proposition or who could not be understood when he attempted to give the answers. Some of the data taken down by the observers were later found to be illegible or obviously incorrect, and these of course had to be thrown out in working up the results. The sum total of these exceptions was trifling in comparison with the total amount of satisfactory data, and it is believed that no error of appreciable magnitude was introduced because of them. On the surface lines, 5720 cards were given out to passengers entering the cars, 5429 were collected, and 5168 were later found to contain satisfactory



TRAFFIC COUNT—FIGS. 9 AND 10—SHOWING THE PROPORTION OF PASSENGERS TAKING VARIOUS LENGTHS OF RIDE ON BOSTON SURFACE ROUTES 661 AND 705

TABLE SHOWING INCREASE IN LENGTH OF RIDE WITH NUMBER OF FREE TRANSFERS USED

| Route Number | No Transfers | | 1 Transfer | | 2 Transfers | | 3 Transfers | | Total Number of Passengers Counted |
|-----------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|------------------------------------|
| | Number of Passengers | Average Ride, Miles | Number of Passengers | Average Ride, Miles | Number of Passengers | Average Ride, Miles | Number of Passengers | Average Ride, Miles | |
| 212 | 630 | 2.45 | 198 | 3.04 | 86 | 4.98 | 20 | 6.77 | 934 |
| 419 | 386 | 2.19 | 196 | 3.35 | 76 | 6.36 | 3 | 7.60 | 660 |
| 661 | 481 | 4.95 | 68 | 5.55 | 55 | 7.32 | 3 | 9.37 | 607 |
| 705 | 336 | 2.11 | 97 | 3.79 | 27 | 5.80 | 0 | ... | 460 |
| 762 | 614 | 5.20 | 275 | 6.67 | 22 | 9.03 | 4 | 10.30 | 915 |
| 907 | 482 | 4.21 | 195 | 4.34 | 69 | 5.87 | 9 | 10.03 | 755 |
| Check Count 907 | 528 | 3.92 | 227 | 4.46 | 63 | 5.57 | 19 | 10.15 | 837 |

data. The latter figure represents 90.4 per cent of all the cards given out.

WORKING UP THE DATA

The office work of computing the length of ride of each individual and tabulating and analyzing the data is of course the expensive part of this type of traffic count. The distance traveled by each individual had to be measured separately, but this work was greatly simplified and speeded up by the construction of straight-line charts representing the various surface-line routes. Each stop along the route was plotted to scale on the straight-line plot and was numbered according to a number system adopted for the field work. By the use of a scale marked off in miles, it was only a matter of reading the length of ride directly from the chart by placing the zero point of the scale at the passenger's origin and reading the distance to the destination. Connecting lines to which passengers transferred from the routes under observation were similarly laid out. Unusual transfer rides for which no charts were made were measured directly from a map of the railway system. For rides from the downtown tunnel stations tables were made showing the distances to all important localities, transfer points and terminals, and the ride of each individual had only to be measured on the map from the nearest of these tabulated points.

At the same time that the length of each individual ride was being computed, the number of times the passenger had to transfer to complete this ride was also determined (from a knowledge of the system) and all data entered in the upper part of the slip. In this work transfers to or from the rapid transit line terminals at Harvard Square, Sullivan Square, Dudley Street or Forest Hills were not counted, as the Boston system is so laid out that in general riders are practically obliged to make this transfer to reach the center of the city from the outlying districts.

Finally all data were assorted and tabulated so as to give, by lines, the numbers of passengers riding less than 0.5 mile, between 0.5 and 1 mile, between 1 mile and 1.5 miles and so on by half-mile groups up to the maximum ride. These results were calculated as percentages of the total number of passengers questioned, and then plotted. The results for each of the surface lines, including the check count made on the Newton-Brighton line, and the results of the tunnel station investigations are shown in the accompanying figures numbered 3 to 10. The plots do not represent any particular distances or points along the given routes. For instance, the percentage shown in the 1 to 1.5 mile group on a given route does not mean passengers boarding the car or riding at any specific place on the route but is made up of all passengers who took a ride at any point, the length of their riding being within the designated limits.

The data were also sorted out according to the num-

ber of transfers made by the passengers. Then the total passenger-mileage for those making no transfers (ride completed on the original car), those making one transfer, two transfers and three transfers was added up and tabulated. The average ride was computed for these different classes, with the result that on every line the length of ride showed an increase directly corresponding to the number of transfers. The accompanying table shows these results in some detail.

DISCUSSION OF RESULTS

The main features and significance of the results of this investigation were pointed out in the summary at the beginning of this abstract. It is not within the scope of this particular paper to recommend or suggest rates of fare for the Boston Elevated Railway system or any other street railway. That is a general problem, toward the solution of which the research division at the Massachusetts Institute of Technology is devoting some effort. The question of the actual length of haul of passengers, discussed above, is merely one of the many factors which are being studied.

It is believed, however, that such a study of the traffic on a complicated urban electric railway system will furnish valuable information that will amply justify its expense. Not only does it show the actual and indisputable facts as to the length of haul and the effect of transfer traffic but also possible economies or conveniences in the routing of cars may be brought out. Subsequent to the work of the technology men, the Boston Elevated Railway transportation officials used this method to investigate the feasibility of a proposed revision of routes. The same form of slips and badges for observers were utilized. Practically this same method of traffic study was adopted in 1912 by the experts of the Philadelphia Department of City Transit to determine the best routes for the new rapid transit subways.

Norwegian Electrification Plans

Plans for the electrification of the Christiana-Drammen Railway in Norway will be submitted to a committee of experts, including two Swiss, one German, one Swedish and one Norwegian engineer. The representative committee is necessitated because of the fact that the system to be adopted for the whole country's railway electrification has to be decided upon now. A general plan has already been drawn up for the electrification of all the Norwegian railways. The necessary amount of power has been calculated, and the localities fixed upon where this power is wanted. The various transformer stations have also been located, and the areas for the different power stations have been specified. The plan involves the purchase of small waterfalls, and it is proposed to build the hydroelectric power stations by degrees and in such a manner that they can supplement each other. As regards the Christiana-Drammen Railway, the source of power supply has not as yet been determined.

The *Electric Railway & Tramway Journal* recently published statistics from the various electric railways in Great Britain to show the effect of the war upon the industry. In practically all cases a reduction in service has taken place, but the effect of the war upon receipts has been exceedingly variable, some roads having lost thousands of dollars during the course of the year while others actually show increased receipts for the same period. There is a general difficulty in obtaining supplies of material, and prices in general have been found to have increased.

Wisconsin Association Ends Meetings

Summary of Taxation Discussion on March 16—Full Details of Remarks on One-Man Car Operation at Final Session on March 17

THE Wisconsin Electrical Association, the opening session of which on March 16 was reported in the *ELECTRIC RAILWAY JOURNAL* of March 18, page 563, concluded its work in Milwaukee with a final meeting on March 17, when one-man car operation was the subject of chief interest to electric railways. Before the report of this session, however, there will be presented a summary of the discussion on taxation, which as the last topic at the opening meeting was referred to only briefly in the preceding report. Elsewhere there are also published abstracts of papers presented on March 16 as follows: "Attitude of Wisconsin Railroad Commission on Security Issues," by Harold L. Geiss, secretary of the commission, and "President's Address," by M. C. Ewing, secretary and manager Wisconsin Valley Electric Company, Wausau, Wis. Other railway papers not appearing below will be published later.

TAXATION OF UTILITIES

The main remarks on taxation at the March 16 session were made by T. E. Lyons, member Wisconsin Tax Commission, who described the tax methods used in Wisconsin and told why there have been annual increases in taxation. He stated that in Wisconsin the steam railroads pay 9 per cent and the electric railways 2 per cent of all the taxes. He explained that the method of making the tax levies is based on the *ad valorem* system as nearly as it can be applied to all property in the State. The electric and steam railways pay taxes on the value of all the railway properties, whereas lighting and power companies and other local industries pay upon actual assessments. The tax commission has nothing to do with the amount of taxes assessed but merely distributes the assessment. The rate of taxes is obtained by dividing the total amount of taxes required by the value of all the taxable property in the State. In 1915 the Wisconsin Tax Commission had to distribute assessments which would produce a total of \$43,500,000 in taxes.

Mr. Lyons explained the marked increase in the amount of taxes as being entirely due to the expenditures authorized by local regulatory bodies and the public. Taxes, not only for Wisconsin but for the whole United States, have increased uniformly over a period of years and will continue to increase as long as the public continues to authorize improvements. Taxes are no higher in Wisconsin than in other states, some showing a greater increase per capita and others less than Wisconsin. The general average increase in taxes from 1903 to 1913 in Wisconsin was approximately 100 per cent.

Mr. Lyons then described how the commission fixes value in distributing the tax levy. It is not very difficult to determine the value of personal property, real estate or buildings, because they are sold frequently. There are few instances, however, to guide anyone in fixing the value of a utility, and it is very difficult to determine its value. To fix a value the commission asks for reports of everything that could be taken into account as elements of value, and therewith the commission attempts to arrive at the cost to reproduce the property new. Then it takes into account the securities issued and the average net earnings. The commission also investigates the history of the company, its present

condition and its prospects, and the general movement of property in the vicinity.

Mr. Lyons stated that the physical value could not be used in all cases, because the commission desired to know the selling value of the property as the basis for levying taxes, and with equal physical values the earning power of two properties might vary greatly. In some instances, he said, the value was based entirely upon the yield of the property, the total amount being obtained by capitalizing the average net earnings over a period of five years. In Mr. Lyons' opinion gross earnings are not an indication of value, because they only show the volume of business and not the profit. The value of a property for rate-making purposes is another matter and should be considered wholly from the standpoint of how much money was put into the property to build it up. Its taxation value, however, should be based upon how much money can be obtained from it in the way of profits.

In answer to an inquiry Mr. Lyons explained that when earnings are capitalized to arrive at a basis of value, 6 per cent is applied to the properties in prosperous communities and 10 per cent to the utilities in the smaller cities and villages. The average rate for capitalizing earnings, as applied to street railway properties within the State, is about 6.5 per cent. Even this basis of fixing value, however, will not do for new properties, for the results of the first two or three years of utility operation cannot be made use of as a measure of value.

F. W. Walker, general manager Milwaukee Northern Railway, Cedarburg, Wis., suggested that a new factor had entered into electric railway operation which should be given consideration in distributing taxes. In the past electric railways were considered monopolies in the communities they served, but this had been disproved by the recent jitney competition. In connection with the value of water powers, Mr. Walker said that the rapid progress made in developing the internal combustion engine indicated that it might soon compete with central-station energy for consumers requiring 50 kw. or more. Mr. Lyons replied that these factors were taken care of in part by the reduced earnings, but of course from the standpoint of prospects they might affect the value of a property.

OPERATION OF ONE-MAN CARS

The morning session on March 17 was devoted to a paper by H. W. Young, president Delta-Star Electric Company, Chicago, and to other subjects of interest to light and power companies. At the afternoon session R. M. Howard, general manager Wisconsin Railway, Light & Power Company, Winona, Minn., read a paper describing his two years' experience with one-man cars. This appears in abstract form elsewhere. While reading the paper Mr. Howard explained that of the amount paid out for claims approximately one-half was chargeable to a test case which the company won in the higher courts. In response to an inquiry he stated that the motormen collect and pocket the fares and ring them up on the register, but do not attempt to issue transfers until the passengers leave the car. Since there is only one transfer point on the system, the schedules are made sufficiently flexible to permit the motorman to

take whatever time he requires to issue transfers. The company has not considered using fare boxes, because it operates double-end cars in the one-man service, and the lines are not equipped with loop tracks.

In answer to other inquiries Mr. Howard explained that the one-man cars operate over 8 miles of single track with two railroad crossings. Prior to one-man operation and during the first two years, a schedule speed amounting to 9 m.p.h. was adopted, but changes are now being made in switch locations so that the service can be speeded up to the extent of 10 m.p.h. and a twelve-minute headway maintained. The rear doors are equipped with manually-operated emergency spring locks which the passengers can open by pulling a chain. The passengers have not opened these doors except under abnormal conditions, as when the car is crowded and the entire load is discharged at one point. There is no objection to opening the rear door at this time because there is no danger and it shortens the time of unloading.

Mr. Walker was of the opinion that if the motorman controlled the emergency door lock, he would have just one more thing to do when he should be completely engaged in handling an emergency. If the rear door was under the control of the motorman and operated with pneumatic door engine, it should act upon the release of the air. Attention was called to the fact that the one-man cars on the Menominee & Marinette Light & Traction Company's line in Marinette, Wis., are equipped with an alarm to indicate to the motorman that a passenger has opened the rear door. It was also brought out that the Wisconsin Railroad Commission has ruled that the rear doors of one-man cars shall be left so that they can be opened by passengers in an emergency.

S. B. Way, vice-president and general manager Milwaukee Electric Railway & Light Company, Milwaukee, Wis., stated that his company operates one-man cars in Kenosha, Wis., with pneumatic emergency lock mechanisms on the rear doors. These door mechanisms are tested daily and have worked very satisfactorily. He was of the opinion that the character of the passengers handled on one-man cars should largely govern the selection of the rear door operating mechanism. So far as he could learn, there has been no objection to either the manual or pneumatic control of the rear door lock.

H. O. Seymour, general manager Wisconsin Telephone Company, Milwaukee, Wis., then read his paper on "The Telephone Company and the Electric Utility." In this he told of the attitude of the telephone company toward other electric utilities, and outlined the practice to follow in order to secure uniformity of negotiations and agreements between different public service companies. Mr. Way then explained the work of the National Bureau of Standards in preparing the national electrical safety code, and Mr. Howard closed the program with a description of an automatic current-limiting circuit breaker which he had adopted in his substations to protect the railway feeders and rotary converters. This description appears on another page.

At the close of the program President Ewing suggested that as there appeared to be discrimination against public utilities in Wisconsin taxation, it would be well to appoint a committee to investigate the subject and report before or at the next annual meeting of the association. He recommended that this committee investigate whether the public utilities, including central stations and electric railway companies, are bearing more than their just proportion of Wisconsin taxes and whether they are paying more taxes than similar utilities in other states. Upon motion the association authorized the president to appoint such a committee.

It was recommended by committee that the salary of the secretary be increased from \$350 to \$400 a year and that copies of the president's address be mailed to each member of the association. The following new officers were unanimously elected: President, W. E. Haseltine, secretary and general manager Ripon Light & Water Company, Ripon, Wis.; first vice-president, B. F. Lyons, vice-president and general manager Beloit Water, Gas & Electric Company, Beloit, Wis.; second vice-president, A. E. Peirce, vice-president Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis.; third vice-president, John St. John, secretary and treasurer Madison Gas & Electric Company, Madison, Wis., and secretary-treasurer, George Allison, comptroller Clement C. Smith properties.

President's Address

BY M. C. EWING

Secretary and Manager Wisconsin Valley Electric Company,
Wausau, Wis.

The Wisconsin Electrical Association kept closely in touch with all legislative matters at the last session, and by open and frank discussion at all committee hearings presented to the legislators a large amount of reliable information which had the immediate result of assisting in the defeat of a great number of proposed measures pernicious in their conception and unwise in their scope. If all the bills affecting public utilities that were introduced at the last session had been enacted into laws and had stood the test of the courts, it is conservative to say that the value of privately owned utilities in the State would have been materially less than it is to-day. When a proposed measure is unjust, discriminatory and confiscatory, intelligent effort ought to demonstrate that fact, and when it is once demonstrated and properly presented to the legislature, there is, as a rule, little danger of bad law-making. The danger lies in utility interests failing properly to present their cases and letting them go by default.

The problems of regulated monopoly are being decided on their merits, and yet only a few of the really important principles of regulated monopoly have been thoroughly tried out or determined. There is little use in shutting one's eyes to the facts as they are, and the municipal acquisition during the last two years of a number of comparatively large electric utilities in Wisconsin is at least one indication that regulation is not always satisfactory. Wisconsin law permits plants and parts of plants to be acquired in haste and without due consideration, a mere majority of votes at any election settling the question beyond recall. One of the dangers of regulation in Wisconsin, therefore, lies right here. A considerable percentage of the people has favored regulation with the one view of continually enforcing greater service and at the same time a reduction in the cost of service. These two processes must have their limit. Yet when a ruling commission after careful investigation is unable to comply further with popular demand for reductions in rates or unprofitable extensions, the judgment of the commission is impeached and repudiated. This has happened in a number of instances in Wisconsin. Local politicians who have instigated unfair demands, in their disappointment immediately condemn the commission and direct their efforts toward municipal ownership. Thus condemnation elections are being carried upon prejudice rather than upon sound business principles. Public welfare will be best served under present conditions of municipal government by privately owned utilities, and the responsibility for the correct understanding of these matters must rest entirely with the officials of the utilities. Lack of

intelligent publicity on the part of some utilities themselves is still evident.

A few of the members of this association are the unhappy custodians of small electric railways. These lines have had anything but a bright and rosy history, and their owners are facing a still darker future. The rapid development of automobiles is the latest affliction of these properties, and since self-propelled mobile conveyances are just out of the experimental stage their future growth in usefulness seems assured. As these new styles of conveyances increase in use, the street railways, in the smaller cities at least, are undoubtedly destined to a still more difficult existence. There are unquestionably many small roads which should never have been built—at least there seems no likelihood that their builders will ever recover their investment. We can neither determine the course nor can we let go, and there seems nothing to do but to hang on and do the best we can.

Two years ago the electric railways of Massachusetts began campaigns for increased rates, which in many cases have been granted. Increased fares are in many instances equally necessary in Wisconsin, and where this is true they should be asked for, after first frankly notifying the public of the intention and the necessity thereof. There is no sound reason why the power and light business of most of the companies should be permanently called upon to supply the deficits for the transportation departments, as is being done by many small jointly operated properties.

For the smaller cities with lines of light traffic, the one-man cars and the lighter equipment appear to be the last trench in economy, and there are those who believe that many of the small electric passenger lines will yet find a resting place with stage coaches, horse cars, etc. Less taxes, direct and indirect, less paving and fewer street improvements would, of course, defer the funeral, but the public recalls that the companies have contracts to pave the streets and shows no disposition to cancel such contracts. There is not seen any organized effort on the part of many companies to present intelligently to the public the financial straits in which they are now found. Whatever the results may be, managers and operators should frankly and persistently inform the public of the true financial condition of their companies. This information may not solve all their difficult problems, but it will do no harm and it may do some good. There has been no electric railway building in Wisconsin of any consequence for a number of years, and there is not likely to be any in the future under present conditions. Street improvement burdens should be placed on the property holders, where they belong, but they will never be so placed unless the companies educate the public to this necessity.

Two Years' Experience with One-Man Cars

BY R. M. HOWARD

General Manager Wisconsin Railway, Light & Power Company, Winona, Minn.

The operation of the one-man system in Winona, which was introduced twenty-two months ago, has been entirely satisfactory. We have had no objections from the public or municipal authorities. The trainmen perform their duties in a manner satisfactory to the company and to the public and appear to have ample time for all the various duties imposed by this system.

Our experience has demonstrated that it is necessary to have the platforms of sufficient length to furnish room for separate entrance and exit. The new cars that we had built for one-man operation have separate entrances and exits from the platforms, and we find that these cars handle our traffic safely and expeditiously and

that we are able to maintain our schedules with the cars except under unusually heavy traffic conditions which occur at infrequent intervals. Our gross earnings have been improving.

We find, however, that the remodelled cars with short platforms are rather slow in loading and unloading because there is not sufficient room on the platform to provide for separate entrance and exit, thus making it necessary for incoming passengers to wait on the street until outgoing passengers have left the car. As we are planning to increase our schedule speed to give the same headway with a smaller number of cars, and as we wish also to provide for future growth of our business, we have duplicated our order for larger cars. This order, when received, will enable us to equip our entire line with the cars having the long platforms and separate entrances and exits.

Our experience has indicated that it is very desirable to have an air-brake equipment on this type of car and we have, therefore, ordered such equipments for all our 34-ft. single-truck cars. The additional cars and air-brake equipment will place us in a position to handle our business and maintain a schedule of 10 m.p.h. The car equipment purchased about two years ago, which was especially designed for one-man operation, has worked out to our entire satisfaction, and the new cars will be exact duplicates in so far as platform and seating arrangement is concerned.

We have adhered strictly to one-man operation and have not employed a conductor since the one-man system was placed in operation. We handle fair-days, circuses, baseball and theater crowds, etc., with one man on each car, and our experience has not indicated the necessity of using conductors even during periods of heaviest traffic.

When the one-man system was first placed in operation the question of flagging railroad crossings was carefully studied, and we decided to stop the car 15 ft. or 20 ft. from the crossing and have the motorman flag in the usual manner by advancing to the center of track, returning to the car and then proceeding. The plan has worked out very nicely, and we are still operating under this rule.

The adoption of the one-man system has practically eliminated all complaints of discourtesy to passengers on the part of the employees. It has also eliminated all arguments regarding the payment of fares. The trainmen have no time to get into heated discussions with passengers.

We have carried 2,354,638 passengers during the past twenty-two months, 10 per cent of whom were transfer passengers, and we have operated 762,511 miles. Our total expenditures charged to accident account during the period amounts to 0.7 per cent of our gross earnings, and to the best of our knowledge no claims are pending at present.

The possibilities of an increase in accidents on account of one-man operation appears to be an interesting topic of discussion, and I am going to discuss the accident situation in detail. Our experience so far bears out our previously-formed opinion that there will be fewer accidents with the new methods of operation. Our total accidents during the period number sixty-eight, divided as follows:

| | |
|-----------------------------------|----|
| Platform | 0 |
| Inside car | 5 |
| Rigs (horse) | 16 |
| Persons struck | 4 |
| Collisions with cars | 2 |
| Automobiles | 33 |
| Bicycles | 3 |
| Motorcycles | 1 |
| Fell just after leaving car | 2 |
| Riding horses frightened | 2 |
| Total | 68 |

We have not experienced a single platform accident, but in two cases accidents happened to passengers after they had stepped from the car. These passengers were not injured until after they had left the car, and the injuries were reported as a matter of safety to complete our records. We had five accidents inside the car. Two of these were due to passengers having balls of ice under their heels, and when they stepped in on the smooth floor they slipped and fell. One was a plain drunk that fell on the floor of the car. Two were caused by passengers losing their balance when the car was started. Only two of all of these passengers were injured, and these but very slightly.

We experienced sixteen collisions with horse-drawn vehicles. Eleven of the collisions were with covered wagons such as laundry wagons, milk wagons and ice wagons. Most of the drivers are irresponsible boys who seem to take a fiendish delight in violating the traffic ordinances and turning suddenly across the track in front of a car without giving the motorman an opportunity to avert a collision. We had thirty-three automobile collisions. I will not comment particularly on these. In ten or twelve cases the collisions occurred when the street cars were standing still or were run into from the side or rear.

In the entire list of accidents there is not one which could be attributed to the absence of a conductor. Our experience appears to demonstrate the fact that one-man operation does not have a tendency to increase the number of accidents. More than 85 per cent of our accidents are collision accidents, and we expect that the installation of air-brake equipment, in addition to making it easier for us to maintain our schedule, will also reduce the number of those that occur.

In conclusion, our experience has confirmed our original opinions regarding the merits of the one-man system and we now plan to speed up our schedules, reduce the number of cars and increase the earnings per car and per car-hour. We are demonstrating our faith in the future of the one-man system by ordering sufficient additional car equipment to equip our lines completely with cars that are especially designed for this method of operation.

Attitude of Wisconsin Commission on Security Issues

BY HAROLD L. GEISSE

Secretary Wisconsin Railroad Commission, Madison, Wis.

To those whose attention is frequently directed to questions of rates and service it would appear sometimes that if the regulation of security issues really retards development there ought to be more of it. Yet the body regulating the security issues may not, other things being equal, erect its judgment that a proposed project will not, in all human probability, yield a fair return as a barrier to its fulfillment. The sustained effort of the Wisconsin Railroad Commission has been to aid the development of well chosen enterprises, keeping their activities within the law. If "the cream is off the public utility business" it is because the days of exploitation are past and the day of honest development is here. How far the commission is able to go in discouraging the embarkation upon an enterprise which in the light of the commission's knowledge of the business and of surrounding conditions is bound to prove disastrous, is frequently misunderstood. Frequently, by virtue of the confidence it enjoys, the commission is able to have some influence in preventing the recurrence of those gross economic wastes that occurred so often before the days of security regulation. But it has no power to refuse an authorization because

in its judgment the project is not well considered. To do so would be to assume managerial functions. The commission has power to require only that the corporate management show a legal right to accomplish the proposed act. If the management can show that the project is within the law the duty of the commission is fulfilled.

The law does not contemplate that its administration should result in absolute safety. If, therefore, the law be properly understood, the flank attack upon it frequently made to the effect that the State binds itself in some sort of guarantee that the securities are sound or will earn interest or dividends, is repelled. No one would seriously contend that because the State has created a system of banking inspection and supervision, it thereby assumed to guarantee the safety of the funds entrusted to the banks by depositors. Yet the regulation of security issues and the inspection of banks are founded in the same concept, namely, that the State owes to its people the duty to protect them so far as reasonably possible against malfeasance on the part of the creatures to which it gives special privileges.

An accomplishment of the statute not frequently considered, but one of prime importance, is the effectual determination of the priority of issues. The law in Wisconsin provides that before issuing any securities the company shall file an application with the commission sworn to by the president and the secretary of the company, stating the purposes for which the securities or the proceeds from the sale thereof are to be used. Upon due proof a certificate of the commission is granted. If the securities are to be exchanged for property, the value of the property must be stated in the certificate. This certificate is required to be recorded on the books of the company, and both as a public record in the office of the commission and as a corporate record it is notice to all the world of the effectiveness of the lien of the securities authorized to be issued, because the lien does not attach unless and until the certificate is issued. This feature of the law is of exceeding importance to investors and to the utilities. It makes definite and certain that which might be confusing and obscure, thereby increasing public confidence in the securities. It may logically be presumed to be an element favorable to their marketability.

A further consideration is the ability of the utility to market the securities at a warrantable price. This is particularly important in the instance of new enterprise, where it may assume almost vital significance. In this connection it is well to speak of the frequently voiced criticism that the authorization of the commission helps to sell the securities. There is a vivid inconsistency between the argument that regulation retards development and this argument that it aids in the sale of securities. One or the other must go by the board.

Of influence with the commission in considering an application for authority to issue securities is the efficiency and personnel of the management. A great deal may be said as to the advisability of giving this feature of an application considerable attention. The question of the public relations of the management and of its general policy is important. If a management has shown a breadth of vision in conceiving means of developing the property to better serve its public, this fact should go a good ways in concluding the determination of the commission to authorize an issuance.

It is not to be concluded that the stock and bond law of Wisconsin is in a perfected condition. There are certain defects that are apparent to those who have given it thought. The statute, with others affecting the issuance of corporate securities, is a growth, and it is

only to be expected that it has rough spots that should be smoothed out. The present law provides that stock must be issued at par, but that bonds or other evidences of indebtedness may be issued at a price not less than 75 per cent of their par value. It is frequently found that it becomes necessary for a corporation to issue stock at less than the actual value, and this necessity, in the instance of corporations in general, has led to a frequent evasion of the statute.

In the case of the public service corporations it is the duty of the commission to see that the statute is not evaded. This the commission does, though frequently recognizing that it might be advantageous, if it were possible, for the corporation to issue its stock at a discount. There would seem to be no logical reason why, if bonds are authorized to be issued at less than their par value, stock should not be issued at less than par. Many public utility enterprises are handicapped, especially construction enterprises, by the fact that the commission is not permitted to authorize stock discounts. No one would contend that either stock or bonds should be permitted to be issued at an excessive discount. To permit this would result in that inflation of capital issues that the stock and bond law was designed to prevent. The commission, however, has in its possession at all times a great deal of information respecting the price at which money may be obtained, and it is not an improper suggestion that the law be modified to enable it definitely to fix the price down to which securities may be sold, whether they be stock or bonds.

Feeder Protection by Automatic Current Limitation

BY R. M. HOWARD

General Manager Wisconsin Railway Light & Power Company, Winona, Minn.

Two 300-kw., 600-volt, d.c. rotaries are operated at the La Cross substation of the Wisconsin Railway, Light & Power Company to furnish current for the local street railway, and they flashed over frequently when the trolley wire came down or when bad-order cars were on the line. The flash-overs and also the sudden dropping of the d.c. load when the circuit breakers operated interfered with the regulation on our transmission line as our waterwheel governors did not operate fast enough to compensate for the instantaneous reduction or increase in load under the conditions cited.

After some investigation we installed on each railway feeder automatic current-limiting circuit breakers of the type developed by the General Electric Company for use in automatic substations. The equipment consists of two relays and two 500-amp., 600-volt contactors mounted on a suitable panel together with two sets of resistance grids and the necessary wiring. The contactors are normally held in closed position by 600-volt electro-magnets, and they short-circuit the resistance grids. In our case the relays are set to operate at 500 amp. and 550 amp. respectively. The rotary circuit breaker is set at 850 amp. In event of current exceeding 500 amp. on a feeder the first relay

operates, breaking the circuit on the contactor coil and allowing the contactor to fall open and cut in the first set of grids with 0.25 ohm resistance. If the current value continues to rise and goes over 550 amp., the second relay operates, the second contactor cutting in 0.47 ohm additional resistance from the second set of grids. The relays are equipped with dash pots, which allow the relay to reset eight or ten seconds after the current drops below the relay setting, and the resetting of the closed contactor-coil circuit closes the contactor and short-circuits the resistance. The equipment is entirely automatic and requires practically no attention.

To illustrate the protective value of this equipment, assume a resistance of 0.28 ohm in feeder and return with the trolley wire short-circuited on the rail. Under this condition at La Crosse both sets of grids would be instantly inserted in series with the feeder, giving a total resistance of 1 ohm. and limiting the current to 600 amp. with 600 volts at the switchboard. Without the resistance, more than 2100 amp. would flow through the feeder. A bad-order car with its motor flashing over will generally cause the first contactor to operate, and the reduction in voltage caused by the insertion of resistance in series with the feeder reduces the current value to a point where it is not so destructive. A reduction in voltage is much better than the opening of the rotary breaker, as the cars keep moving until the automatic circuit breaker resets.

This installation has reduced flash-overs, practically eliminated the regular circuit-breaker operation, improved the regulation on transmission line and reduced railway motor and controller burn-outs.

Compulsory Health Insurance

Proposed Legislation in Eleven States Providing for Compulsory Health Insurance Opposed by Labor Organizations

THE National Civic Federation, in a statement just issued relative to the proposed legislation in eleven states having sessions this winter, purports to show that compulsory state sickness (health) insurance, such as is being urged by social reformers, is not favored by the trade unions, by railroad brotherhoods in the United States or by employers. The statement points out that the objection of the former group is partly based upon the failure of national health insurance in England, asserts that the plan being promoted here is actuarially unsound and calls attention to the fact that there are no statistics at present upon which legislation of this character may safely be based.

The National Civic Federation is part of the movement which has brought into common touch various bodies representing employers, wage earners, fraternal organizations and insurance companies, with a view of establishing first of all data upon which a system of social insurance might have scientific foundation. The information desired will be available in the near future and will, it is hoped, afford an American solution of this problem. No states can afford to enact any compulsory self-insurance legislation until after a comprehensive investigation has been made as to what extent and through what means the application of social insurance beyond the voluntary methods now employed may be possible in this country. It is suggested that a commission composed of those representing the various interests, and not one made up simply of the advocates of compulsory insurance, be created in each state. The National Civic Federation calls attention to the report of one of its earlier commissions on insurance in the United Kingdom, and the conclusion that there should be resistance to any spirit of ambition in America to copy doubtful European experiments.

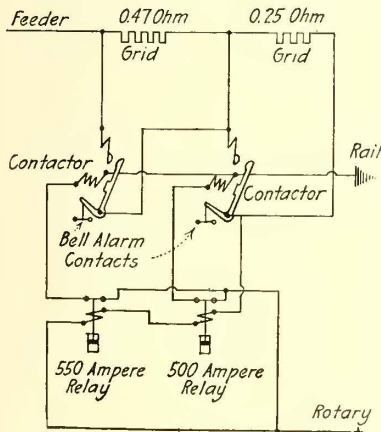


DIAGRAM OF CONNECTIONS OF CIRCUIT BREAKERS AND PROTECTION RESISTANCE

necessary wiring. The contactors are normally held in closed position by 600-volt electro-magnets, and they short-circuit the resistance grids. In our case the relays are set to operate at 500 amp. and 550 amp. respectively. The rotary circuit breaker is set at 850 amp. In event of current exceeding 500 amp. on a feeder the first relay

Chicago Electrification Report Discussed

At the New York Railroad Club, George Gibbs Presented a Paper on the Chicago Terminal Report—Advantages of Electric Switching Service Pointed Out—Discussion by Prominent Steam and Electrical Engineers

THE annual electrical night of the New York Railroad Club was held on the evening of March 17. For some eleven years this meeting has been an event in electrical and steam railroad circles in New York, and has called out a large gathering. The program was prepared by the electrical committee of the club, whose chairman this year was E. B. Katte, chief engineer of electric traction, New York Central Railroad, and the first announced speaker was George Gibbs, consulting engineer, Gibbs & Hill, New York. The subject of Mr. Gibbs' address was the recent report on smoke abatement and railway terminal electrification made for the Chicago Chamber of Commerce. Gibbs & Hill were the consulting electrical engineers in the preparation of this report, which was published in abstract in the issues of the ELECTRIC RAILWAY JOURNAL for Dec. 4 and Dec. 11, 1915. Mr. Gibbs had prepared before the meeting for distribution among the members a brief printed abstract of the report, with illustrations, covering some of the principal points that were raised.

In opening the meeting Mr. Katte complimented the authors of the report on its completion, and said that it was the most important event in electric railway matters during the year, as well as the most comprehensive report on electric railway subjects ever issued in print.

Mr. Gibbs did not read the printed abstract of the report which had been distributed before the meeting but described the reason for the appointment of the committee and its organization, and gave some deductions from the report. He explained that the problem set was that of the entire suppression of the steam locomotive in Chicago and not the partial substitution of electricity for steam. The railways were to be taken as they exist and the substitution of electric for steam traction made with as little change in physical property and operating methods as was consistent with minimum costs for the changes. He then showed a number of slides made from diagrams in the report, and discussed their import. He also analyzed the operating expenses given in the report under steam, as in 1912, and if electricity was used. He said that the total saving in operating expenses inside the electrical zone for 1912 with electricity would have been \$3,793,569, and this was apportioned between the different services as follows:

| | |
|---|-----------|
| Saving in through passenger service..... | \$ 66,079 |
| Saving in road freight service..... | 278,631 |
| Saving in suburban passenger service..... | 996,018 |
| Saving in yard and transfer service..... | 2,452,841 |

He then pointed out that the yard and transfer service furnished two-thirds of the saving and that this yard service could be conducted electrically without materially affecting operating costs and methods outside the electrified district. On the other hand, electrification of through service, passenger and freight, would interfere with the length of outside engine runs and require additional constructive mileage and other outside expense which would have to be deducted from the saving inside the zone.

Mr. Gibbs also presented a rearrangement of the table of annual operating costs as given in the report, to show the account in which the savings in electric traction occur. This rearrangement, based on the 1912 figures, is given in the table opposite.

He also called attention to the fact that by far the greatest saving, as shown in this table, is in the item of power, and that the next largest is in "Engine House Repairs." He also pointed out that the power saving occurs very largely in the switching service, a service in which the steam locomotive is worked very uneconomically. Thus, according to the report, tests showed that the switching engines were standing 40 per cent of the time, that the average length of run was only 628 ft., and that the speed while in motion was only a little more than 5 m.p.h. These are conditions which are greatly against economical steam locomotive performance.

Mr. Katte was the first speaker to discuss the report, and explained that the report was based on the plan that all railroads would pool their interests and get their power from one station or one power system, but he doubted whether New York City would permit the erection of overhead wires carrying 33,000 volts within the city limits. He also doubted whether it was advisable to use an overhead wire carrying 11,000 volts as the trolley wire in a city as large as Chicago. If it was necessary to modify the plan of electrification system to direct current, the cost would be materially increased. From the data in the report it was certain that the railway companies could not afford to electrify their terminals without financial assistance. He believed that if the people felt that the railroads should be electrified, they should be willing to contribute to the expense, either by legislation permitting increased railroad rates in the form of an additional terminal charge, or, since the municipality would be the gainer by the receipt of increased taxes collected from owners of property adjacent to the electrified tracks, a portion of this increased revenue might be paid to the railway company to help bear the cost of the improvement. Experience in other cities has demonstrated that the electric operation of steam railroads is reliable and attractive, but the first cost of the installation is prohibitive except where special conditions warrant extraordinary expenditures.

Following Mr. Katte, A. B. Symons, who had been a partner of Horace G. Burt, the first chief engineer of the committee of investigation, outlined the steps leading to the formation of the committee. He said that the demand for the electrification of the railroad terminals arose because it was popularly supposed that steam locomotives caused a large part of the smoke in Chicago, from 43 to 50 per cent of the total. The

| | OPERATING EXPENSES—ITEMS AFFECTED | | |
|---|-----------------------------------|-------------|-------------|
| | (1912) | | |
| | Steam | Electric | Saving |
| Power | \$5,536,708 | \$2,936,654 | \$2,600,054 |
| Repairs | 1,953,708 | 1,377,847 | 575,861 |
| Communication | 157,237 | 258,173 | d 100,936 |
| Engine house expense..... | 1,293,394 | 258,678 | 1,034,716 |
| Roadway | 1,395,706 | 1,420,254 | d 24,548 |
| Buildings, fixtures and grounds | 139,116 | 642,623 | d 503,507 |
| Conductors, brakemen and enginemen | 458,195 | 246,266 | 211,929 |
| Totals | \$10,934,064 | \$7,140,495 | \$3,793,569 |
| Added costs due to change in operating methods in and beyond the city | | | \$1,996,113 |
| Final net saving, 1912..... | | | \$1,797,456 |
| Total on basis of 1922..... | \$14,214,283 | \$9,282,644 | \$4,931,639 |
| Added costs | | | 2,594,947 |
| Final net saving, 1922. | | | \$2,336,692 |

d=loss instead of saving.

press also was in favor of electrification. The Illinois Central Railroad was the object of much of the agitation, and in an engineering paper the statement was made that this railroad could be electrified within the city limits for \$8,000,000. The idea was also promulgated that electrification would cure all evils. To controvert this feeling some persons pointed out the part which the Illinois Central Railroad had had in the appreciation of land values, but these arguments had little effect. A change in the presidency of the Illinois Central Railroad involving the retirement of a very popular man was utilized in connection with the electrification agitation. As a result of all this, the railroads of Chicago saw that something would have to be done to please the public, and this committee was the result. Mr. Symons expressed a high opinion of the value of the report.

W. S. Murray, who was recovering from a severe attack of typhoid fever, was able to take but a brief part in the discussion. He expressed gratification that the single-phase system had been recommended by the committee, and stated his belief that as a whole the conclusions reached by the committee were correct. He thought that part of the railroad system of Chicago could be profitably electrified. In conclusion, he quoted from a letter recently received from Mr. Huber-Stockar, consulting electrical expert for the Swiss Railway Department, stating that the single-phase system had been selected for the St. Gothard Tunnel electrification.

The next speaker was William McClellan, consulting engineer, New York, who referred to the extraordinary difficulties connected with criticism of such a monumental work, the committee's report. However, it was evident, that on subject matter of capital cost, the committee had to be conservative, as there were many contingencies which could not be provided for. The actual cost of electrification would probably be much greater than that estimated. The report was made to answer definitely the question as to what the railroads would have to pay for electrification. Its function was not to evaluate the attendant advantages, but rather to determine whether this was a feasible thing to ask of the railroads. If the broader questions were asked, a different treatment would be required. The speaker believed that if electrification were demanded, the city of Chicago should in some way assist in financing it.

E. B. Temple, assistant chief engineer, Pennsylvania Railroad, referred to the recent electrification by that company in Philadelphia. In this terminal sixteen locomotives out of 300 have been eliminated by electrification. The Chestnut Hill extension will eliminate some more. Complete electrification of the terminal would eliminate fifty locomotives, or 17 per cent of the total using the Broad Street station. The total cost would be \$10,000,000, not including a power house. The Pennsylvania electrification in Philadelphia is being carried out not to eliminate smoke but to enable the company to conduct traffic more expeditiously. The Philadelphia Electric Company furnishes the power, and it is a question how much actual smoke reduction results from burning the coal in the power house as compared with burning it in the steam locomotives, when much of it would be emitted in the open country. Mr. Temple also felt that the municipality should co-operate in such undertakings, at least by assisting in the elimination of grade crossings, etc. Nearly all of the costs of eliminating such crossings in Philadelphia have been carried out on the basis of equal division of the expense between the city and the railroad. This is the kind of co-operation that counts. A total of \$30,000,000 is now being invested in Philadelphia in track elevation.

C. H. Quinn, electrical engineer Norfolk & Western

Railway, expressed his belief that electrification comes down in the end to a question of dollars and cents. In the case of the Chicago electrification, the public had in mind that it was a suburban undertaking. As a matter of fact, most of the savings were found in the substitution of electric locomotives for yard engines.

E. S. Doughty, consulting engineer, New York, gave some of the results of his experience as a smoke inspector in Chicago. He said that in an experiment a consolidation locomotive pulled a heavy train of loaded freight cars without producing any smoke, showing the possibilities of correct firing. With yard engines, it is more economical to fire low and keep the locomotive smoking. The Illinois Central Railroad received a great deal of criticism partly because it is largely used for commutation service with the South Side. In hot weather the smoke is very disagreeable, particularly in view of the fact that the road runs through a residential district. To show that smoke from industrial plants can be kept down if desired, he cited the circumstances that, in Chicago, when the smoke inspectors are on duty, the smoke is kept down, but at other times furnaces in industrial plants are allowed to smoke.

E. R. Hill, Gibbs & Hill, New York, in commenting on the estimated savings due to electrification, pointed out the general fact that it does not pay to establish short terminal divisions on a steam railroad. Sixty per cent of the savings in the present case are due to the switching locomotives, the natural field of which is in a restricted local zone. The electric switching locomotive is very efficient, and it takes the place of a most inefficient steam engine. The feasibility of electrification progress must be determined on common sense lines, and no arbitrary ordinances can solve the problem.

Mr. Gibbs then answered a number of questions which had been asked during the discussion regarding details of the report. He said that in general the densest consumption of coal is in the business district where the population is densest in Chicago. He called attention to the fact that the report contained a study of schemes by which municipalities can co-operate with the railroads. He said that the traffic in the city which could not be electrified by means of continuous conductors were principally in the stock yards, on the water fronts, etc. Storage batteries or internal combustion engines could be used as motive power in these sections. In regard to the economies of electrification, Mr. Gibbs said that the Pennsylvania Railroad Terminal in New York could undoubtedly be operated more cheaply by steam locomotives than electric, and that the same was probably true with the New York Central Railroad. One difficulty is in eliminating steam locomotives without adding to outside costs. On the Norfolk & Western Railway electrification the engine runs were not affected on either side of the electrified zone.

In closing the discussion, Mr. Katte, referring to one of Mr. Gibbs' remarks, agreed with him that the New York Central electrification was not expected to pay directly, but referred to the value of the air rights over the tracks with electric operation.

The mechanical department of the Public Utilities Company, Evansville, Ind., has found it economical to place rattan patches on seat ends when they become worn through. These patches are made with new material which is woven into the old rattan to a point about 3 in. back from the hole. Water is liberally applied to the old rattan and to the new patch to soften them, so that the weaving can be readily done. The completed job is neat in appearance, and the economy resulting from patching the large piece of old rattan that is in good condition makes the work worth while.

A. R. E. A. Committee Reports

American Railway Engineering Association Reports of Interest to Electric Railways Presented at the Annual Convention in Chicago on March 21, 22 and 23 Included Those on Ties, Conservation, Signals, Track, Lumber and Wood Preservation

AT the annual convention of A. R. E. A. in Chicago on March 21-23 the economics of labor in signal maintenance was one of the subjects assigned to the committee on signals and interlocking. Its report discussed the various phases of this subject, and the committee concluded that because signal apparatus was largely electrical and because special training on the part of maintainers to obtain economy and efficiency was required, it would not recommend any combination of signal and track maintenance forces. It did conclude, however, that occasionally it might be found practical and economical to combine the forces engaged in maintaining the various other electrical features of the road with those maintaining signals. As a general proposition, however, the committee decided that a higher degree of economy and efficiency would be obtained by co-operation rather than by combination. This committee also reported progress in its study of the problem of signaling single-track roads, with special reference to the effect of signaling and proper location of passing sidings on the capacity of a line. The report contained a method of finding the proper locations of passing sidings for trains of one kind, and for determining the capacity of a given piece of single-track road in trains of one kind. Work along this line will be continued and various other formulas will be developed, applied and tested in actual service.

TRACK IN PAVED STREETS

That portion of the Manual devoted to track construction and flangeways at paved street crossings and in paved streets was reviewed and revised by the committee on signs, fences and crossings. Through some misunderstanding strong opposition had developed against the conclusions adopted after an investigation of this subject in 1913. The objection was concerned principally with the recommendation that 141-lb., 9-in. girder rail should be used. This year's committee studied the original report and concluded that the 9-in. rail was intended for use in the construction of track in paved streets and not at paved street crossings. After a thorough consideration of the subject, the committee decided that three distinct forms of track construction were desirable. For paved street crossings where the general direction of traffic was at right angles to the track, the regular standard track construction should be used and the space occupied by the track should be planked over. The flangeway should be formed by using rail laid upon its side and properly secured to the ties, or rail set upright and bolted to the running rail. If the latter construction was employed the side of the rail head adjacent to the flangeway should be beveled to an angle of about 45 deg. to prevent horses' feet from being trapped.

For tracks located in paved streets, subject to heavy traffic and requiring a granite block paving, the committee recommended that the track construction should consist of stone or gravel ballast at least 12 in. deep, treated ties and 141-lb., 9-in. girder rail, and that the paving within the track limits should comply with municipal requirements as to the depth of the base, the thickness of the sand cushion and the filling of the

joints. Tracks located in streets subjected to light traffic only, the committee recommended, should be built of the standard track construction using treated ties and stone or gravel ballast, and the space occupied by the tracks should be paved to conform with municipal requirements.

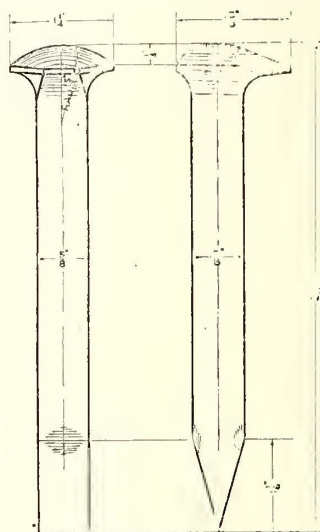
TIES, TRACK STRESSES AND FASTENINGS

The work of the committee on ties included an investigation of the effect of tie plates and track spikes on the life of cross-ties; specifications for cross-ties and switch-ties, and a summary of the progress on substitutes for wooden ties. The committee did not reach any definite conclusions concerning the effect of tie plates and track spikes on the life of cross-ties, because it felt that the practice had not progressed far enough. Revised specifications for cross-ties and switch-ties were submitted, however, for the approval of the association.

One of the subjects considered by the committee on rail was that of preparing specifications for track bolts and nut locks. Accordingly specifications for medium carbon steel track bolts and nuts, and for quenched carbon and quenched alloy steel track bolts and nuts were submitted, and it was recommended that they supersede those now in the Manual. This committee also revised the specifications for joint bars in order to provide more satisfactorily for bars made of alloy steel.

Specifications and designs for cut and screw spikes were two of the subjects assigned to the committee on track. Responses to a circular letter showed that only two or three of the roads reporting used A. R. E. A. specifications for cut spikes but that the specifications more generally used were not materially different from them. This year's committee did not deem it advisable to change the standard specifications materially, but did submit a design for cut spikes which it recommended for adoption as standard. The dimensions of the new standard cut spike are shown in the accompanying illustrations.

The head of the new cut spike is designed to take the hammer blow directly over the axis of the spike and thus minimize the damage to spike-heads and danger of breaking the heads off during extremely low temperatures. The tilting downward of the nose gives a stronger and more rugged construction, and provides an easier clearance in the spike machine. It also permits the spike to be pulled more readily with a claw-bar. The reinforcement of the spike head was made symmetrical with that on the back of the neck which was provided



RECOMMENDED DESIGN FOR CUT SPIKES AS A. R. E. A. STANDARD

for driving the spike forward against the rail. A reinforcement was added on the front of the neck to provide additional metal to withstand rail wear and necking of spikes which has been prevalent with the old flat tie-plate. Changes were also recommended in the physical tests including the requirement that they be made on the finished spike instead of on the bars from which the spikes are manufactured. The proposed specification required an elongation of not less than 20 per cent in 2 in., and if the test was made on the bar, 25 per cent in 8 in. When cold, the head of the spike was required to bend backward without a sign of fracture until the underside was in line with the body. Under the heading of workmanship and finish, no tolerance less than the dimensions shown is allowed.

DENSE AND SOUND PINE

"Dense pine" and "sound pine" were the terms substituted for longleaf pine and shortleaf pine, in the report of the special committee on grading of lumber, thus replacing the designations that are generally used. This change was recommended after the committee had followed the investigations made by the United States government and the American Society for Testing Materials, which led to the adoption of these changes in terms. The terms "dense pine" and "sound pine" referred particularly to the quality of density and weight in their relation to strength values of Southern yellow pine. Southern yellow pine was defined as the species growing in the Southern states from Virginia to Texas, and included pines hitherto known as longleaf, shortleaf, loblolly, Cuban and pond pines. The specification for dense Southern yellow pine states that it shall show on either end an average of at least six annular rings per inch and at least one-third summer wood, or else that the greater number of the rings shall show at least one-third summer wood, all as measured over the third, fourth and fifth inches of a radial line from the pith. Wide-ringed material excluded by this rule will be acceptable, provided the amount of summer wood, as above measured, shall be at least one-half. It was also provided that the contrast in color between the summer wood and the spring wood should be sharp and that the summer wood should be dark in color, except in pieces having considerably above the minimum requirement for summer wood. In cases where timbers do not contain the pith, and it is impossible to locate it with any degree of accuracy, the same inspection is required over 3 in. on the approximate radial line beginning at the edge nearest the pith in the timbers over 3 in. in thickness, and on the second inch nearest to the pith in timbers 3 in. or less in thickness. In dimension material containing the pith, but not a 5-in. radial line, which is less than 2 in. by 8 in. in section or less than 8 in. in width and does not show more than 16 sq. in. on the cross-section, the inspection shall apply to the second inch from the pith. In larger material that does not show a 5-in. radial line, the inspection shall apply to the third inch farthest from the pith. The radial line chosen shall be representative, and in case of disagreement between the purchaser and the seller the average summer wood and number of rings shall be the average of the two radial lines chosen. Sound Southern yellow pine includes pieces of Southern pine without any ring or summer wood requirement.

WOOD PRESERVATION

Specifications for bridge timbers to be creosoted were also formulated and presented by the committee on grading of lumber. It took the standard specifications for structural timber as printed in the Manual, and omitted all reference to the heartwood and heartface re-

quirements and substituted a clause permitting sapwood. In explanation the report stated that recent investigations plainly showed that heartwood and sapwood had exactly the same strength with equal moisture content.

Water sampling in creosote, the relation of the amount of preservative and the depth of penetration to the resistance of materials against decay, and the compilation of service test records made up the report of the committee on wood preservation. The first subject was discussed at length, and a tank car sampling device was submitted for approval accompanied by the results obtained from various methods of sampling. The committee was unable to reach any definite conclusion concerning the relation of the amount of preservative and the depth of penetration to the resistance of materials against decay. It recommended that the subject be continued, and it expected that the analysis and study of the service test records would furnish a basis for a definite conclusion.

TRACK STRESSES, BRIDGES AND CONSERVATION

Experimental work undertaken by the special committee on stresses in railroad track has made satisfactory progress. The committee reported that a considerable amount of time was being expended on the development of instruments and methods for conducting the tests. The results so far obtained, the report stated, indicate that the committee will be able to determine the general action of the track under moving loads, and it plans to continue the tests during the coming season.

An investigation of the relative merits of ballast-deck wooden trestles as compared with reinforced-concrete trestles was conducted by the committee on wooden bridges and trestles. While this work was well in hand it was the sense of the committee that there were so many factors both of an engineering and economic nature that they should be thoroughly considered before intelligent conclusions could be reached. Circular letters of inquiry on this subject were sent to seventy-five of the largest and most important railroads in the United States and Canada, and a tabulation of their replies accompanied the report.

In connection with the report of the committee on conservation of natural resources attention was called to the advantage of greater development of hydroelectric power as a means of conserving coal resources. The report described in some detail the results of electrical operation on the Butte, Anaconda & Pacific Railway and the Chicago, Milwaukee & St. Paul Railway. The report of this committee was offered simply to show progress, and the committee requested that the report be received as information.

OTHER REPORTS

The committee on ballast submitted a statement regarding the efficiency of ballast, placing the various materials in the following order: Stone, broken slag (not granulated), gravel, chats, burnt clay or gumbo, and cinders. The efficiency of gravel was considered to be much improved by washing because this removes undesirable materials and because the desired percentage of each size of gravel can be secured during the process. The committee was unwilling to make definite recommendations regarding the use of the pneumatic tamping machine. Ballast "formers" were considered to produce considerable economy, but specific data were not available to permit making a complete report. A sub-committee which had investigated the economical depth of ballast presented data from steam railroad reports indicating that there is a much greater depth of ballast actually existing in tracks than has previously

been supposed, and that while many standard plans show 12 in. the actual depth in main-line construction is much greater.

The committee on electricity presented data regarding third-rail and overhead clearances which have been outlined in previous issues of the *ELECTRIC RAILWAY JOURNAL*. It was also reported that the national joint committee on overhead and underground line construction has not yet completed its work on the revision of crossing specifications, owing to the fact that the National Bureau of Standards had included such specifications in its safety code. The committee's representatives on the national joint committee on electrolysis stated that they had no report to make until the joint committee prepares its report. No meeting of this committee was held during 1915, but sub-committees had been at work preparing various sections of the report.

"Preparedness" Discussed

Subject Prominent at New England Banquet—A. B. Leach Talks on Railway Economics—
New Officers Elected

SIX hundred members and guests of the New England Street Railway Club celebrated the sixteenth annual banquet of the organization on Thursday evening, March 23, at the Copley-Plaza Hotel, Boston. The occasion was one of the most largely attended in the history of the club, under the favorable weather conditions which enabled the active operating men present to forget the snow burdens of a long and rigorous winter and relax amid the joys of good fellowship. Among those at the speakers' table were the Governor of Massachusetts, the Mayor of Boston, the chairman, and other representatives of the Massachusetts Public Service Commission, two members of the Connecticut Public Utilities Commission, and prominent electric railway executives.

The menu cards were cleverly designed in the form of 4.5-in. shells, the program being illustrated with timely "preparedness" sketches, including a fearfully and wonderfully conceived "6-cent-imeter" gun loaded with a 6-cent fare for 1916-1917.

GOVERNOR MCCALL URGES FAIR PLAY FOR STREET RAILWAYS

A square deal for the street railway was vigorously advocated by Governor McCall of Massachusetts, who was the first speaker of the evening. He said in part:

"I am glad to meet so many men in the practical work of doing something which your industry represents. The disposition of us all is to try to get upon the same spot at the same time. If it were not for the street railway we should be scattered over the surface of the earth. All transportation companies are entitled to fair treatment on the part of the public. If burdens are placed on the street railway they are sure to come back on the public in the form of decreased accommodations. The street car is the people's auto. It carries a man 10 miles for the price of say 1 mile in a gasoline driven car.

"The expenses of the electric railway are an open book to-day. 'Slush funds' and 'yellow dog funds,' I am glad to say, have disappeared. It is possible to read in the records of every company the cost of manufacturing transportation. Exactions by the public will lead to poor service. The companies should receive a fair return for their service. The street railway is a democratic institution, and it therefore deserves fair treatment at the hands of our legislators." Closing, the speaker emphasized the tendency toward multiplying laws needlessly

on the statute books and expressed his sense of the value of the veto as a timely check on the volume of legislation, which in Massachusetts alone totals 1000 pages of new laws a year. Laws are increasing with vicious fecundity and need to be checked from indiscriminate multiplication.

In introducing the next speaker, toastmaster Ham spoke eloquently of the situation of the United States in the present world crisis and urged the importance of both industrial and military preparedness. Capt. Halstead Dorey, U. S. A., Aide-de-Camp to Maj. Gen. Leonard Wood, Headquarters Eastern Department, Governors Island, N. Y., and Camp Commander, First Training Regiment, Plattsburg, N. Y., described the work of the Plattsburg Camp and outlined the functions of universal military training in the scheme of national defense. Mayor Curley of Boston spoke on the relation of the American spirit to preparedness.

LARGER FINANCIAL ASPECTS OF THE ELECTRIC RAILWAY INDUSTRY

A. B. Leach, New York, emphasized the limitations of the 5-cent fare and said that to his mind the zone system appears to offer the best solution of the problem of securing adequate revenue. Capital is subject to no whims or fiat of legislation when investment is under consideration, but it goes where the best security is possible. It is unfair for municipalities to demand that electric railways share to so large an extent in the upkeep of roadway on each side of tracks. In the last two years one of the speaker's companies has paid \$350,000 in such upkeep, and not a dollar of income has resulted from the outlay.

Speaking of the wage-problem, Mr. Leach said that the higher cost of living and higher wages must be used by the railways as an argument for a higher fare. The jitney as a "guerilla of the streets" must be brought into line and compelled to render its fair share of the public needs, paying for the use of the streets and being subject to damage claims. A possible solution of the problem for the street railway is the taking out by the company of a jitney franchise, offering a quicker and more mobile service at certain hours for an increased fare. Communities benefited should be willing to pay a part of the cost of temporarily unprofitable extensions. The public is more interested in quality of service than in security issues. Public ownership means inefficiency and political administration, and it should be avoided through publicity of accounts. Taxing authorities and regulating bodies should co-operate in dealing with public utilities. The securities of such utilities should be made non-taxable, as are municipal issues, to anticipate the competition for capital expected at the close of the war.

The dinner concluded with a clever speech by a well known impersonator in Boston.

At the business session in the afternoon the following officers were elected for the ensuing year: President, Clark V. Wood, Springfield, Mass.; vice-presidents, Maine, A. H. Ford, Portland; New Hampshire, J. Brodie Smith, Manchester; Vermont, W. F. Corry, Montpelier; Massachusetts, J. E. Dozier, Lynn; Rhode Island, A. E. Potter, Providence; Connecticut, R. W. Perkins, Norwich; secretary, H. A. Faulkner, Boston; treasurer, Fred F. Stockwell, Cambridge, Mass.

Work is now proceeding on the electrification of the London, Brighton & South Coast Railway. The number of passengers carried on the electric lines in 1915 was nearly 70 per cent more than in the last years of steam operation. The increase in passengers carried last year was 15 per cent more than in 1914.

American Association News

The Block Signal Committee, at Its Meeting in Chicago, Discussed Many Subjects of Considerable Interest
—Manufacturers' Dues Under Revised Constitution—General Activity in the Company
Sections Is Indicated by the Many Meetings Reported in This Issue

General Association Activities

BLOCK SIGNAL COMMITTEE MEETS AT CHICAGO

Many features of considerable interest in electric railway block signaling were handled by the joint committee on block signals during its meeting in Chicago, March 21, at which J. M. Waldron presided. The members of the committee and the guests in attendance included J. B. Stewart, Jr., Youngstown, Ohio; John Leisenring, Springfield, Ill.; G. K. Jeffries, Indianapolis; G. N. Brown, Syracuse; C. D. Emmons, South Bend; W. C. Smith, Boston; H. W. Griffin, New York; S. M. Day, Rochester; R. V. Collins, West Newton; C. P. Nachod, Louisville, and L. E. Gould, Chicago. The subjects assigned to the committee by the executive committee were reported on in detail by the chairman of the subcommittee and final action was taken on many of them so that material is well in hand for the preparation of the report which will be presented at the fall convention.

Mr. Leisenring spoke of the work that had been done in connection with reviewing the association standards and recommendations for aspects. He said that the standard aspects of the American Railway Association showed position-light signaling, but no color-light signaling. There was general discussion on the need for clearly-defined aspects for both steam and electric roads, which aspects would conform so far as conditions permitted.

The chairman read letters on the subject of operating by signals without the aid of dispatchers. Such letters had been received from C. F. Handshy, assistant general manager Illinois Traction System; C. D. Emmons, general manager Chicago, South Bend & Northern Indiana Railway, and R. L. Koehler, superintendent Scranton & Binghamton Railway. Mr. Koehler's letter set forth answers to sixteen questions that had been propounded by J. W. Brown, a member of the committee.

Messrs. Collins and Nachod discussed the revision of circuits of contactor signal systems which would permit the use of the standard color-light aspects and thus would avoid necessity for the motormen observing the movement of the disk or the change in the aspect to make certain that the signal had operated properly when the car passed under the contactor.

The committee members discussed the desirability of recommending the omission from the Manual of the standard, regarding the use of continuous track circuits for the control of automatic signals for high-speed interurban service and considered the insertion of certain paragraphs on the "Requisites of Installation for Automatic Block Systems." J. J. Doyle, Baltimore, is preparing abstracts of the rules and regulations of commissions as affecting block-signal installations on electric railways, which material will be included in the report, and H. H. Norris, *ELECTRIC RAILWAY JOURNAL*, is preparing a bibliography on signaling which will be included in the report.

General discussion was held on what symbols it might be desirable to insert in the Engineering Manual. The use of some comparatively large sign to indicate the lo-

cation of signals and sidings along interurban rights-of-way was also discussed by several of the members who were using such signs. G. N. Brown displayed a blueprint of a sign about 3 ft. x 4 ft. in dimensions, reading "Block Signal 1000 Feet." The sign had large black letters on a white background and was mounted at a height about level with the motorman's eyes, its function being to enable motormen to locate themselves more easily. Mr. Jeffries then described the sign which is used throughout the interurban lines of the Terre Haute, Indianapolis & Eastern Traction Company. This is oval in shape, 3 ft. long and 2 ft. high, and is made of cast iron with raised letters reading "2000 Feet—Name of Siding." The letters are black on a white background and the signs are mounted on substantial posts. These signs have been found of considerable value, not only in helping the motormen to locate the signals, but also in checking the memory of the train crews regarding orders. Mr. Jeffries pointed out that the use of the name of the siding was an important feature in that respect.

Revised clearance diagrams were then considered for inclusion in the report, and it was stated that the chairman of the block signal committee will shortly ask the secretary of the association to send out data sheets requesting the essential facts regarding the cost of operating block signals.

The subject of highway crossing protection also received very thorough discussion. In this it was pointed out that a committee of railway men in the State of New York has prepared a data sheet which will be sent broadcast throughout the country with a view to co-ordinating the ideas of not only railways, but also automobile associations and state and municipal authorities preparatory to the choice of some standard aspect which can be recommended for general use by steam and electric railroads.

Drawbridge protection was then discussed by Mr. Smith, who described the practice of the elevated railways, and Mr. Gould, who described the safety features installed by the Chicago Elevated Railways to provide against trains approaching an open draw. The series of tests proposed by R. V. Collins for contactor-signal equipment was then discussed, as were such other subjects as the code of safety rules of the National Bureau of Standards, the form of contract for signal installations and the operation of trains by signals without the aid of dispatchers. It is probable that the next meeting of the committee will be held somewhere in New York State in June.

REVISIONS FOR ENGINEERING MANUAL

The American Electric Railway Engineering Association has issued its revised sheets for the Engineering Manual, the revision being to the month of December, 1915. The new sheets comprise forty-six folders of various lengths, the data contained therein bringing up to date the record of the preferred practices of the Association, as well as the standards and recommendations. The new index that is supplied with the revision

sheets contains a complete list of reports and discussions on the various engineering subjects that have been presented before the Engineering Association since the year 1907, so that reference to information contained in the Association's proceedings may be quickly made. In addition, there is a general index of the material contained in the *Manual* as revised, this including the list of standards and recommendations of the Association that was published in last week's issue of the *ELECTRIC RAILWAY JOURNAL*.

MANUFACTURERS' DUES UNDER REVISED CONSTITUTION

Letters received by the secretary of the American Electric Railway Association recently show that there is some misunderstanding among manufacturers in regard to the dues payable by them as member companies of the association under the revised constitution. Perhaps the chief point which is not clearly understood is in connection with the \$5 registration fee formerly charged each manufacturer's representative for attendance at the convention. Under the new plan no such fee will be charged, the manufacturers being on the same basis in this respect as the railway companies and will be privileged to send as many representatives to a convention as they desire without the payment of any additional fee. This will not prevent, of course, any manufacturing representative from joining the association as a member as before for \$5 and getting the publications for which these dues entitle him, but such action is not necessary to secure admission to any convention.

Another point upon which there has been some question has been as to whether manufacturing companies which join the association have to disclose their receipts from electric railway business in their application blank. This is not necessary. The manufacturer needs only state the class, based on gross receipts, in which

his company belongs, and the limits in this classification are so wide that very little definite information is thereby given. No manufacturer need hesitate to join the association through the fear, therefore, that his competitor will know just what his gross receipts were during the previous year.

COMMITTEE ON PASSENGER TRAFFIC

In accordance with the plan outlined at the meeting of this committee held on March 2 a data sheet covering the following particulars has been prepared and is being sent to the members of the association.

I. Interline passenger traffic, arrangements between interurban and steam roads.

II. Financial aspects of the operation of open cars.

III. Special cars, methods and results. (a) City lines, chartered car service. (b) Interurban lines, chartered car service.

ACCOUNTANTS' ASSOCIATION COMMITTEE APPOINTMENTS

The following appointments have been announced:

Representing association at convention of railway commissioners—W. F. Ham, chairman; C. S. Mitchell and Irwin Fullerton.

Accounting definitions—George A. Harris, S. C. Stivers and J. Gerry Dobbins. (Chairman and one other member to be appointed.)

Passenger, express and freight accounting—Walter Shroyer, chairman; E. L. Kasemeier, H. H. Read, R. J. Clark and T. B. MacRae.

Engineering-Accounting—F. H. Sillick, co-chairman; Charles H. Lahr, J. C. Collins and H. A. Gedney. (One member of the committee to be appointed.)

Life of railway physical property—R. N. Wallis, co-chairman; A. R. Patterson and J. M. Smith.

Transportation-accounting—A. E. Dedrick, chairman; George W. Kalweit and W. O. Ingle.

Activities of the Company Sections

PUBLIC SERVICE SECTION

The eighth discussion in the course on "Public Service Economics" was held by company section No. 2 in Newark, N. J., on March 16.

R. E. Danforth, general manager, discussed the operating statistics of the company for 1915. He called attention to the fact that in the past year the scheduled speed had been increased $3 \frac{8}{10}$ per cent by cutting out layovers, etc., the company now operates practically 1,000,000 car-miles per week, and carries an average of 1,132,812 passengers per day. During the year past the cost of settlements for damages has decreased by 25 per cent. Automobile accidents have gradually increased until they now form about 14 per cent of the total. Mr. Danforth quoted freely from the statistics of operating and maintenance costs to indicate where improvements were being made and where others could be made.

H. A. Benedict, mechanical engineer, then gave an illustrated historical talk on the development of the electric car and the power plant. He showed a remarkable collection of slides of cars of various types, including typical cars used on the local property.

William H. Davis, librarian, a recent addition to the staff of the company, explained the purpose and method of operation of the library, and gave some statistics as to contents and circulation. It contains 4350 books and 9000 pamphlets besides numerous periodicals. It is used by 1200 or more persons, who either call at the room or have material sent to them. During the past year about 15,500 books and pam-

phlets were sent to users, and the total use was 36,000 pieces, not including magazines used casually.

H. C. Donecker, assistant general manager, announced the results of the suggestion contest arranged some months ago by the company. One hundred and twenty-five suggestions were received in January and, on account of the large number, only operating details were considered at this time. There were seventy-two suggestions along these lines, forty-eight of them for motormen and conductors. Mr. Donecker read a number of typical suggestions and also the names of a number of contributors, closing with that of William Snell, conductor reporting at the Montgomery Street carhouse, Jersey City, who received the award for the month.

In closing, some moving pictures of a general nature were given under the auspices of the claims department.

MANILA SECTION

At the fourteenth meeting of joint company section No. 5, held on Feb. 1 in Manila, P. I., the principal speaker was C. M. E. Pereira, bookkeeper, the title of his paper being "What Street Railways Have Done for the City and Its Inhabitants." At the meeting twenty-nine applications for membership in the railway association were presented, all but four being from members of the transportation department.

Mr. Pereira said that the first street railway in the Islands was built in Manila thirty years ago by the *Compañía de Tranvías de Filipinas*, a European-Fili-

pino corporation. Horse and steam tram cars were operated. When the Americans arrived an agitation for better transportation was begun, the pioneer being A. Burlingame Johnson. The result was the present company, financed in the United States, which inaugurated the new system in April, 1905. In 1907 the suburban line to Pasig through Fort McKinley was built and steam was replaced by electricity on the line to Malabon. Conditions since the American occupation have not been conducive to the investment of outside capital so that the optimism and courage of the pioneers, which have resulted in 52 miles of street car lines in Manila, deserve a greater financial reward than they have so far received. The poorer classes have benefited greatly from the improvement in the railway system as they have been able to get out of the congested districts. A large class of small-home owners has been built up. The outlying towns have benefited also through the American and European colonies which have been formed in the Singalong, Malata, Pasig, Santa Mesa and Santa Ana districts.

SECTION NO. 10 DUE ON MARCH 31

A company section of the association will be formed on March 31 by Newport News & Hampton Railway, Gas & Electric Company, at Hampton, Va. This Allen & Peck property is under the management of E. F. Peck, and promises a fertile field for local association activities. Representatives of the association will be present to assist in launching the new section.

MILWAUKEE SECTION

A meeting of company section No. 1 was held on March 2. J. G. Hordgrove, of the company's counsel, gave an extemporaneous talk on paving, tracing the paving situation from the early days of the street railway in Milwaukee, and outlining the franchise requirements. Committee reports on special work and design of cars were presented and discussed. A "quiz" period of fifteen minutes followed the general order of business, and mimeographed copies of the "Review of the Technical Press" were distributed.

CAPITAL TRACTION SECTION

Section No. 8 met for the first time in its new quarters in the general office building of the company on March 9 with a record attendance. Addresses were delivered by P. T. Moran, president of the Washington Chamber of Commerce, and Vice-President D. S. Carll and President George E. Hamilton of the company. A program of musical numbers and recitations was rendered by talent gathered from within the membership of the section, and at the close of the evening's entertainment a buffet luncheon was served.

Mr. Carll spoke on "Some Problems the Company Has Met," and gave a brief history of the early operations of the predecessors of the present company. He called upon a number of the older employees present, who recounted personal reminiscences which supplied interesting details of the company history. The occasion developed into a regular experience meeting. In closing, Mr. Carll said that his purpose had been to bring out the importance of co-operation between the company and its employees in the solving of past problems, and predicted that this same spirit would enable the company successfully to meet every difficulty which might arise in the future. Mr. Hamilton said that Mr. Moran had been invited to speak not because he was president of the Chamber of Commerce, but because he was a man who from small beginnings had accomplished great things. He said that labor and ambition rooted in integrity were the implements with which Mr.

Moran had forced his way in life, and that by using the same implements, which were in their possession, the employees of the local company can accomplish much for themselves and for the community.

DENVER TRAMWAY SECTION

The thirty-fourth monthly meeting of the section was held in the company's assembly hall on March 18, with W. G. Matthews in the chair. Four reels of moving pictures showing the several processes in the manufacture of "National" pipe were first shown. There were 150 persons in attendance.

The address of the evening was by Hon. Sheridan S. Kendall, a member of the Colorado State Public Utilities Commission, and it was entitled "The Triangle." The suggestion for this subject was obtained by Mr. Kendall from the monogram recently adopted by the company, and which was described and illustrated in the issue of the *ELECTRIC RAILWAY JOURNAL* for March 4, 1916, page 450. His remarks covered the relations of a public utility corporation to its patrons, to the investor and to the employee, and they brought forth a lively discussion.

CHICAGO ELEVATED SECTION

President Charles L. Henry addressed an enthusiastic meeting of the Chicago Elevated Section on Jan. 18, taking the opportunity to describe to this recently formed section the plan and scope of association work, and the place of the company sections in this work.

The following meeting was held on Feb. 29, in the rooms of the Western Society of Engineers, with an attendance of eighty. The secretary reported that since the last meeting thirteen new applications had been received, making the present membership 177. The constitution was amended to provide for meetings on the third Tuesday of each month except during July and August. Among the topics discussed in connection with the question box were, "Which is more economical, the use of flanged brakeshoes or plain ones?" and "How much power measured at the substation bus is required to start up rotary converters of various sizes from the a.c. side and the d.c. side?" The matter of a binder for the preservation of safety bulletins was discussed, and a committee reported that it would have a suitable binder ready for distribution at the next meeting. It was also decided to print and circulate copies of the constitution and by-laws.

The speaker of the evening was M. J. Feron, general superintendent of transportation, who has been in the service of the Elevated Railroads for twenty-one years, having risen from the position of switchman. He spoke on "Training of Transportation Employees." He said that an employee is essentially an investment, a great deal of time and effort having been spent in his initial training, so that in further dealing with him a consistent effort must be made to conserve this investment and to derive from it an adequate return to the company which made it. An infraction of the rules by an employee, unless extremely serious and repeated, should not call for dismissal, by which the entire investment in the training of this employee is lost, but rather for "repairs" or admonition. If the employee can thus be made to realize his mistake, he becomes a more valuable man, and yields a higher return on the investment.

Mr. Feron quoted a number of statistics to show the permanency of the personnel of transportation employees on the local property. On account of the unreliability of their employment, the extra guard class changed very rapidly, but in the last few years the rate of change has decreased considerably. All transportation employees work as extra guards, and progress from

COMMUNICATIONS

Standards Should Cheapen Cost

CHICAGO SURFACE LINES

CHICAGO, ILL., March 20, 1916.

To the Editors:

I was very much interested in reading the editorial in your issue of March 11 entitled "Standards Should Cheapen Cost," and as chairman of the committee on the use of standards of the American Electric Railway Engineering Association I desire to thank you for bringing out the very important point which you have mentioned in connection with this subject. I also note that in your issue of March 18 you have published the up-to-date list of standards and recommendations that have been approved by the Engineering Association, and I wish to say that our committee appreciates the assistance which you have rendered to date in connection with this subject. We welcome any further aid that you may give in drawing this matter to the attention of the electric railway industry at large.

H. H. ADAMS,

Chairman Committee on Use of Standards.

BROOKLYN RAPID TRANSIT SYSTEM

BROOKLYN, N. Y., March 14, 1916.

To the Editors:

I note your editorial reference of March 11 to the insular attitude of the larger companies in regard to the use of association standards, and believe that, in general, this is correct. The larger companies who, as stated by you, control the situation to the extent of purchasing large quantities of material, could do much to increase the value of the association's specifications, by decreasing the cost of the product, if all of them got together on the single set of standards that are thus presented. If those in direct charge of the various technical departments of the larger properties were more interested in this feature, the incentive toward the establishment of future standards and the revision of those already established would be much greater than it is to-day, when a more or less discouraging situation confronts the committees.

It is my belief that lack of sincerity or of interest on the part of all concerned (and every official of the various railroad properties bears his share) is primarily the reason for the present situation. Only a conservative number of standards have been established, and then only after a full discussion and thorough consideration for the interests of the manufacturers and the electric railway companies as a whole. Yet the standards are used but little and they do not have the standing with the manufacturers that is enjoyed by the standards of the Master Car Builders' and Master Mechanics' Associations.

Nevertheless, the standards of the American Electric Railway Engineering Association are determined upon broad lines. They must be if they are to be of value. They can never be established without the representation, or at least consultation, on the part of reputable manufacturers. The full views of the latter, through their engineering departments or factory managements, must be obtained, and this point, as a matter of fact, I consider as a first essential. However, it need not necessarily be followed to an extent that would bias the action finally taken, which primarily must be for the benefit of the electric railway properties and their various managements.

But, before these various standards are used in a

that class to the others, that is, to be regular guards, switchmen, towermen, conductors, motormen, service inspectors, etc. At present, the companies have in their employ 314 transportation men who have been with them continuously for fifteen years or more. A method of discipline of employees by further education rather than by the application of summary methods is not only a paying proposition, from the business standpoint, but it is a duty which is owed to the employee.

PORTLAND (ME.) SECTION

Company Section No. 9, that of the Cumberland County Power & Light Company, met on March 10, with 150 men in attendance. The principal speaker was Judge Benjamin F. Cleaves of Biddeford, Me., chairman of the Public Utilities Commission for the State of Maine. He explained the relations of the commission to the public, traced the development of the railway and lighting utilities and prophesied good results for the future from co-operation between the public and the utilities.

Following the address there were musical numbers and a banquet, prepared and served under the direction of Clarence Houghton, chairman of the hall and supper committee. G. C. Estill was appointed chairman of the program committee vice G. S. Brush, resigned.

WASHINGTON R. & E. COMPANY SECTION

The regular monthly meeting of the Washington Railway & Electric Company section was held in the new assembly hall of the company on March 13. An address was given by Maj. Robert Hugh Patterson, an American army surgeon recently returned from the European war zone where he had been stationed with the American Red Cross forces. The address was preceded by a song recital, and at the conclusion of the meeting a buffet luncheon was served. The attendance at the meeting was about 100 members. President Kimball announced that the present membership is nearly 150, and he anticipates that this will be increased in the near future.

Major Patterson stated that in view of the unselfish manner in which America had sent money, food, clothing and medical supplies to the war sufferers abroad, it was now time for us to begin conserving the medical resources of the country for home consumption as part of the government preparedness program. He described first-aid methods with the aid of motion pictures, and gave practical demonstrations of applied methods with Dr. L. W. Glazebrook, chief surgeon of the company, as his subject.

Tramway Accident Increase in Germany

Since the outbreak of war the number of tramway accidents in Germany has shown an alarming increase, owing chiefly to the substitution of unskilled men for train motormen and conductors who are fighting in the war. Statistics show that in the period between the beginning of the war and Dec. 8, 1915, there were 425 collisions between tramcars, 120 of these between Aug. 1 and Dec. 31, 1914, and 305 between Jan. 1 and Dec. 8, 1915. In the same five months from August to December, 1915, there were only six collisions. The collisions between tramcars and wagons and other vehicles also show an increase in the last sixteen months. The municipal authorities have decided to appeal to the military commandant to release both motormen and conductors, who are merely performing garrison duty, and permit them to return to work.

general way, and to such an extent that they will be of real value to the electric railway industry, it will be necessary to awaken real interest. By this I do not mean the kindly expressions that oftentimes emanate from those who are associated in our work, but who refuse to accord practical support the moment they return to their properties from conventions or meetings. Frequently such officials, who have given ostensible support to the standards, sit tight in exactly the opposite position and, when they are requested to advise why they do not use association standards, reply that they believe their own to be better, or that their peculiar situation makes it desirable or necessary to act differently—in other words, pinning the blame to that poor old over-worked phrase, or excuse, "local conditions."

It is true also that many of those having to do with the establishment of standards are not in a position to carry out their recommendations. Often it is difficult to overcome the somewhat narrow views expressed by those represented in our association work, these views being set forth purely from motives akin to self-preservation. For instance, some officials see fit to oppose certain details in connection with the establishment of standards because these do not happen to exist upon their own systems or because such practices are not a part of their own routine. This has been true to a large extent, and my object in pointing it out is to indicate that the final establishment of a standard is possible only after the most thorough discussion, investigation and full expression of views by all those who are interested, including even those who can never look beyond the confines of their own properties. W. G. GOVE,
Superintendent of Equipment.

Why Trolley Wire Wears Out

UNITED RAILROADS OF SAN FRANCISCO

SAN FRANCISCO, CAL., March 13, 1916.

To the Editors:

Supplementing the article which I recently sent you on the subject "Why Trolley Wears Out" the following additional notes on the relation of retrievers and trolley wear may be of interest.

In the preretriever days when the trolley rope hung loosely from the pole the whole upward pressure from the trolley base springs was applied vertically to the under side of the wire, and the wear on wheel and wire was nearly symmetrical.

With the retriever pulling diagonally downward from the end of the trolley pole, beside this vertical pressure which still remains, there is brought about an additional side pressure between the trolley wire and one flange of the trolley wheel that causes the wear in the wheel and on the wire to be unmistakably one-sided, as an inspection and study of condemned wheels and wire from straight line track readily reveals. The excess wear on both is always found on the side likely to be abraded as the result of the rope pull from the off-center retriever, and is thought to explain large increases in trolley wire and trolley wheels used per car-mile for renewals in years immediately following the adoption of retrievers.

With a 6-in. diameter retriever located in the center of the car front, the rope leaves it at the periphery of the coil and is 3 in. off center or 3 in. away from a point directly below the trolley wire. With the retriever located beside a 12 in. diameter headlight the rope is 6 in. off center at the retriever. This location brings an appreciable and constant, though perhaps slight, horizontal pressure between one flange of the wheel and the wire. Retrievers have even been found located so that the rope emerges as much as 16 in. off center.

On curves the trolley wire is located off center for minimum rolling friction between wheel and wire and the farther this curve location of the wire from the track center, the greater is the side pressure between wheel and wire due to the existence of the retriever even if located centrally.

Retriever pull on devices a short time in service has been found to vary from 1 lb. to as high as 9 lb. For some long cars on 45-ft. radius curves the wire is located 57 in. off center. With an 18-ft. high wire, retriever 5 ft. 6 in. above the ground, 16 in. off center and 9 lb. pull there would be a theoretical side pressure of nearly 4 lb. between wheel flange and wire in such an extreme case with retriever and wire on opposite sides of the car center.

If the retriever was off center on the same side of the car as the trolley wire was off center, theoretically this side pressure would be less. Practically it might be more with some types of retrievers because the rope would pull harder over the iron edge of the mouth of the retriever than it normally drags, and would increase the retriever reluctance to yield up the necessary rope. This reluctance under such conditions is often enough to cause the wheel to leave the wire and, to forestall this, conductors are seen to pull out slack rope and hold it out until past curves located on the same side of the car as the retriever to prevent interruption to service.

The high polish and deep scores to be found on the edge of the mouth of certain types of retrievers where the trolley rope drags proves the existence of this additional friction.

The retriever has undoubtedly come to stay, but in a company covering millions of car-miles per year this continuous one-sided grinding against the soft trolley wire and brass ears caused by the presence of the retriever may be a serious item in copper consumption, whether the device is located centrally or off center, besides increasing the frequency of re-earring the line.

A study of the annual consumption of trolley wire and trolley wheels for purely maintenance purposes per car-mile for a series of years before and after the adoption of retrievers might surprise some companies. The theory of trolley renewals occurring in periodic cycles must be allowed for in considering wire figures though it has no place in considering wheels.

S. L. FOSTER, Chief Electrician.

Service Improvements on the London & Southwestern

The advantages of electric operation on the Kingston and Shepperton lines of the London & Southwestern Railway, the electrification of which was placed in operation on Jan. 30, is already very noticeable, according to the engineer. The company has made a marked revision of its local service. The quicker acceleration of the electric trains enables them materially to reduce the number of trips hitherto in force, while the steam trains on other routes, such as those running to Hampton Court, are arranged in many instances only to stop at principal stations, thus enabling quicker service. Moreover, as a result of the policy of standardizing the service, important developments affecting almost the whole of the suburban and outer suburban operations have been made. After 5.30 a. m. every train is electric, except on routes which are not wholly on the section at present equipped, and a ten-minute service is provided. Originally, a steam local train running between Waterloo and Kingston took thirty-five minutes to cover the journey, while the time taken by the electric trains is only twenty-eight minutes. Six-coach electric trains will be used as required to meet traffic variations.

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.

A One-Man Pole-Hoisting Machine

BY W. E. NEES

Superintendent of Railway, Selma Street & Suburban Railway,
Selma, Ala.

The Selma Street & Suburban Railway has recently built in its shop in Selma, Ala., a pole-hoisting machine which has several good features, and which will probably be of interest to the readers of the *ELECTRIC RAILWAY JOURNAL* as a continuation of the subject discussed by C. R. Harte in the issue for March 18. The machine is strictly a one-man affair, one man with it being able to handle any pole that is liable to be used on an electric railway. The accompanying photographs show the construction and method of operation of this machine.

With most pole-raising machines, more time is required to get them ready than is used in the actual raising of the poles. With this machine, however, the mast is raised by the same hoisting tackle that is used to raise the pole, so that all that is necessary in operating the machine in pole-setting is to run it up to the hole, fasten the hook on the end of the chain to the lower end of the mast, and begin to turn the winch in the hoisting direction. It operates so easily that one man has been able to raise a 1500-lb. pole without pausing for breath.

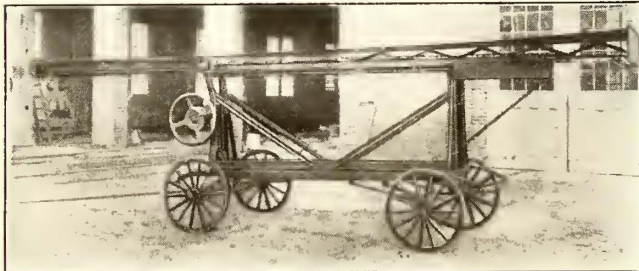
The machine consists of a steel frame carried on wagon axles, the frame serving to transport a steel

mast or gin pole and to mount a winch used for raising the mast and also the pole when the mast is placed in position. The frame is made of angle irons, and well-braced, its construction being clear from the illustrations. The whole machine is made up of standard material, a 22-ft. Bates expanded metal pole being used for the mast, and a Yale & Towne winch for hoisting purposes. The mast is strong enough to carry very heavy loads and it is provided with a substantial base 14 in. wide and 42 in. long.

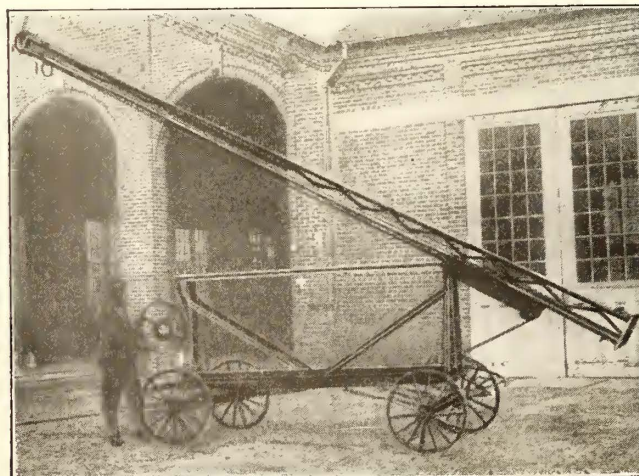
Two head lines, fastened permanently to the top of the mast, are provided to take the lateral strain. When the mast is in place and the head lines are made fast to trees, poles, or other suitable anchorages the machine is ready for business. Two iron pins or stakes are used as anchorages if no others are available. The head lines are adjusted to permit the mast to lean so that its top extends toward the pole hole about 6 in. from the vertical.

The hoist has a self-contained arrangement that prevents it from lowering the load unless the winch is turned backward, against the hoisting direction.

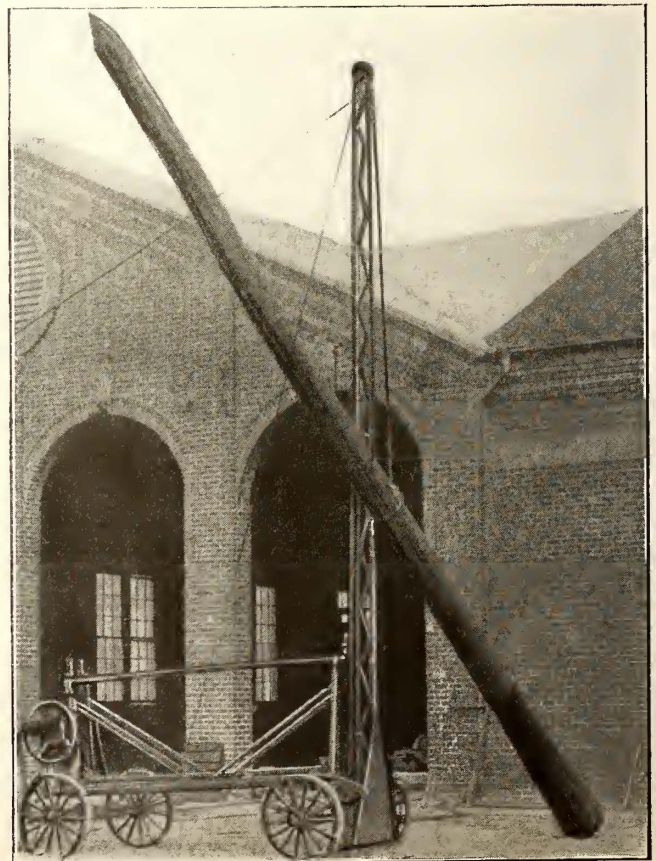
The weight of the mast is nearly balanced on one end of the supporting frame, so that a very slight effort serves to raise it to a vertical position. It is placed slightly out of balance to render easy its return to normal, or horizontal position. When the mast is raised its weight is automatically transferred to the



ONE-MAN POLE HOIST IN LOWERED POSITION



ONE-MAN POLE HOIST IN PROCESS OF BEING RAISED



ONE-MAN POLE HOIST WITH MAST IN HOISTING POSITION

ground, and the machine is relieved from all strain while a pole is being raised.

When a pole has been set and tamped a slight turn of the winch in the lowering direction releases the chain hitch and the hook returns to the ground. It is made fast to the bottom of the mast and by a slight pull on the head lines the mast is started down. As soon as it leaves the vertical the effect of the slight counterbalance is felt and the mast is returned to the horizontal by the unwinding motion of the winch.

Reclaiming Broken Track Tools

BY "WAY ENGINEER"

Ordinary track hand tools, as a rule, are not reclaimed when they become badly worn or broken, and only such repairs are made as can be readily handled by an ordinary laborer. This is particularly true of large construction jobs where a considerable item of their cost is expended in track hand tools, yet when a job is completed comparatively few of the tools are to be found that are good enough to turn over to the maintenance forces. Many of these worn and broken hand tools which are discarded as useless can be repaired profitably. Experience on some roads has demonstrated this fact, and the ease of making repairs has been considerably facilitated by the introduction of portable welding outfits. While it has been found economical to repair tools, it is also very important that the repairs be properly made to accomplish the best results. It is as essential to good workmanship and efficiency that tools should be kept in proper condition as it is to buy first quality tools. In other words, tool repairs should be concentrated at a single point where one or more men may be regularly employed in putting them in serviceable condition.

Specific cases of repairs to hand tools that pay include reclaiming good shovel blades in which the handles have been broken, by supplying new handles. Handles in good condition may often be had by taking them from blades that are completely worn out. Claw bars badly worn, or with one of the claws broken may be reclaimed by dressing the bar down to form a new claw, or if there is not sufficient stock remaining, a new claw may be welded on. It is also important, and has now become general practice, to keep track picks sharp and properly tempered. The cost of the pick, however, is so small that reclaiming an old one by welding on a new point is hardly worth while. Lining bars and tamping bars may be readily restored to good condition by straightening, redressing and retempering.

Accurate workmanship when repairing spike mauls is very important. An untrue surface makes it impossible to strike a true blow, and an improperly struck blow may bend a spike or cause an accident. An improperly tempered maul soon becomes untrue when the metal is too soft, or if it is too hard pieces may chip off and cause an accident. The same requisites apply to track chisels which primarily must be purchased with steel of proper quality. A poor chisel delays the work, and increases the cost of any operation. It is also very important to keep track jacks in perfect operating condition. Where several extra ones are not on hand a bad-order jack may tie up a gang. The track jack like the track drill, is more expensive than the average hand tool, and it is not general practice to have an unlimited supply of extra ones. It is therefore important that jacks and drills not only be in good order but that they be inspected for defects occasionally, and when repairs are necessary they should be made by an expert mechanic in order to insure results.

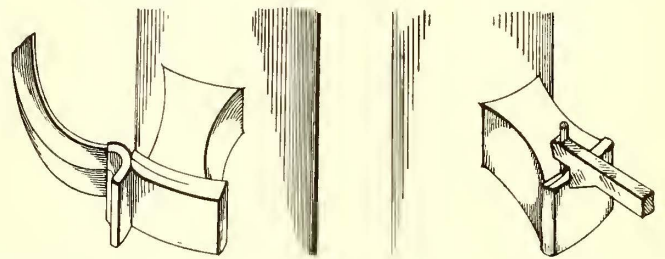
With no other track hand tools are accuracy and good

repair so important as with the ordinary track gage and level. When these become damaged for any reason the utmost care should be exercised to see that the repairs are made properly, and after the work is completed their accuracy should be checked before they are actually used in track work. Repairs to either of these tools are difficult to make because accuracy is so essential, hence, it is especially advisable to have this work done by an experienced repairman. In other words, the repairing of most track hand tools is a job for a specialist if the best results and maximum economy are to be obtained. A first-class blacksmith is best qualified to do this kind of work, but it must be borne in mind that not every blacksmith can repair these tools. Experience in making repairs to hand tools is a necessary requisite, hence it is better to employ one man on work of this kind and hold him responsible for the quality of the repairs made.

Gage for the Adjustment of Controller Fingers

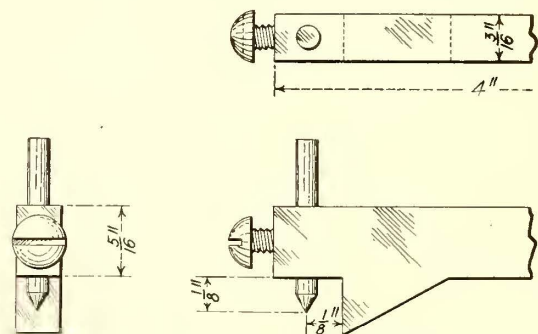
BY R. H. PARSONS, ELECTRICAL FOREMAN

The life and service of controller fingers depend so much on their proper adjustment that too much care cannot be given to this point. The General Electric Company recommends a lift of $3/32$ in. or $1/8$ in. for each finger. This gives sufficient contact, and at the same time does not subject the springs to excessive



DIAGRAMS SHOWING METHOD OF USING CONTROLLER-FINGER MARKING GAGE

motion, which would have a tendency to break them in a short time. It is believed that the lift should approximate $1/8$ in. rather than $3/32$ in., because in old cylinders there are invariably irregularities which make the segments a little higher on one side than on the other, and a $3/32$ -in. lift at the beginning might mean only



A MARKING GAGE FOR USE IN ADJUSTING CONTROLLER FINGERS

$1/16$ in. at the full parallel position, which would be getting near the point of insufficient contact.

As it is a difficult matter to get the proper lift by eye, and still more difficult to instruct men to do so, a gage similar to the one herewith illustrated will be found an excellent aid. This gage is a scratcher with a permanent setting of $1/8$ in. or $3/32$ in. It is constructed so that when used as shown in one of the illus-

trations it will leave a mark on the segment at the proper distance from the outside surface.

After the segment has been marked, which takes but an instant, the cylinder should be moved until the segment just touches the finger. The finger is then set so that its line of contact shall be in line with the mark on the segment, after which its set-screw is tightened. This completes the setting of the finger as far as lift is concerned.

Sanitary Water Cooler with Isolated Ice Chamber

BY C. W. DUNCAN

Master Mechanic Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Much controversy has been heard concerning the sanitation of drinking cups for interurban and steam passenger cars, while little attention, if any, has been paid to the container of the drinking water. Unsanitary conditions are caused by the contact of drinking water with the ice, which may contain impurities from having been handled by men whose hands are often dirty and possibly contain disease germs. On many roads the water tanks are seldom if ever tested and cleaned. The water tanks used on most interurban roads are made of zinc

On the side of the tank near the bottom edge is located a cock for draining the water of the ice tank. The cooling chamber is permanently fastened inside the ice tank by the pipe which leads from the inside of the cooling chamber to the faucet on the outside of the ice tank, and it is supported by the false bottom, which is 3 in. from the true bottom of the tank. Rubber washers and nuts are placed on both the outside and inside of the cooling chamber and tank to keep the drinking water from mixing with the ice water and to keep the ice water from leaking out around the pipe where it passes through the side of the tank. The ice tank is covered with a tight-fitting cover made in two pieces so that the front half can be easily removed for filling with ice. The neck of the porcelain jar projects through the cover of the ice tank for about $\frac{3}{4}$ in. There is a heavy rubber washer around the inside of the neck of the porcelain cooler upon which the neck of the water bottle rests, making a tight joint.

The water cooler and bottle are placed in the corner of the lavatory, with the faucet on the aisle side. The ice tank and the inside of the recess are painted white, which gives the outside an attractive and sanitary appearance. The bottle is held in place by a brass strap, hinged at one end and flat at the other.

The cost of the outfit was as follows:

| | |
|---|---------|
| Tank and drain cock..... | \$7.60 |
| Glass bottle..... | .75 |
| Faucet and porcelain cooling chamber..... | 3.00 |
| Total..... | \$11.35 |
| Labor of installing..... | 2.50 |
| Total..... | \$13.85 |

The cost of both the cooling chamber and tank would be greatly reduced by buying in quantities. The cost of the old tank previously used was \$12 without the faucet, or with the faucet about \$13.85, plus the expense of installing.

Power Plant Inventory

BY J. C. HENRIQUES
Electrical Engineer

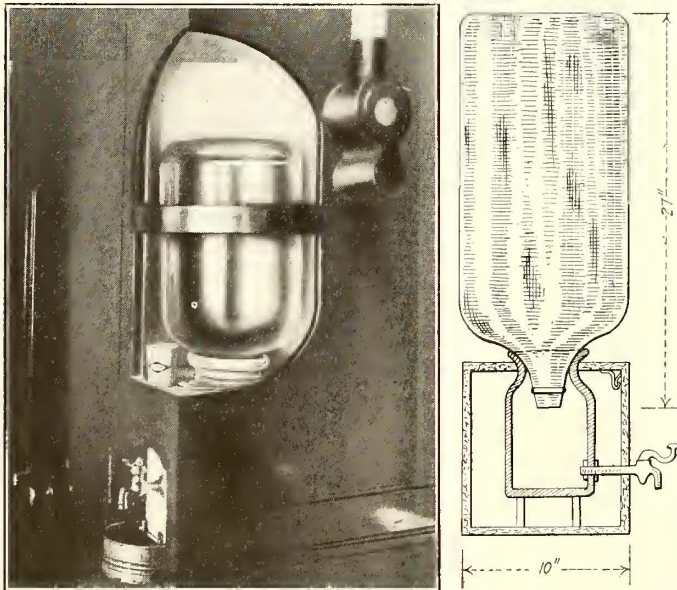
In making a valuation of the electrical equipment of power plants and substations it is often assumed that the taking of a correct inventory requires little knowledge of the apparatus used or of its functions. Such is not the case, however, for the work of listing items which go to make up the physical property on which the whole valuation lies must be done by competent engineers who are thoroughly familiar with the operation and construction of all units and auxiliaries. Correct listing is essential in order that every item be carefully noted and that no omission or duplication may occur. The following is a description of the method used and found to be successful by the writer.

The equipment should be listed in the following order:

| | |
|--|---|
| Conduit | Rotaries and transformers |
| Cables and wires | Generator and motor generator sets (alternating and direct current) |
| High-tension compartments | Mercury arc rectifiers |
| High-tension switchboards (three- and two-phase) | Storage batteries (including end cell switches) |
| Direct-current switchboards (inclusive of arc distribution switchboards) | Auxiliary apparatus |
| Miscellaneous switchboards | Miscellaneous apparatus |
| Foundations | |

The detailing of the apparatus will be taken in the order in which it appears above.

The blueprints of the station to be appraised should be obtained and checked in the field, all corrections being noted on the prints. The prints of conduit runs should be referred to the company's superintendent of construction for changes of conduit sizes and runs, all



SANITARY WATER COOLER

or copper, and lined with sawdust or asbestos. They are constantly in need of repair, thus necessitating the use of acids inside the tanks, which thus become very unsanitary. In many cases the water leaks through the first wall into the asbestos for some time before the flavor of impurities is noticeable in the water.

In order to eliminate this unsanitary condition and to reduce the cost of maintenance of the water cans, the writer has designed and installed a sanitary water cooler, shown in the accompanying illustrations, which on the cars where it has been installed in connection with penny-in-the-slot machines for dispensing drinking cups has produced a sale of double the number of cups sold with the old-style drinking water container.

The cooler consists of a 10-in. x 24-in. glass bottle, a porcelain or enameled cooling chamber (the latter being preferable on account of breakage), and an ice tank. The tank is 10 in. x 10 in. x 12 in., and is made of No. 23 gage sheet iron with a $\frac{5}{8}$ -in. wall. It is filled with charcoal. The tank is designed with a false bottom so that the ice can be packed all around the cooling chamber.

| Reference | CONDUIT | | WIRES | | | | CONDULET FITTINGS | | | LOCATION OF CONDUIT | |
|-----------|---------------|--------------|-----------------|-------------|----------------|--------------------|-------------------|--|--|---------------------|----|
| | Size and Kind | Total Length | Number of Wires | Code Letter | Length in Duct | Length Out of Duct | Total Length | | | From | To |

POWER PLANT INVENTORY—HEAD OF BLANK FOR LISTING MISCELLANEOUS CONDUIT AND WIRES

changes being noted on the prints. A form should then be designed to show the kind, length and size of conduit, how laid, duct formation and location. All high-tension and low-tension feeder conduit should then be measured from the prints and recorded. Machine conduit for each unit and storage-battery conduit are next taken. All miscellaneous conduit is listed last.

If blueprints of conduit runs are not available, the following procedure is recommended: Make up a floor plan to scale and plot in the size and kind of conduit at the various locations where they rise out of the floor or end in the manhole. The connecting up of the conduits to their proper locations can be done by an engineer who is familiar with the laying out of conduits in substations and power houses. If possible, it is also recommended that the conduit, etc., should be measured up and listed in the field.

Cable forms should show the location, size, insulation (thickness and size), thickness of sheath if any, number of cables in duct, length of cable in duct, out of duct and total length of cable. From the conduit sheets already listed the length of the cables in the conduit can be obtained. The sizes and insulation specification are

| Reference | Quantity | Description of Equipment | Year Installed | Remarks |
|-----------|----------|--------------------------|----------------|---------|
|-----------|----------|--------------------------|----------------|---------|

POWER PLANT INVENTORY—HEAD OF BLANK FOR LISTING GENERAL EQUIPMENT

found in the code sheets for the different sizes of machines. The cables outside of the conduit are measured in the field.

Cables should be taken up to the busbars on bus cables but should not include them. The appraiser should obtain from the company a list of cables used for various purposes and use a code letter or number for each. This will facilitate the making up of a compact form for listing. The cables in the miscellaneous conduit should be listed with the conduit, a form being designed to include the cable code (letter or number) and length. The miscellaneous conduit is considered as all remote control conduits, meter conduits, fuse control, panel, etc.

The high-tension compartment should be divided into a general section and an individual section. The general section includes all general equipment that could not be assigned to an individual compartment, such as compartment material (brick or concrete), iron (frame work and wire screens, etc.), ground and bonding wire, insulators, barriers and covers (material and size), bus section transformers, copper buses, etc. The individual section includes compensators, transformers (current and potential), oil and knife switches, cables

and wires (between buses and switches), panels, meters, etc.

High-tension switchboards should be divided into a general section and an individual section. The general section includes all equipment, conduit and wiring bus cables, ground wire, insulators, bus transformers, etc., which cannot be assigned to an individual panel, such as iron (frame work, screens, etc.). The individual section includes regulators with equipment common to it, oil and knife switches, cable from bus to switch, wiring on panel, meters, relays, etc. The three-phase switchboard should be listed before the two-phase switchboards when two-phase switchboards are installed in the station. The reason for this is the fact that stations are usually built to transform three-phase current to two-phase current. Therefore the three-phase equipment takes precedence over the two-phase equipment.

Arc distribution switchboards should be listed under the direct-current switchboards. The three-phase con-

| Reference | LOCATION | | Code Letter | Number of Cables | LENGTH PER CABLE | | Total Cable Length | Remarks |
|-----------|----------|----|-------------|------------------|------------------|-------------|--------------------|---------|
| | From | To | | | In Duct | Out of Duct | | |

POWER PLANT INVENTORY—HEAD OF BLANK FOR LISTING CABLES

trol switchboard for arc machines should be listed under high-tension switchboards. The direct-current switchboards are handled in the same manner as the high-tension switchboards, the general section being identical, while the individual section includes copper connections between knife switches, circuit breakers, and copper busbars, switchboard wiring, meters, panels, relays, etc. Miscellaneous switchboards such as charging panels, remote-control panels, meter panels, fuse panels, neutral switch panels, synchronizing panels, etc., should be noted, also the size and kind of material and meters mounted on them.

The foundations should be considered next, and the size, construction material (brick or concrete) footings, if any, should be noted. When machine foundations are common with the building foundations, they should be considered as part of the building and listed with it. This will prevent the duplicate listing of foundations.

Rotaries, including transformers and voltage regulators, should be designated by the manufacturer's name and serial number, the company's number, the voltage, the capacity in kilowatts, type, number of phases, speed and frequency. End play and speed limit devices, field rheostats and circuit breakers, except

CONDUIT

| Reference | LENGTH, SIZE AND KIND | | | | | | | | | | | Wall Suspension | Ceiling Suspension | Building Wall | Trench Length | Trench Excavation | Number of Ducts | Duct Assembly | LOCATION OF CONDUIT | |
|-----------|-----------------------|-----|----|----|-----|----|------|----|----|-------|-------|-----------------|--------------------|---------------|---------------|-------------------|-----------------|---------------|---------------------|----|
| | IRON PIPE | | | | | | TILE | | | FIBER | | | | | | | | | From | To |
| | 1" | 1½" | 2" | 3" | 3½" | 4" | 2" | 3" | 4" | 1 Ch. | 2 Ch. | | | | | | | | 4 Ch. | |

POWER PLANT INVENTORY—HEAD OF BLANK FOR LISTING GENERAL CONDUIT

where circuit breakers are mounted on the switchboards, should be noted also.

For generators and motor-generator sets, the same information is required as specified for rotaries, as well as the method of connection to prime mover (direct belted or countershaft). When generators are driven by steam turbines and the cost includes both units (i.e. generator and turbine) it is suggested that one-third of the cost be credited to the electrical equipment and two-thirds to the mechanical equipment. The manufacturing companies, usually divide the cost of machine in the above-mentioned way. The foundation for these machines should also be considered in the same manner when it is common to both units.

When mercury arc rectifiers are listed, the starting panel should be included as it is usually included in the cost. The manufacturer's name and serial number, the company's number, the voltage, amperage, capacity in number and kinds of lamps, number of phases, type of panel, also the oil switches and meters mounted on it, should be noted.

Storage batteries should include the connecting coppers and the iron frame work supporting them from the end cell switches to the cell, also between cells. Specify the number and type of insulators, number of cells, size of cells, material cells are made of, how cells are supported, number and size of plates in each cell (positive and negative), type of plate and manufacturer's name. End cell switches should be designated by the manufacturer's name, the number of cells controlled, number of points and whether it is controlled electrically or by hand.

All transformers (current and potential) and voltage regulators, should be designated by the manufacturer's name and serial number and company's number.

The dates when equipment is bought and installed should be obtained from the records of the company. If the company has no records, it is often possible to get the date of purchase from the manufacturer.

All apparatus such as pumps, blowers, compressors, cranes, etc., how connected (direct or belted), capacity and manufacturer's name should be noted, as well as starting rheostats, switches and switch boxes that go to make up this type of equipment. These should be listed under the heading of Auxiliary Apparatus. All water, air and oil piping, fire apparatus, emergency kits, rubber mats, etc., should be charged to miscellaneous equipment. When the auxiliary and miscellaneous equipments are listed in power houses they should be credited to the power account to conform with a uniform system, if one is demanded by a public service commission.

Progress on Australian Electrification

The tunnel from Long Nose Point to Balls Head, in the electrification of the Sydney-North Shore line, Sydney, Australia, under construction, is nearly completed, the recent flooding having been successfully overcome, and it will be possible to lay the cables in a few weeks. At the White Bay power house, machinery capable of developing 30,000 hp. has been installed, and there is room for 60,000 hp. or 90,000 hp. in all, which is sufficient for the electrification of the whole of the suburban line. It is estimated that the North Shore system can be electrified for \$1,461,000; it is also considered that the White Bay power house should be utilized at the earliest possible moment for this railway, and that the building of the new electric railway rolling stock should be commenced at once, in order to be ready for the electrification of the suburban line as soon as the power is available.

Vibration Theory of Rail Corrugation

In view of the attention that has been directed toward the subject of rail corrugation in this country, a pamphlet recently written in German by A. Meyer, member Royal Board of Public Works and manager Grosse Berliner Strassenbahn, is of timely interest, and a brief abstract of a translation is presented herewith. The pamphlet is of 87 pages and is published by H. S. Hermann, Berlin, 1915, price 2.5 marks.

The author begins by citing no less than eleven possible theories of corrugation which have been advanced from time to time, but states that none of them (with one partial exception, namely, the character of rail metal) has ever been demonstrated to be more than a contributory factor. He puts forward, therefore, the influence of perpendicular movements in the rails as a primary cause. As early as 1906, he says, comment was made on the fact that corrugations appeared in rails loose enough to allow vertical movement (in the form of high frequency vibrations) during the passage of cars. Whenever the acceleration of this movement was downward the wheel pressure was less, thus forming a crest; whenever this acceleration was upward the wheel pressure was more, thus forming a valley, and therefore the length between crests would correspond to the distance covered by the car during a single vibration of the rail.

Opportunity for such vibrations might be set up in rigid track by the introduction of one or more free lengths of rail, say 1 ft. long, that are not in actual contact with the concrete, because of careless construction, poor design or the like. In flexible track each length of rail between ties acts, of course, like a beam that is practically free to swing up and down whenever a rolling load strikes it a blow.

The vibration period of transversely vibrating beams is independent of their width, but is directly proportional to the square of the free length and to the square root of the density. It is also inversely proportional to the beam height, or thickness, and to the square root of the tensile strength or modulus of elasticity. Also, when beams are rubbed rapidly they vibrate longitudinally, maintaining their ordinary density at points of maximum movement, whereas the density at the no-movement points alternately increases or decreases. In this case the vibration period is independent of the force applied and the thickness of the beam, but is directly proportional to the length and to the square root of the specific weight and is inversely proportional to the square root of the elasticity.

On this basis the author undertakes to show by means of some elaborate calculations that the tendency to corrugate increases as both bending of the rail and its period of vibration decrease. Consequently, the strongest tendency toward corrugation is presented by rigid tangent track, and a much weaker tendency by elastic tangent track. On all curved track the tendency is even less than it is on elastic tangent track.

In actual service the theory is that a rolling, or sliding, load on a rail sets up high-frequency waves, or vibrations, of which those in a vertical direction are chiefly responsible for corrugation. As the rolling load is suddenly imposed on a section of free rail, the resulting vibration causes the rail head to move first away from the wheel and then back toward it, giving alternately minimum and maximum pressures between the wheel and the rail. When there is created a progression of waves due to establishing harmonics of the original simple vibration in the rail, the crests come into strong impact with the wheel while the valleys are practically relieved of load. The wheel thus passes with a shock

from one wave crest to the next, causing excessive wear of the rail and a crowding forward, or displacement, of the rail metal at the points of impact. This condition grows worse if the rail is made softer and the wheel harder.

Theoretically, when the length of free rail increases 100 per cent the wave length increases 140 per cent, and the number of vibrations decreases correspondingly. Hence, the waves grow smaller as they approach the points of support, becoming infinitely small in theory. This cannot actually occur, however, because the support, or nodal point, is never absolutely rigid in practice, and, therefore, the corrugations must extend beyond it. However, the waves will be shorter at the support than at the point of greatest freedom of movement. As the speed of the rolling load increases the corrugation lengths increase, while the period of vibration and the number of vibrations do not change. Also, as the speed increases the coefficient of displacement of the metal varies as the square. For instance, if the speed increases from 10 m.p.h. to 20 m.p.h., the displacement of metal at the points of impact will be four times as great, but this displacement of metal is divided between the wheel and the rail in inverse relation to the hardness of each. Thus it should be possible to select the kind of rail and wheel compositions best suited for the track structure. As the destruction of track is so costly, the rail should be much harder than the wheel tires, although, of course, this will increase the displacement of the wheel metal because of the greater vibration energy of the rail when it is made of hard material.

No rigid construction will permit an economical relation between rail wear and wheel wear. In elastic construction the waves have a period of vibration that is considerably longer than in rigid track, and no demonstration is required to prove that the longer waves produce less noise and less wear for rails and wheels. Longer wave lengths may be obtained by increasing the "give" at the point of support, the change being roughly in proportion to the amount of the increase in "give."

The author calls attention to the desirability of having rolling mills produce a rail of variable composition throughout its cross-section, the head being hard and the supporting structure flexible to reduce the energy of vibration. Such rails, he says, will shortly be rolled according to the Melaun patent, the practicability of the step having been indicated by mechanical, physical and chemical tests which were made by the Royal Prussian Railways.

In conclusion the author discusses the various theories that have been advanced as to the cause of rail corrugation, stating that the character of rail composition could not be held responsible for the great variation existing in the lengths of corrugations. With regard to the influence of high speed he states that crests are thus made higher and rate of wear is greater, but that the resulting corrugations are less troublesome. With regard to the influence of excessive rates of acceleration and braking, the author suggests that the front truck of the car should have a much smaller load on the front axles than on the rear axles, the use of such maximum traction trucks tending to keep down corrugation in general. He contends that the motor drive is of little or no importance in causing corrugation, for the waves are plentiful enough on sections where motors are not in use at all, and he decries the possibility that corrugation can be caused by hard tires, these being of importance only in regard to rate of wear. Nosing may be associated with corrugation on curves, but it cannot be applied to the case of tangents.

In short, the author believes that, since vibration in the rail is the primary cause of corrugation, it is of

most importance to do everything that is possible to minimize such vibrations, and he suggests the following remedies:

1. Use rails having the least possible height.
2. Use tough but not excessively hard metal for the rail, except in the head. The shape of the rail head also should conform to that of the wheel to reduce unit pressures and minimize displacement of metal.
3. The present single-web form of rail lowers the period of vibration, but a double-web rail such as has been suggested would increase the period of vibration, thus decreasing the tendency toward corrugation.
4. Avoid rigid tracks.
5. Avoid short distances between rail supports, especially on sections of track where acceleration and braking takes place.
6. Avoid rigid fastenings. Metal plates and metal ties are harmful. Where these cannot be avoided, they should be used in connection with wooden blocks or felt liners under compression. The rails should be installed on the ties as flexibly as possible to minimize the effect of establishing nodal points for any vibrations that may be set up.
7. In concrete construction, which is so costly to disturb, the rail should be harder than the wheel, but elsewhere it is possible to choose the most economical compositions for the particular conditions involved.

Diesel Engines in Texas

In a recent issue of the *Electrical World*, R. H. Burdick presented operating data for a number of small Diesel engine plants in the State of Texas where fuel oil containing 19,500 B.t.u. per pound was obtainable at a price of 3 cents per gallon. The actual unit production costs obtained in two of these stations between Sept. 1 and Dec. 31, 1915, are shown in the accompanying table. In the station at Paris as cited in the table there were three engines of 500 hp. each, while in the station at Tyler there were four engines of 225 hp. each. The difference between the figures for labor cost which appear in the table is due apparently to the difference in the load factors existing at the two plants, as the Paris station employed six men, whereas the Tyler station employed but four. The wide diversity in the figures for maintenance cost is accounted for by the fact that the Paris engines are of more modern design than those at Tyler, the former having been operated about eight months and the latter having done severe intermittent shop duty over a period of six or seven years prior to their installation at Tyler. The author estimated the cost of a 1050-kw. Diesel station at \$145 per kilowatt and the cost of a 1100-kw. steam station at \$100 per kilowatt. Assuming fixed charges of 15 per cent for the Diesel engine station (of which 8 per cent was for depreciation) and 12 per cent for a steam station he calculated that, at 50 per cent load factor, the total station output costs would be respectively 9.5 mills per kilowatt-hour and 11.4 mills per kilowatt-hour.

Data:

| | Paris | Tyler |
|---------------------------------------|---------|--------|
| Station output (m. kw.-hr.) | 1,565 | 499 |
| Rating of plant (kw.) | 1,050 | 600 |
| Station factor, per cent | 51 | 28½ |
| Total fuel oil (gal.) | 149,072 | 78,455 |
| Pounds oil per kw.-hr. output | 0.672 | 1.100 |
| B.t.u. per kw.-hr. output | 13,100 | 21,400 |
| Production costs (mills per kw.-hr.): | | |
| All labor | 1.44 | 2.24 |
| Fuel oil | 3.07 | 5.18 |
| Water | 0.09 | 0.19 |
| Lubricants and waste | 0.04 | 0.56 |
| Miscellaneous supplies and expense | 0.10 | 0.29 |
| Maintenance of engines | 0.04 | 4.48 |
| Maintenance of buildings | 0.05 | 0.05 |
| All other maintenance | 0.15 | 0.61 |
| Total production cost, mills | 4.98 | 13.60 |

NEWS OF ELECTRIC RAILWAYS

INCREASE SOUGHT IN CLEVELAND ALLOWANCES Cleveland Railway Asks That the Maintenance, Depreciation and Renewal Allowance Be Increased

At the meeting of the City Council of Cleveland, Ohio, on the evening of March 20, the Cleveland Railway asked that the maintenance, depreciation and renewal allowance be increased to 8 cents per car mile flat. At the present time the allowance is 4 cents for January, February, March, April, May and December, 5 cents for June and 6 cents for the other months. The company also asked that Council direct Fielder Sanders, Street Railway Commissioner, to permit the company to reduce its deficits and suspended accounts by such amounts per month as he deems proper.

There is a debit balance of \$956,572 in the road and equipment suspended account and \$73,440 balance in the depreciation and renewal suspended account, allowed by arbitration for over-expenditures previous to March, 1913. The deficit in the maintenance, depreciation and renewal reserve as of March 1, 1916, was \$564,000. The company recalled the fact that the board of arbitration recommended the transfer from the interest fund to the maintenance, depreciation and renewal fund of amounts equal to these over-expenditures or as an alternative that the maintenance allowance be increased.

It seems likely that Mr. Sanders will oppose the increase of the allowance to 8 cents per car-mile. He said the suspense accounts and deficits were inherited from a former administration and were left for the present administration to consider. He expressed the opinion that such an increase would endanger 3-cent fares and that such a large allowance was unnecessary. Mayor Harry L. Davis said that the matter had to be opened some time and it had as well be now as any other time. If the demand is not allowed the company may ask for arbitration of the question.

Officials of the company feel that on account of the increasing business and the higher rate of fare, the suspended accounts and deficits should be reduced more rapidly than they have been in the past. The reduction should at least keep pace with the growth of the business. Considerable money is to be expended this year in track renewal and other improvements. J. J. Stanley, president of the company, said that he does not care to create any new deficits and for this reason asked that the allowance be increased to a point to cover the expenditures as they are made.

MEASURES AFFECTING ELECTRIC RAILWAYS PASSED IN KENTUCKY

Various measures of direct interest to the electric railways of the State were enacted at the last session of the Kentucky Legislature, which has just adjourned at the end of its regular biennial session. Probably of first importance to the street railways is the workmen's compensation law. This is virtually a compulsory measure, since it would deprive employers of five or more persons of the common-law defenses of assumption of risk, responsibility of a fellow servant, contributory negligence, etc. It does not provide for a State administered fund, but prescribes that insurance may be carried in commercial companies or in mutual organizations.

Another measure passed provides that parts of the right-of-way of railroads may not be condemned for the use of poles carrying telegraph wires. This measure relates principally to the controversy between the Louisville & Nashville Railroad and the Western Union Telegraph Company, but would apply, it is stated, to electric railway lines in the State as well.

Electric railways and other corporations, if they have been paying off by the month, hereafter will pay at least twice monthly under the provisions of another act so providing. This has been signed by the Governor. Proponents

of the measure urged that long waits for his money imposed a hardship on the laboring man and contributed to the ill-gotten prosperity of the loan shark.

An anti-pass act prohibits certain public officials from accepting transportation favors.

A measure designed to increase the powers of the State Railroad Commission so as to give it authority over joint rates failed of passage.

PENSIONS ARRANGED FOR NEW YORK EMPLOYEES Outline of Pension System Regulations of the Interborough Rapid Transit Company

A pension system has been established by the board of directors of the Interborough Rapid Transit Company, New York, N. Y., for the benefit of employees of the company, taking effect on Jan. 2, 1916. The benefits of this pension system will apply to employees who have attained the age of seventy years and have been in the service of the company or its predecessors not less than twenty-five years, and to employees who have been twenty-five or more years in such service and who, in the opinion of the board of pensions, have become physically and permanently disabled.

The pension department is to be administered by a board of officers, to be known as the board of pensions, to be appointed by the president, subject to the approval of the board of directors.

Subject to the approval of the president, the board of pensions is to have power to make and enforce rules and regulations for the care and operation of the department; to determine the eligibility of employees to receive pension allowances; to fix the amount of such allowances; to prescribe the conditions under which such allowances may inure.

Physical examination by two physicians appointed by the board of pensions is to be made of employees recommended for retirement who are under seventy years of age, and a report thereof, with the recommendation of the examining physicians, is to be transmitted by the secretary to the board of pensions for consideration in determining such cases.

Service is to be computed from the date since which the person has been continuously in the service, as shown by the pay-rolls, to the date when retired, eliminating in the final result any fractional part of a month. Leave of absence, suspension or dismissal followed by reinstatement within one year, or temporary lay-off on account of reduction of force is not to be considered as a break in the continuity of the service. Persons who leave the service relinquish all claims to the benefits of pension allowance.

The pension allowances authorized by the board of directors to be paid monthly are upon the following basis:

For each year of service one per centum of the average monthly pay for the ten years next preceding retirement, provided, however, that in no case shall the pension allowance for employees retired, in accordance with the provisions of the regulations, be made less than \$20 a month.

The company in each year is to make an appropriation of an amount not to exceed \$50,000 in payment of pension allowances for the year. If the pension allowances create demands in excess of the appropriation, a new basis ratably reducing the pension allowance is to be established to bring the expenditures within the limit of the fund. Notice of such new basis is to be given before the beginning of the year in which it may be decided to put the same into effect.

In the event that any person is receiving accident or sick benefits from the relief department at the time the pension is granted, the pension allowance paid is to be for the difference between the amounts received from such sources and the amount which otherwise would be the pension allowance.

The acceptance of a pension allowance is not to debar any employee from engaging in other business.

OPPOSITION TO PROPOSED PHILADELPHIA CHANGES

Modification of the So-Called Taylor Rapid Transit Plan Provokes Opposition

The announcement of the proposed modification of the plans for the new rapid transit system in Philadelphia, referred to in the ELECTRIC RAILWAY JOURNAL of March 11, page 512, has stirred up considerable opposition from several factions. Mayor Smith has finally accepted responsibility for the change in the routing of the subway under the City Hall so that the delivery stations would be outside of the foundations of the big building topped by Father Penn's statue. He has declared, however, that beyond this he had not considered Director of City Transit Twining's plans in any formal manner, and that if the people of Philadelphia wanted the Taylor plans carried out, they will get what they wanted.

Senator Penrose and the Mayor would seem to be aligned against each other. The Senator is reported to have said:

"I feel that I owe it to my friends in the various sections of the city who are menaced by the proposed emasculation of the city's admirable plans for transit developments to stand by them to the end. South Philadelphia needs a subway which will carry passengers around the loop through the business district, as well as through North Philadelphia directly. North Philadelphia must have elevated branches and express tracks in addition to local tracks to Arch Street. The district consisting of the Parkway, the northwest section and the Roxborough district must be provided with proper delivery and through system for passengers. The Woodland Avenue line is a vital necessity. There will be absolutely no division of opinion among ward organizations and civil bodies and among the people generally regarding the vital necessity that the Taylor plans be constructed to carry people between all parts of the city for one fare.

To this the Mayor rejoined as follows:

"Former Director Taylor, who occupies rooms adjoining the suite of Senator Penrose, appears to be following a dispassionate attitude like myself in refusing to make any criticism of Mr. Twining's plans until we are informed by Mr. Twining what his plans actually contemplate. The people of Philadelphia need not get excited like the Senator—their interests will be satisfactorily cared for and they will get just what they want, and that without assistance or interference from Mr. Penrose."

SUMMARY OF DALLAS APPRAISAL FIGURES

The Figures of Dr. Bemis for the Dallas Railway Properties Presented in Tabular Form

The "model" traction and lighting franchise of the city of Dallas, Tex., in process of printing, will be voted upon by the people at the general election on April 4. It was at first understood that the people would vote only as to whether the city charter should be amended to permit the city to adopt the ordinance, but a statement issued by the Mayor explains that the full ordinance will also be voted upon. If both the proposed amendments and franchises are defeated there will be no change in the traction and light situation. Neither will there be any change if the charter amendment is defeated, but the proposed ordinances carry. If, however, only the amendment to the charter is carried and the franchises are beaten, it will be a year before another franchise can be submitted, as the franchise ordinances will provide that they cannot be adopted without a vote of the people at the next regular city election.

The terms of the ordinance were reviewed in the ELECTRIC RAILWAY JOURNAL for Feb. 26, page 417. One of the provisions is that the electric light property shall be separated from the railways. The Dallas Consolidated Electric Street Railway is to purchase and consolidate in one company the Metropolitan Street Railway, the Rapid Transit Railway and the Northern Texas Traction Company. The final summary of values of property owned by Stone & Webster as submitted to the city by Edward W. Bemis shows \$3,765,111 as the cost to reproduce new the property of the Dallas Electric Light & Power Company and \$2,985,964 as the cost of reproduction less accrued depreciation. These figures are as of Sept. 30, 1915. The figures of the

railway companies as of Sept. 30 follow, those in column "A" showing the cost of reproduction new and those in column "B" showing the cost of reproduction new less accrued depreciation:

| | Northern Texas Traction Company | | Dallas Consolidated Electric Street Railway Rapid Transit Company and Metropolitan Street Railway | |
|---|---------------------------------|--------------------|---|--------------------|
| | "A" | "B" | "A" | "B" |
| Engineering and superintendence | \$103,865 | \$80,887 | \$328,460 | \$248,332 |
| Right-of-way | 336,608 | 336,608 | 4,978 | 4,978 |
| Other land | 30,073 | 30,073 | 109,438 | 109,437 |
| Grading | 134,717 | 126,736 | 176,767 | 126,000 |
| Ballast | 73,579 | 60,376 | 256,591 | 212,214 |
| Ties | 53,087 | 37,699 | 94,465 | 76,951 |
| Rails, rail fastenings and joints | 92,618 | 66,327 | 447,682 | 313,870 |
| Special work | 19,272 | 13,806 | 217,069 | 168,527 |
| Track and roadway labor | 50,164 | 40,939 | 185,100 | 132,018 |
| Paving | 44,108 | 24,645 | 675,486 | 553,392 |
| Roadway machinery and tools | 100 | 75 | 14,714 | 11,743 |
| Bridges, trestles and culverts | 72,273 | 50,400 | 20,259 | 18,311 |
| Crossings, fences and signs | 4,789 | 4,544 | ..... | ..... |
| Signal and interlocks | 4,401 | 1,490 | 3,962 | 3,551 |
| Telephone and telegraph | 709 | 609 | ..... | ..... |
| Poles and fixtures | 15,576 | 12,449 | 33,207 | 22,479 |
| Distribution system | 50,547 | 43,301 | 172,288 | 148,530 |
| Shops and carhouses | 21,179 | 18,098 | 182,013 | 167,249 |
| Miscellaneous structures | 2,019 | 1,361 | ..... | ..... |
| Supplies | 300 | 300 | 62,967 | 62,968 |
| Total, Division 1..... | \$1,109,985 | \$950,724 | \$2,985,446 | \$2,381,150 |
| Passenger cars | \$226,064 | \$180,798 | \$554,565 | \$357,251 |
| Service equipment | 875 | 628 | 10,443 | 7,961 |
| Electric equipment of cars | 83,572 | 67,501 | 252,007 | 155,369 |
| Shop equipment | 1,956 | 1,174 | 20,766 | 18,170 |
| Furniture | 1,114 | 703 | 13,306 | 11,308 |
| Miscellaneous equipment ..... | ..... | ..... | 3,253 | 2,117 |
| Total, Division 2..... | \$313,491 | \$250,804 | \$854,341 | \$552,176 |
| Substation building | 9,073 | 8,385 | ..... | ..... |
| Substation equipment | 64,443 | 55,504 | ..... | ..... |
| Transmission system | 3,968 | 3,471 | ..... | ..... |
| Total, Division 3..... | \$77,484 | \$67,361 | ..... | ..... |
| Law expense | 16,692 | ..... | \$55,000 | ..... |
| Interest | 62,546 | ..... | 203,022 | ..... |
| Taxes | 5,015 | ..... | 16,912 | ..... |
| Promotion expense | 18,338 | ..... | 60,000 | ..... |
| Insurance | 206 | ..... | 632 | ..... |
| Total, Division 4..... | \$102,698 | \$88,799 | \$338,556 | \$279,139 |
| Grand total..... | \$1,603,660 | \$1,355,690 | \$4,178,353 | \$3,212,467 |
| Thirty-five cars owned by Dallas Equipment Co. .... | ..... | ..... | 231,011 | 221,967 |
| Grand total, including Dallas Equipment Co. .... | ..... | ..... | \$4,409,366 | \$3,434,433 |

The following statement has been given out by Charles F. Wallace reiterating the stand taken some time ago:

"It has come to my attention that, notwithstanding repeated assertions to the contrary, some people are still saying, and others are still believing that the street railway and lighting properties will accept the Lindsley franchise if the proposed charter amendments carry, and the franchises are approved.

"It is so necessary for intelligent action that every voter should understand fully the position which the interests I represent have taken and will maintain with reference to these franchises, that I wish to state that position again clearly, officially and finally.

"In a statement made on Feb. 20 I said these companies would be unable to go forward and develop under the terms that have been offered them, and that, therefore, they could not be accepted. Mr. Baker on behalf of the companies has so stated. Mr. Coke on behalf of the largest interest in the properties has so stated. Both Mr. Baker and Mr. Coke acted with full authority and made their statements before the Commissioners on March 1 at a meeting open to the public.

"I wish to repeat now my former statement that neither the owners of the street railway and lighting properties in this city nor the companies can accept the Lindsley franchises, and because they cannot, they will not accept them. Any statements that may hereafter be made to the contrary can only be made for the purpose of misleading the citizens."

A detailed statement outlining the procedure by the city in any contingency following the election on April 4 on the franchises and charter amendments will be issued within a short time by Mayor Henry D. Lindsley. This statement will take into consideration the contingency of adoption of the charter amendments, approval by the voters of the franchises themselves, and the refusal of Stone & Webster to accept the grants. Mayor Lindsley stated on the day following the issuance of the statement by Mr. Wallace quoted above, that he believed that Stone & Webster will not refuse the franchises, notwithstanding the statements that have been made.

An offer to submit to the voters of Dallas at the election to be held on April 4 a proposal of arbitration of the franchise differences between the city and Stone & Webster has been forwarded to Charles F. Wallace, local representative of the corporation. This proposition will be submitted to the voters along with the city's proposed franchises. Its submission will be conditioned upon agreement by Stone & Webster to bind themselves to accept the franchises if they are approved by the voters in preference to the arbitration proposal.

Thus, if a majority of the voters should decide that "the valuation and rates of return fixed by Dr. Bemis and the Board of Commissioners are fair and just," then under the terms of the present proposition Stone & Webster would be obligated to accept the franchises as drawn with the stipulated valuations and rates of return. But if the people should vote that "the valuations and rates of return in these franchises be determined by arbitration," then Stone & Webster would be obligated to accept the franchises as drawn except as to valuations and rates of return, and in such matters would be bound by the result of arbitration.

BAY STATE STREET RAILWAY PLACES LARGEST SURFACE CAR ORDER OF YEAR

C. F. Bancroft, superintendent of motive power and machinery of the Bay State Street Railway, Boston, Mass., has awarded a contract for 200 trucks and 200 semi-convertible cars of the type described in the *ELECTRIC RAILWAY JOURNAL* of Oct. 23, 1915, page 854, to the Laconia Car Company, Boston, Mass. The Laconia company was the lowest bidder on the new rolling stock. Bids covering electrical equipment were opened March 22, and it is expected that the latter contract will be signed about April 1.

This order for 200 cars is the largest surface car order placed this year, and naturally will be welcomed by the industry as another sign of the return of good business. Other large car orders placed to date during 1916 are the following: New York Municipal Railways, 200 subway cars; Public Service Railway, Newark, N. J., 197 cars, 177 of which are to be built in its own shops and twenty of which have been ordered from an outside car builder; Cincinnati (Ohio) Traction Company, 100 cars (reported); Kansas City Railway, fifty cars.

OPEN DISCUSSION BEFORE NEW YORK COMMITTEE

There was an open discussion on March 17 before the Thompson committee, which is inquiring into the work of the New York Public Service Commissions, as to the advisability of transferring jurisdiction over subway construction from the Public Service Commission to some municipal body. There were many divergent expressions of opinion. The Citizens' Union in a memorandum said that it believed any legislation to accomplish the purpose of transferring supervision over construction to the city would be exceedingly unwise and adverse to the best interests of the city, particularly at this time.

Theodore P. Shonts, president of the Interborough Rapid Transit Company, has been the principal witness recently. The committee reviewed a great deal of the ground leading up to the present rapid transit construction contracts, going again into the change in attitude on the part of the late Mayor Gaynor toward the present so-called dual system. Mayor Mitchel and Comptroller Prendergast also have appeared as witnesses in connection with the unsigned memorandum of March 22, 1910, by Mr. Shonts to Chairman Wilcox of the commission which it has been explained was to serve merely as a basis for negotiations.

PITTSBURGH SUBWAY FRANCHISE EXPLAINED

The subway franchise asked for by the Pittsburgh Subway Company was before the committee on public service and surveys of the City Council of Pittsburgh, Pa., on March 21. A. O. Fording, general counsel for the company, explained that the company would like to build a subway from Liberty Avenue and Ferry Street along Libert Avenue, up Oliver Avenue to Grant Street, thence to Webster Avenue and Fullerton Street, through Herron Hill to Center Avenue and Grant Boulevard, where the track would rise to the surface. Surface franchises would continue out to the East End. Turning off from the main subway would be another line running from Herron Hill and Grant Boulevard to the Forbes Street entrance of Schenley Park. The company does not contemplate a downtown loop at present, but would have two downtown stations. Mr. Fording said that the subway outlined would cost \$15,000,000 to \$20,000,000.

In Council Mr. Dailey presented a resolution that the President of Council invite A. Merritt Taylor, Philadelphia, Pa., to report on the question as to what rapid transit facilities should be constructed.

STORY ON RED SPECIAL TRIP

An interesting story on the trip of the "Red Special" train of the American Electric Railway Association to the San Francisco convention appears in the March issue of the *Railroad Man's Magazine*, published by the Frank A. Munsey Company. It is from the pen of Thaddeus S. Dayton, who was a member of the party and was connected with the secretary's office as publicity agent of the association during the trip. It is entitled "The Flight of the Genius Special," and the passengers on the train, according to the caption under the heading, included "wizards of the rail, givers of voice to the people, conquerors of the cataract, founders of inland empires, openers of the wilderness."

The account of the trip is written in attractive style, and several entertaining anecdotes are related of members of the train crew and passenger list. The story concludes with an account of how L. P. Crecilius started a stalled motor bus in which some of the members of the party were touring the Yosemite region. He discovered the trouble was due to the loss of magnetism by the magneto, and he re-magnetised it by transferring some magnetism from another magneto by means of his jack knife.

Latin American Market Inquiry Proposed.—The Bureau of Foreign and Domestic Commerce at Washington announced on March 21 that it would soon begin an exhaustive investigation of South American markets. Special agents of the bureau assigned to the task are expected to leave about April 15. The textile, wearing apparel and electrical goods markets will in particular be studied.

Increase in Wages in Reading.—The Reading Transit & Light Company, Reading, Pa., voluntarily increased the pay of its motormen and conductors from 23 cents to 24 cents an hour. President E. L. West of the company said: "We are trying in every way possible to improve our railway service. Our motormen and conductors have done and are still doing their share to help the cause along. The increase is in appreciation of their efforts."

C. E. A. Accountants Issue Report.—The compiling committee of the Central Electric Railway Accountants' Association has just issued a new pamphlet report, dated January, 1916. This contains lists of officers and members, an index to accounting forms on file in the secretary's office, a synopsis of decisions and recommendations by the association in regard to handling interline accounts, a list of committee reports and papers published in previous pamphlets, and the various addresses and papers presented at the Indianapolis meeting on June 11-12, 1915, and the Detroit meeting on Dec. 7-8, 1915.

Scranton Men Seeking New Terms.—The present agreement between the Scranton (Pa.) Railway and its employees expires on April 1. The men are seeking a new contract to run until April 1, 1918. They have asked for a 20 per cent increase in the wages of all carhouse men, shopmen and power-house employees and for a flat wage rate of 30 cents an hour for all motormen and conductors. The trainmen now receive 22 cents an hour the first year; 24

cents an hour the second year, and 26½ cents an hour the third year and thereafter.

Strike of Shop Employees in St. Louis.—Two hundred employees of United Railways, St. Louis, Mo., walked out of car shops on March 17 because forty-five men had been laid off as there was no work for them. To a committee of their associates President Robert McCulloch said the company had been unable to run a full shop on account of the high prices of materials due to the European war and that this necessitated suspending the men.

\$60,000 Carhouse Fire in Massachusetts.—The Palmer, Mass., carhouse of the Springfield & Eastern Street Railway was about two-thirds destroyed by fire on the night of March 17. Nineteen cars valued at \$50,000 were gutted and the damage to the building is estimated at \$10,000. The property lost was fully insured. The rolling stock put out of commission consisted of four closed and twelve open passenger cars, two snow ploughs and a dump car. Several cars stored at the front of the house were saved. The loss affects the Springfield Street Railway, which owned the cars and operated the road. Most of the rolling stock destroyed was operated between Springfield and Palmer.

Cincinnati Plans Maturing.—E. W. Edwards, chairman of the Rapid Transit Commission of Cincinnati, Ohio, announced at a meeting of the Cincinnati Real Estate Exchange on March 14 that no resolution has been adopted by the commission to the effect that the street railway system in that city would be condemned, and the property leased to a company which would operate both the local lines and the rapid transit loop, if satisfactory arrangements cannot be made otherwise. On the other hand, it was expected that the company would co-operate in securing the loop. A retail market will be established in the main interurban terminal station on the site of the old city hospital to handle the products shipped on the interurban trains.

Ohio Commission Has Authority to Require Inventory.—Attorney-General Turner has rendered an opinion to the Ohio Public Utilities Commission to the effect that the commission has authority to instruct a public utility company to file an inventory and valuation of its property, when the question of rates for service is pending, and that the law conferring that authority is valid and enforceable. This opinion was rendered after the Toledo Railways & Light Company, through its attorneys, had denied the authority of the commission to compel it to file an inventory and appraisal, as desired by Toledo city officials. The attorney-general, however, says that there must be a question of rates pending; that the request must come from the City Council and that the commission is under no obligations to consider unofficial requests.

What Mr. Witt Is Likely to Report.—Peter Witt, former street railway commissioner of the city of Cleveland, Ohio, who was retained by the Chamber of Commerce of Lynn, Mass., to report in connection with the application of the Bay State Street Railway to the Public Service Commission for permission to increase its fare unit from 5 cents to 6 cents, has returned to Cleveland, but it is expected that he will resume his studies of the Bay State Company's system soon and appear at the hearings before the commission. It is said unofficially that Mr. Witt is inclined to favor the consolidation of the Boston Elevated Railway and the Bay State Street Railway, the operation of one-man cars in outlying districts and the turning of cars from north of Boston through the East Boston tunnel.

Reorganization of New York Commission Complete.—The Senate of the State of New York, on March 16, confirmed the nominations made by Governor Whitman of Travis H. Whitney and Charles S. Hervey, both of Brooklyn, to be members of the Public Service Commission for the First District. Mr. Whitney succeeds Commissioner J. Sergeant Cram, whose term expired on Jan. 31, 1916. His term of office, therefore, will expire on Jan. 31, 1921. Mr. Hervey succeeds Commissioner George V. S. Williams, who resigned in January. Mr. Hervey's term will expire on Jan. 31, 1917. It is now an entirely new commission, the oldest member, in point of service, being Col. William Hayward, who took office on April 1, 1915. The new chairman, Oscar S. Straus, was appointed in December, 1915, and Commissioner Henry W. Hodge in January, 1916.

Financial and Corporate

ANNUAL REPORTS

Chicago Surface Lines

The gross earnings, expenses and distributed residue receipts of the Chicago (Ill.) Surface Lines for the twelve months ended Jan. 31, 1915 and 1916, follow:

| | 1916 | 1915 |
|---|---------------------|---------------------|
| Passenger cars | \$31,061,878 | \$31,299,201 |
| Chartered cars | 4,175 | 5,206 |
| Funeral cars | 4,805 | 5,516 |
| Mail cars | 60,673 | 71,767 |
| Mail carriers | 24,837 | 24,837 |
| Newspaper cars | 8,291 | 8,040 |
| Freight earnings | 801 | 874 |
| Garbage car service | 27,499 | 22,492 |
| Advertising | 221,338 | 218,744 |
| Rents of buildings, etc. | 80,754 | 91,712 |
| Sale of power | 82,292 | 86,642 |
| Interest on deposits | 105,175 | 120,129 |
| Miscellaneous | 8,243 | 10,888 |
| Gross earnings | \$31,690,761 | \$31,966,048 |
| Maintenance | \$2,650,658 | \$2,464,564 |
| Renewals | 2,535,261 | 2,557,284 |
| Operation of power plants | 2,779,718 | 2,781,907 |
| Operation of cars | 9,376,311 | 8,786,524 |
| General expense, including traffic expenses and those of Board of Supervising Engineers | 1,966,780 | 1,945,924 |
| Taxes | 1,732,629 | 1,353,073 |
| Total expenses | \$21,041,356 | \$19,889,275 |
| Residue receipts | \$10,649,405 | \$12,076,773 |
| Divided: | | |
| Chicago Railways, 59 per cent. | \$6,283,149 | \$7,125,296 |
| South Side Lines, 41 per cent. | 4,366,256 | 4,951,477 |

The showing made by the Chicago Surface Lines, comprising the Chicago Railways and the South Side Lines (Chicago City Railway, Southern Street Railway and Calumet & South Chicago Railway), was not so favorable in 1915 as in 1914. For the year ended Jan. 31, 1916, the lines showed a falling off in gross earnings of \$275,287 or 0.86 per cent as compared to the preceding year, while the total expenses of operation increased \$1,152,081 or 5.79 per cent. As a result the divisible residue receipts suffered a loss of \$1,427,368 or 11.81 per cent.

The bulk of the decrease in gross earnings naturally came in passenger car earnings, which fell off \$237,323 or almost 0.76 per cent. Earnings from chartered cars, funeral cars, mail cars, freight traffic, rent of buildings, sale of power, interest on deposits and miscellaneous sources also showed varying degrees of losses, while only the earnings from newspaper cars, garbage cars and advertising had gains. The gross earnings of the surface lines showed a heavy decline during the first eight months of the fiscal year. The loss up to Sept. 30, 1915, including the loss in receipts from a two days' strike, totaled \$695,753. With October, however, the gross earnings began to show a slight increase. In the remaining months of the fiscal year the gain was about 5 per cent, so that the net decrease for the year was only the before-mentioned \$275,287.

The cause for the large increase in operating expenses may be found in the higher payments for maintenance, car operation and taxes. There was an increase of \$20,856 in traffic and general expenses, but this was more than counterbalanced by the decrease of \$22,023 in renewal expenses and \$2,189 in expenses of power plant operation. The largest increase in amount was in the case of car operation expenses, which rose \$589,787 or 6.37 per cent, due to the increased wages effective on June 1, 1915, after the strike settlement. Next in amount and much higher in percentage increase were the tax payments, which jumped \$379,556 or 28.04 per cent. The remainder of the increased operating expenses came from the maintenance group, which showed a rise of \$186,093 or 7.55 per cent. This increase was for both way and structures, and equipment, no division for these two classes being made in the annual report of the Chicago City Railway, from which the foregoing table is taken.

The gross earnings of the Chicago Surface Lines amounted to \$31,690,761, expenses \$21,041,356 or 66.4 per cent of

the gross (62.22 per cent in 1915), leaving residue receipts of \$10,649,405. These were divisible 59 per cent or \$6,283,149 to the Chicago Railways and 41 per cent or \$4,366,256 to the South Side Lines. The income statement of the Chicago City Railway, the main one of the South Side Lines, follows:

| | |
|---|-------------|
| 41 per cent of the residue receipts of Chicago Surface Lines | \$4,366,256 |
| Joint account expenses, interest on capital investment of the Chicago City Railway and Calumet & South Chicago Railway, and net earnings of Southern Street Railway | 3,500,467 |
| Net earnings of Chicago City Railway | \$865,789 |
| City's proportion, 55 per cent, as per ordinance | 476,184 |
| Company's proportion, 45 per cent, as per ordinance | \$389,605 |
| Interest on capital investment | 2,507,908 |
| Income from operation | \$2,897,513 |
| Other income, net | 81,582 |
| Gross income | \$2,979,095 |
| Interest on bonds outstanding | 1,565,555 |
| Net income | \$1,413,540 |
| Surplus at Jan. 31, 1915 | 183,617 |
| Surplus | \$1,597,157 |
| Dividends, 8 per cent | \$1,440,000 |
| Miscellaneous | 21,035 |
| Total | \$1,461,035 |
| Surplus at Jan. 31, 1916 | \$136,122 |

Thus the Chicago City Railway produced a net income of \$1,413,540 after paying all operating expenses and bond interest. This net income applicable to dividends equaled 7.85 per cent on the capital stock at par, as compared to 9.83 per cent for the preceding fiscal year and 9.43 per cent for 1910, the lowest percentage back that far. The company had to resort to surplus for the declaration of its dividends, the dividend excess over the net income for the year being \$47,495. Moreover, the dividend payments in 1915 aggregated only 8 per cent as compared to 9 per cent in 1914 and 10.5 per cent in 1913. The 1915 payment was the lowest since 6.75 per cent in 1907, the high point being 1910 with 10 per cent and 6 per cent extra. During the last fiscal year the Chicago City Railway built 4.64 miles of single track and reconstructed 14.93 miles of single track. Its total mileage is now 317.04 miles.

Twin City Rapid Transit Company

The comparative statement of income, profit and loss of Twin City Rapid Transit Company, Minneapolis, Minn., for the twelve months ended Dec. 31, 1914 and 1915, follows:

| | 1915 | 1914 |
|---|-------------|-------------|
| Revenue from transportation | \$9,401,233 | \$9,227,602 |
| Revenue from other railway operation | 52,731 | 56,618 |
| Total railway operating revenue | \$9,453,964 | \$9,284,220 |
| Way and structures | \$995,556 | \$964,240 |
| Equipment | 723,085 | 685,526 |
| Power | 839,673 | 847,275 |
| Conducting transportation | 2,582,226 | 2,506,351 |
| Traffic | 49,297 | 46,579 |
| General and miscellaneous | 909,295 | 831,350 |
| Transportation for investment—credit | 39,504 | 49,138 |
| Total railway operating expenses | \$6,064,628 | \$5,832,183 |
| Net operating revenue | \$3,389,336 | \$3,452,037 |
| Taxes assignable to railway operation | 687,454 | 593,078 |
| Operating income | \$2,701,882 | \$2,858,959 |
| Non-operating income | 23,927 | 15,425 |
| Gross income | \$2,725,809 | \$2,874,384 |
| Rent for leased roads | \$3,000 | \$3,000 |
| Interest on funded debt | 989,843 | 983,743 |
| Net loss miscellaneous physical property | 12,442 | ..... |
| Miscellaneous debits | 8,248 | ..... |
| Total deductions from gross income | \$1,013,534 | \$986,743 |
| Net income transferred to profit and loss | \$1,712,275 | \$1,887,641 |

The foregoing statement, which is prepared on the basis of the official I. C. C. classification, is different from that of preceding years, but the 1914 figures have been adjusted in order to make them comparable. The increase of \$169,744 or 1.8 per cent in railway operating revenues, which was brought about by an increase of \$173,630 or 1.9 per cent in transportation revenue and a decrease of \$3,887 or 6.8 per cent in other railway operating revenue, was more than offset by the increase of \$232,445 or 3.9 per cent

in operating expenses. This increase in operating costs arose mostly from increases of \$31,316 or 3.2 per cent for maintenance of way and structures, \$42,559 or 6.2 per cent for maintenance of equipment, \$75,875 or 3.0 per cent for conducting transportation and \$77,945 or 9.3 per cent for general and miscellaneous.

Moreover, the taxes assignable to railway operation also showed a large increase of \$94,376 or 15.9 per cent, so that the operating income decreased \$157,077 or 5.5 per cent. The non-operating income increased \$8,502 or 55 per cent, while the deductions from gross income increased \$26,791 or 2.7 per cent, with the result that the net income decreased \$175,366 or almost 9.3 per cent. The report of the company attributes the decrease in net income largely to the operation of 24.34 miles of new lines and extensions put into operation in November, 1914, and to the increase of \$94,376 in taxes, this last being due to an increase of nearly 13 per cent in the rate of taxation in both Minneapolis and St. Paul.

During 1915 the company charged to depreciation \$1,015,900 as compared to \$994,072 in 1914. The total expenditures for additions and replacements were \$2,190,793. The average total single-track mileage operated during 1915 was 438.68 miles, and the gross passenger revenue per mile of single track operated was \$21,308. During 1915 the company carried 185,654,985 revenue passengers, an increase of 1,298,022, while the transfers redeemed totaled 69,259,767, an increase of 2,517,767. The ratio of operating expenses and taxes to revenue rose from 69.09 per cent in 1914 to 71.24 per cent in 1915. In 1915 the company paid 7 per cent on its preferred stock and 6 per cent on its common stock. The rate earned on the common stock was 6.83 per cent, this being a drop from 8.05 per cent in 1914 and from 7.22 per cent in 1910, the lowest back to that time.

Northern Ohio Traction & Light Company

The comparative statement of income, profit and loss of the Northern Ohio Traction & Light Company, Akron, Ohio, for the years ended Dec. 31, 1914 and 1915, follows:

| | 1915 | 1914 |
|---|-------------|-------------|
| Gross earnings | \$3,890,750 | \$3,636,084 |
| Operating and taxes | 2,373,010 | 2,237,428 |
| Net earnings | \$1,517,740 | \$1,398,656 |
| Interest on funded debt and notes payable | 628,309 | 606,898 |
| Available for dividends | \$889,431 | \$791,758 |
| Dividends on preferred stock | 199,281 | 182,364 |
| Dividends on common stock | 450,000 | 450,000 |
| Surplus | \$240,150 | \$159,394 |

The gross earnings of the company for 1915 gained \$254,666, or 7.0 per cent, while the operating expenses and taxes increased \$135,582, or 6.6 per cent, so that the net earnings showed a gain of \$119,084, or 8.5 per cent. In spite of an increase of \$21,411, or 3.5 per cent, in interest on funded debt and notes payable, and of \$16,817, or 9.2 per cent, in dividend payments on preferred stock, the surplus for 1915 amounted to \$240,151 as compared to \$159,394 for the preceding year.

The increase in gross earnings was mostly brought about by a gain of \$109,035, or 3.0 per cent, in passenger earnings; \$119,738, or 18.5 per cent, in light and power earnings; \$20,668, or 23.4 per cent, in freight earnings, and \$8,262, or 16.5 per cent, in park earnings. The increase in operating expenses arose from the following factors: Maintenance of equipment, an increase of \$49,403, or 16.5 per cent; conducting transportation, an increase of \$29,705, or 4.5 per cent; general expenses, an increase of \$112,414, or 21.2 per cent; maintenance of way and structures, a decrease of \$51,235, or 14.2 per cent, and operation of power plants, a decrease of \$4,704, or 1.1 per cent.

The depressed industrial conditions that marked the end of 1914 continued into 1915, and in February the gross earnings of the company reached the low point of \$260,451. With spring, however, there came a general quickening of business in all lines, which would have shown more favorably in railway earnings had not jitney buses made their appearance in Akron. Competition from this source continued throughout the summer and the autumn, but in December the combined influence of a regulatory ordinance and the wearing off of the novelty brought a large decline in

the number of jitneys. In spite of the foregoing factors and the rainy and cool weather during the summer, the earnings in July amounted to \$371,736. After dropping back to \$339,599 in October, they arose with accelerated industrial activity to \$379,817 in December, the last-named month showing the highest net earnings for the year.

The gross earnings per mile in 1915 were \$12,973 as compared to \$12,637 in 1914, while the net earnings per mile in the two years were \$4,574 and \$4,444 respectively. The operating ratio for the last fiscal year was 60.99 per cent, as compared to 61.53 per cent in 1914. The trackage of the system was increased 4.27 miles during the year, making a present mileage of 241.04. The total expenditures for additions and improvements during the year were \$651,741. The output of the power stations was 88,355,252 kw.-hr. in 1915, an increase of 18.2 per cent. The operation of inter-urban limited cars is said to be a growing branch of the company's service, and the gross earnings from this source in 1915 were \$373,705, or 52.68 cents per car-mile. The company during the year made a monthly charge of \$5,000 to operating expenses to cover depreciation of cars and equipment.

MEXICAN OUTLOOK STILL UNCERTAIN

Deposit of Securities Requested to Facilitate Negotiations for Restoring Lines to Owners

Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of March 11, page 517, of the formation of a protective committee for the bonds of the Mexico Tramways and its affiliated corporations, the Mexican Light & Power Company, the Mexican Electric Light Company and the Pachuca Light and Power Company. In order that the committee may be fully representative and speak with authority in dealing with the government, bondholders are urgently invited to deposit their bonds, on behalf of the committee, at the head offices of the London County & Westminster Bank or the Union of London & Smith's Bank, or at the London or Edinburgh offices of the Bank of Scotland. It is reported from London that there is at present no idea of any reorganization of the companies, and that the committee is merely endeavoring to avoid a break with the government so that operations may be resumed on a more profitable basis when the political situation has cleared.

It will be recalled that in May, 1915, a circular was issued by the directors of the Mexico Tramways explaining the difficulties caused by the conditions of unrest in Mexico. As announced in the *ELECTRIC RAILWAY JOURNAL* for June 5, 1915, page 1086, the directors of the company stated at that time that the working of the tramways had been arbitrarily taken over by the military authorities, with consequent complete cessation of revenue to the company and deterioration of installation and rolling stock; that the receipts of the light and power companies had seriously diminished, owing largely to non-payment by the authorities of bills for street lighting and power; that the business of the company operating in the Pachuca district had greatly decreased on the shutting down of many of the mines, and that so large an amount of paper money had been issued by each authority that the value of the Mexican dollar had fallen from 25d to 5d, making remittances almost impossible. Conditions are said not to have changed materially since then and the tramways are still operated by the military authorities.

The London *Economist* says that receivers have been appointed by the Canadian and English courts for the Mexican Light & Power Company, one of whom, at the request of the committee and the trustees, visited Canada and the United States, and discussed the situation with the trustees and directors. With regard to the tramways, negotiations have been carried on by the companies' representatives, both in the United States and in Mexico, with the friendly assistance of the British Foreign Office, and lately Señor Carranza has signified his intention of restoring the management of the tramways to the company. It is to facilitate these negotiations that the deposit of securities is now asked.

A recent newspaper dispatch from Mexico City stated that the property of the company was about to be returned to its legal owners on Señor Carranza's instructions.

Bloomington & Normal Railway & Light Company, Bloomington, Ill.—Bodeil & Company, Providence, R. I., and Richter & Company, Hartford, Conn., are offering \$432,500 of 6 per cent guaranteed cumulative preferred stock of the Bloomington & Normal Railway & Light Company at par and accumulated dividend. The stock is redeemable at the option of the company at 105 and dividend. The dividend is guaranteed by indorsement by the Illinois Traction Company, which also guarantees the par value in the event of liquidation or dissolution. The Bloomington & Normal Railway & Light Company has \$1,200,000 of common stock outstanding, \$450,000 of 6 per cent cumulative preferred stock and \$1,680,000 of bonds, of which \$137,000 are held in the sinking fund.

Cities Service Company, New York, N. Y.—The directors of the Cities Service Company on March 15 declared a dividend of 3 per cent on the \$17,481,422 of common stock, payable in convertible debentures on July 1 to holders of record of June 15. A cash dividend of one-half of 1 per cent was also declared, payable on Aug. 1 to holders of record of July 15. This restores both classes of stocks to the original 6 per cent cash dividend basis. Common stock warrants already outstanding were made exchangeable for bonds or stocks on May 1. The preferred stock warrants must be exchanged prior to May 1 or they will be called.

Crooked Creek Railroad & Coal Company, Webster City, Iowa.—Walter R. Dyer, Boone, Iowa, said to represent the Fort Dodge, Des Moines & Southern Railroad, has purchased under foreclosure the property of the Crooked Creek Railroad & Coal Company. The road is 18 miles long. It extends from Webster City to Lehigh. Electrification of the line is said to be contemplated.

Electric Bond & Share Company, New York, N. Y.—The gross income of the Electric Bond & Share Company for the year ended Dec. 31, 1915, amounted to \$1,820,337, while the net income totaled \$1,401,085. During the year preferred dividends were declared to the extent of \$344,646 and common dividends to the extent of \$433,778, leaving a surplus income for the year amounting to \$622,660. The surplus and undivided profits at the close of business on Dec. 31, 1915, amounted to \$4,244,566, as compared to a surplus of \$440,599 at the beginning of business on March 15, 1905.

Harrisburg (Pa.) Railways.—The net earnings of the Harrisburg Railways for the year ended Dec. 31, 1915, are said to have been \$33,511 less than the net earnings for 1914, the decrease being from \$221,330 to \$187,819. The gross operating revenues for 1915 amounted to \$914,936, a decrease of \$78,993 from the 1914 results. During 1915 the company carried 22,435,553 passengers, or 1,225,748 less than the number carried in 1914. The decreased earnings are attributed to unregulated jitney competition, combined with unfavorable weather during the park season, and to some extent with the increased use of automobiles. It is estimated, however, that by far the largest part of the decrease, possibly 90 per cent, was caused by the unregulated jitneys. The loss in revenue necessitated a reduction to 1 per cent of the dividend payable on Oct. 1 to the preferred stockholders. It is stated that the original license fee of \$5 required of jitneys in Harrisburg has been increased, and, in addition, a \$2,000 bond must be filed. Since the ordinance with such provisions became effective, the number of jitneys operating has been materially reduced.

Lancaster & York Furnace Street Railway, Millersville, Pa.—The appraisers appointed by the Lancaster County Court to value the assets of the Lancaster & York Furnace Street Railway have presented two reports. One places the assets at \$59,484 as junk, and the other at \$167,350 as an operating unit. John M. Groff and John H. Myers, the receivers of the road, have been ordered by the court to sell the road at public sale on April 15, subject to the first mortgage of \$150,000. The suspension of operation by the company was noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 22, page 187.

Mountain Railway, West Orange, N. J.—The overhead equipment, tools and two cars, the property of the Mountain Railway, were recently sold for \$285 at public auction. The Federal Iron & Steel Company, Newark, bought the stuff for junk. The sale of the rails was postponed until April 3 at the request of a former stockholder, who stated

Traffic and Transportation

WAUPACA FARE INCREASE MODIFIED

Fare of 12½ Cents by Ticket Substituted for Proposed Charge of 15 Cents

The Railroad Commission of Wisconsin has accepted the modifications proposed by the company in the case involving the increase in fare from 10 cents to 15 cents on the line of the Waupaca Electric Light & Railway Company between the Soo Line depot, Waupaca, to the Grand View Hotel.

On Oct. 21, 1915, the commission received a letter from the company proposing an increase in passenger fares to become effective on Nov. 21, 1915. It was proposed that three 5-cent zones be established in place of the two existing zones between the Grand View Hotel and the Soo line depot in Waupaca. In addition to the cash fares it was proposed to sell reduced tickets to school children in effect from Sept. 1 to July 1 good for passage between Grand View and the Soo Line depot, ten for \$1, and school tickets between Grand View and school No. 6 at ten for 75 cents. It was also proposed to sell family tickets, transferable, good between Benedicts and the Soo Line depot, twenty tickets for \$1.75, and tickets good over the entire line or through three zones, twenty for \$2.70. In place of the 5-cent zones existing on the line from the Soo Line depot to Athletic Park and from Athletic Park to Grand View Hotel it was proposed to establish zones as follows: Soo Line depot to Waupaca city limits; Waupaca city limits to Benedicts; Benedicts to Grand View Hotel. With these modifications in zones the fare over the entire line was to be 15 cents instead of 10 cents.

On Oct. 25 a complaint was received declaring that the increases proposed were unreasonable, and this complaint was later supplemented by a petition of about 350 names, alleging that the rates as proposed would be extortionate. A hearing was held in December before the commission at Madison. The position taken by the attorney for the city was that if upon examination of the books it was shown that in the judgment of the members of the Commercial Club and the Common Council the proposed increases were justifiable, the objection to the change in fares would be withdrawn by the city and the club. During January, 1916, an examination by the city's accountant, H. C. Caswell, Jr., C. P. A., of Oshkosh, Wis., resulted in a formal notification by the city attorney that the city desired to withdraw opposition to the proposed increase in fares.

At the hearing and subsequently, the original proposal of selling twenty tickets for \$2.70 was modified to twenty tickets for \$2.50 or 12½-cent fare over the entire line, and twenty tickets for \$1.75 modified to twenty for \$1.50, good between Benedicts and the Soo Line depot. The school tickets were modified so that ten tickets for 75 cents, good over any part of the line, would take the place of ten tickets for \$1, and the ten tickets for 75 cents as originally proposed. The commission decided that as these modifications were in favor of the patrons, and since an examination seemed to show that they would meet the conditions and be fair to both parties, it would accept the rate schedule as modified.

AUTOMOBILE DECISION RENDERED IN ILLINOIS

In a decision handed down on March 13 the Illinois Public Utilities Commission held that an automobile service was not a jitney business unless it operated over specified routes and on a schedule. The decision was made in the case of the Southern Illinois Light & Power Company against W. W. Horton and Leo F. Kramer, Hillsboro, Ill. The petition asking that Messrs. Horton and Kramer be restrained from operating until they had obtained a certificate of convenience and necessity was, therefore, dismissed.

At the same time this decision was made it was announced that an appeal had been taken to the Sangamon County Circuit Court in the Yellow Cab case from Chicago, in which the commission made a similar ruling.

If the decision is upheld in court the jitney case brought by the Springfield Consolidated Railway against jitney men in Springfield may fail.

In the Hillsboro ruling the commission points out that the automobiles have no specified routes over which they operate on schedule time, that the cars frequently are engaged by telephone, that they frequently run to different parts of the city to carry passengers as ordered, and that they do a cab business. For this reason they cannot be considered common carriers and subject to commission jurisdiction.

PENNSYLVANIA JITNEYS ARE COMMON CARRIERS In the Scranton Case the Commission Rules That a Certificate of Public Convenience Is Necessary

The Public Service Commission of Pennsylvania through Commissioner John Monaghan has ruled that individuals operating automobiles for hire between fixed points are common carriers under the law, and as such must obtain "certificates of public convenience" from the commission. The commission's order is based on complaints filed by the Scranton Railway against M. J. Walsh, W. H. Owens, S. Wilson and F. Williams, of Luzerne County. In his opinion Mr. Monaghan says:

"It is argued that the term 'common carrier' was intended to be used in a limited sense; but any doubt as to the meaning of the term 'common carrier' in the act is swept away by the very broad definition of that term contained in Sec. 1, Par. xxx. The expression 'any and all' common carriers means no more or less than their ordinary use and signification indicates, *i. e.*, all common carriers and not less than all, if the ordinary meaning of very common words and language is to be given them.

"It is contended by the respondent in the present case that the term 'common carrier' as used in the first section of the act, having been preceded and followed by certain named common carriers, restricts the general term to only such carriers as are named; but this contention is without any weight when it is noted that among the specially-named corporations over which jurisdiction is given are several that are not common carriers at all; in addition to which, should we confine our jurisdiction to the corporations specified by name, we would be obliged wholly to ignore the general term 'any and all common carriers.'

"Anyone who holds himself out to the public as ready to undertake for hire or reward the transportation of goods from place to place and so invite the custom of the public, is in the estimation of the law a common carrier.

"A careful review of the facts in the case leads us to the inevitable conclusion that the respondent is a common carrier of passengers under the accepted legal definition of that term at common law, and also under Sec. 1 of the act specifically defining the term 'common carrier,' as including all common carriers of passengers as well as of goods or property. The language conferring jurisdiction upon the commission in Pennsylvania is so clearly explicit and unambiguous as to leave no doubt of our jurisdiction over common carriers of the class represented by the respondent.

"We have, therefore, come to the conclusion that the respondent is a public service company and is entitled to all the rights and liable to all the duties imposed by the public service company law. The respondent being a public service company, may not lawfully begin business without the approval of this commission. . . . As we interpret the act no proposed corporation intending to embark in public service business and no individual partnership or unincorporated association of individuals intending to embark in public service business may do so, unless it or he has first obtained the approval of this commission evidenced by a certificate of public convenience. . . . An applicant intending to operate a motor-vehicle in the business of a public service company must apply for and obtain the consent of this commission."

The Scranton case has been referred to previously in the news columns of the ELECTRIC RAILWAY JOURNAL and was reviewed briefly by C. L. S. Tingley, president of the Pennsylvania Street Railway Association and second vice-president of the American Railways, at the meeting of the association, reported in this paper for Dec. 18, 1915, page 1207.

The commission entered an order requiring Messrs. Walsh, Owens, Wilson and Williams to cease operating until they have applied for and obtained from the commission a certificate of public convenience in accordance with the provisions of the public service company law.

TORONTO RAILWAY AFFECTED BY THE WAR

At a conference on March 13 between R. J. Fleming, manager of the Toronto (Ont.) Railway, Mayor Church and the Board of Control, Mr. Fleming assured the comptrollers that he was anxious to comply with the desire for better service and asked that the threatened indictment of the company for overcrowding its cars be not proceeded with. The company was greatly handicapped by the fact that since the war started more than 1200 of its employees had resigned from the service to go to the front. For the first time in its history the company had to advertise for men and could not obtain them. Out of 175 men taken on early in March only forty-three had completed their training. Despite these obstacles the company was operating more cars daily than in October.

After considerable discussion it was decided to withdraw the indictment proceedings and to recall the bill before the Legislature requiring the company to provide free transportation for soldiers. All other matters in dispute will be referred to the recently appointed traffic commission. This was satisfactory to Mr. Fleming, who outlined a number of improvements which the company intended to carry out in the near future. He was quite willing to consult the traffic commission on all matters instead of appealing to the Ontario Railway Board, if the commission would meet him in a friendly spirit. At the close of the conference Mr. Fleming stated that he was not in favor of employing women as conductors. He thought the work and long hours too arduous for women.

Settling Niagara Falls Accident Claims.—Application has been made to the provincial courts of Ontario by the legal department of the International Railway, Buffalo, N. Y., for ratification of twenty-two settlements made by the claim department for deaths and injuries resulting from the Queenstown, Ont., wreck on July 7, last. A total of \$30,000 has been paid out in making the twenty-two settlements. Many cases are still pending.

Hourly Service Between Galveston and Houston.—The Galveston-Houston Electric Company has resumed hourly service between Houston and Galveston, Tex. This is the first hourly service since the coast storm in August which destroyed the causeway across Galveston Bay. Since that time cars have been operated every two hours. Increase in the traffic and strong indications for additional increases are the reason given by officials of the line for the re-establishment of the old service.

Skip-Stop Trial in Newark.—The Public Service Railway, Newark, N. J., on recommendation of the Board of Public Utility Commissioners and on request of residents along the line, has arranged for a sixty-day trial, beginning on April 1, of the skip-stop plan on the Bloomfield Avenue line between Branch Brook Park and Caldwell. Twenty-two stops each way will be eliminated. Temporary signs will be erected to indicate the stopping points. The stops will be arranged on the equalization plan. If the public is pleased with the plan it is probable that it will be made permanent.

Safety-first Textbook Recommended.—G. W. Knox, general manager Oklahoma (Okla.) Railway, in an address recently made before the Electrical Luncheon Club in Oklahoma City expressed the belief that some day textbooks would be published upon "safety first" and that they would become a part of the regular public school curriculum. He also described many of the modern methods employed to prevent accidents on electric railways as well as the system of education being carried on in safety work. Mr. Knox for many years has been a strong advocate of safety-first methods.

Service Increased in Vancouver.—W. G. Murrin, general superintendent of the British Columbia Electric Railway, Vancouver, B. C., put new schedules into effect on the city lines on March 15, greatly increasing the service. The new schedules provide increased service, particularly during the noon hour, with a special shopping service for the convenience of Fourth Avenue patrons desiring to go downtown to shop in the afternoon. Mr. Murrin states that these changes represent an additional expenditure of \$40,000 per annum, compared with the service in operation prior to March 15.

City Attorney Answers Fare Petition.—City Attorney Hoan of Milwaukee, Wis., has filed with the Railroad Commission of Wisconsin his answer to the application of the Milwaukee Electric Railway & Light Company for permission to increase its fares. He asks that the plea of the company be dismissed. Mr. Hoan, who is the Social-Democratic candidate for Mayor, contends that the company is overcapitalized; that its power charges are too high; that unjustifiably large sums have been set up for depreciation, damage claims, insurance reserves, etc.; that the zone fares are an annoyance, etc.

New Transfer System Proposed for Columbus.—S. G. McMeen, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, on March 17 submitted to City Solicitor Scarlett the new transfer system which has been worked out recently. He desires to secure an opinion as to whether the changes conform to the franchise contract with the city and are legal. The new transfers will specify routes and transfer points and will allow fifteen minutes for transferring. The company found that the privileges allowed under the transfers now in use have been abused. The new system was devised to prevent such abuse.

Shall Women Be Employed on Street Cars?—This question is being asked by the Detroit (Mich.) United Railway in *Electric Railway Service*, which is published by the company and distributed to the public. In introducing a number of letters on the subject which were received from readers the company said in the issue of its paper for March 10: "Evidently our readers are not agreed upon the proposition we discussed a short time ago—whether women of this country should enter the new field of labor recently developed as a result of the European war. We mean as to being employed as motormen or conductors on city street cars. Of the letters received by us all but one are against the novelty, but we desire to add that another of the letters before us is an application from a woman who wants to be a motorman. We are, of course, not at liberty at this time to give her name. Read these letters; you will find them interesting. Does any one of them express your views?"

City Files Its Answer in Trenton Fare Case.—The city of Trenton, N. J., has filed in the Federal Court in that city its answer to the supplemental bill recently filed by the Trenton & Mercer County Traction Corporation, asking that the United States District Court prevent the enforcement of the Public Utilities Commission order restraining the railway from putting into effect its order discontinuing the strip tickets. The city denies that portion of the corporation's supplemental bill which sets out that the order of the commission is unjust, unreasonable, discriminatory, confiscatory, erroneous and illegal, and that it should be set aside. The bill also denies that the board has no jurisdiction to make the order and that the act, concerning public utilities, confers no power upon the board to make such an order. It likewise denies that the order impairs the obligations of the charter, ordinances and contracts, by which the fare for transportation of each passenger over the age of five years shall be 5 cents within the city limits.

Final Argument on Rochester Jitneys on April 12.—At the hearing before the Public Service Commission of the Second District of New York, Commissioner Emmett sitting, in Rochester, N. Y., on March 20 the New York State Railways closed its case against the jitneys that desire to continue to operate there after the expiration of the license granted to them before the public utility law was amended to bring the jitneys under commission jurisdiction. Among the witnesses for the railway were Elmer E. Strong, superintendent of transportation of the company; William O. Ingle, auditor of the company; Joseph K. Choate, vice-president of J. G. White & Company, and John J. Dempsey, superintendent of the New York Municipal Railway Corporation (Brooklyn Rapid Transit System). Mr. Ingle presented data to show that the decrease of \$225,000 in gross earnings of the company in Rochester for the year closed recently was due largely to the jitneys. Commissioner Emmett announced that submission of briefs and final argument in the case will take place before the commission in Albany on April 12.

Personal Mention

Mr. W. W. Grayson, traveling auditor, has left the Puget Sound properties of Stone & Webster to return to the Boston office.

Mr. C. M. Marsh, who has been superintendent of transportation of the Wheeling (W. Va.) Traction Company, has been made assistant general superintendent of the company.

Mr. J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, Joliet, Ill., has been appointed chairman of the street and interurban railway section of the International Rotary Club.

Mr. George W. Lang, who recently returned to the service of the Ottawa (Ont.) Electric Railway as claim agent, has been appointed acting superintendent during the absence of Mr. F. D. Burpee, superintendent, on military service overseas.

Mr. N. McD. Crawford, who recently resigned as president and general manager of the Reading Transit & Light Company, Reading, Pa., has accepted an engagement with the E. W. Clark Management Association and will make his headquarters at Columbus, Ohio.

Mr. A. J. County, formerly a special assistant to President Samuel Rea of the Pennsylvania Railroad, has been elected vice-president of that company in charge of the accounting department. Mr. County entered the service of the Pennsylvania Railroad in 1890 and assisted in the promotion and acquisition of new lines for the Pennsylvania System.

Mr. F. E. Fisher, general superintendent of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., was the subject of one of the recent personal sketches which the Joliet *Evening Herald* is running under the title "How Joliet Men Climbed the Ladder of Fame and Fortune." Mr. Fisher was born in Elyria, Ohio, on Dec. 29, 1860. He has been in business since he was fifteen years old.

Mr. John Edbauer, general passenger agent of the Niagara Gorge Railroad, Niagara Falls, N. Y., has returned from a conference in Chicago with representatives of Western steam lines with the assurances that Western trunk lines will co-operate to make Niagara Falls a winter tourist point as well as a summer resort. Special low rate excursions will be run next winter if present plans are carried into execution. Officers of Niagara Falls commercial organizations are also co-operating with the officials of the Great Gorge Route.

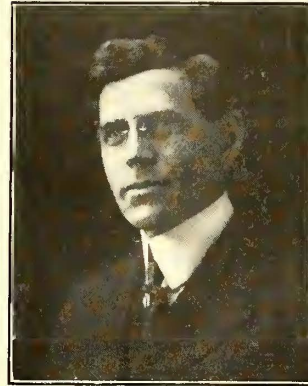
Mr. E. D. Stevens, formerly of the Leyden division of the Denver (Col.) Tramway, has been appointed trainmaster of the interurban lines. His territory will include the Inter-Mountain and the Golden and Leyden lines west of the Denver County line, and he will have authority over passenger, freight and express movements. Mr. Stevens entered the tramway company's service as a motorman on Aug. 15, 1890, on the East division. He continued in the service until June, 1900. He entered the service of the Denver & Northwestern Railway on Feb. 17, 1903, helping in the work of construction. After the lines were completed and had been placed in operation he became a trainman with the company.

Mr. John B. Crawford, who was formerly connected with the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has resigned his position as division superintendent of the Central Illinois Public Service Company at Marion, Ill., where he has been since 1912. Here he had jurisdiction over a division in which the Central Illinois Public Service Company was operating electric light and water properties in thirty-five communities. In the past Mr. Crawford has been connected with a number of railroads, including the Lexington & Interurban Railways, Lexington, Ky.; the Fort Wayne & Wabash Valley Traction Company, Fort Wayne, Ind.; the Winona Interurban Railway, Warsaw, Ind.; the Groton & Stonington Street Railway, New London, Conn., and the Hartford (Conn.) Street Rail-

Mr. E. J. Pearson has been appointed a vice-president of the New York, New Haven & Hartford Railroad, with headquarters in Boston. He will act as a general assistant to Mr. Howard Elliott, chairman of the board and president of the company, and in particular will have charge of all matters relating to construction, operation and maintenance. Mr. Pearson was graduated from Cornell, with the degree of Civil Engineer, in 1883. He has had a large experience in construction and operation, particularly in terminal work, not only on the Northern Pacific Railway, but in cities like Chicago, St. Louis, Kansas City, and recently at New Orleans, where the Texas & Pacific has just completed important terminals. He has also had a long training in the analysis of operating problems and in economical methods of carrying on railway business.

Mr. Malcolm M. Inglis has been appointed manager of the Port Arthur (Ont.) Civic Railway. Mr. Inglis is a Scotchman, and was educated at the high school in Stirling and the Glasgow and West of Scotland Technical College. He entered business in 1901, with Mavor & Coulson, Ltd., engineers and electricians, Glasgow, serving a regular apprenticeship in their various departments, and in addition completing two years in the designing department for electrical machinery. In 1908 he severed his connection with Mavor & Coulson and accepted a staff appointment with Johnson & Phillips, Ltd., London, England, as chief tester and outside erector, and in 1909 became assistant designer to Professor Kahn of the Brush Electrical Engineering Company, Loughborough, England. In 1901 he accepted the position of chief electrical engineer to W. J. Craig & Sons at their Brynkinalt collieries, North Wales, which position he resigned in 1911. From 1911 to 1915 Mr. Inglis was electrical engineer to the town of Yorkton, Sask.

Mr. W. E. Haseltine, the new president of the Wisconsin Electrical Association, is secretary and general manager of the Ripon Light & Water Company, Ripon, Wis. Mr.

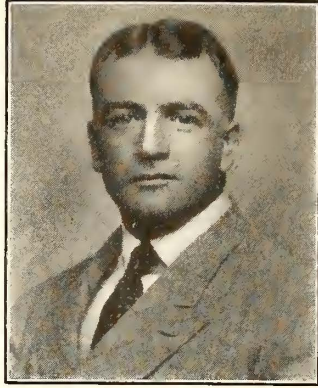


W. E. HASELTINE

Haseltine was born in Schofield, Wis., in 1874, and studied chemical engineering at the Massachusetts Institute of Technology. He left school in 1896 before he was graduated and went to Alaska, where he did some engineering work in connection with the White Pass & Yukon Railroad. In 1899 he returned to the home of his parents in Ripon, Wis., where he and his father bought out the various interests owning the Ripon Light & Water Company. Mr. Haseltine was first made secretary of the company, and later his father, Mr. C. P. Haseltine, president of the company, turned over the management to him. Mr. Haseltine has been a member of the Wisconsin Electrical Association since its organization and served as its first vice-president during 1915.

Mr. Thomas F. Wickham, secretary-treasurer of the Union Gas & Electric Company, Cincinnati, Ohio, has been elected second vice-president of the company in charge of the electric operating department. Mr. Wickham has been associated for the last six years with A. B. Leach & Company, New York, and the properties controlled by that firm, having for three years been in charge of their public utility properties in Macon, Ga. For six years prior to that time he was associated with J. G. White & Company, Inc., New York, in the operation of their public utility properties. Before going to New York, Mr. Wickham was general auditor of the Montreal Light, Heat & Power Company, Montreal, Can. Mr. Wickham is also secretary-treasurer of Columbia Gas & Electric Company, which controls the Union Gas & Electric Company, and as comptroller has charge of the operation of the South Covington & Cincinnati Street Railway and of the electric department of the Union Light, Heat & Power Company, both of Covington, Ky., and controlled by the Columbia Company.

Mr. Edward C. Spring, manager of the Philadelphia division of the Lehigh Valley Transit Company, Allentown, Pa., has been appointed superintendent of transportation of the entire system, assuming in addition to his present work the duties of the late George E. Miller, superintendent of transportation. Mr. Spring will have supervision of all the railways of the company. Mr. Spring has been in charge of the Philadelphia division of the company since 1912. Before that he was assistant to the president of the Philadelphia & Western Railway, Upper Darby, Pa. Mr. Spring is very well known in Pennsylvania, New England and in the Middle West. Before becoming connected with the Lehigh Valley Transit Company in 1910 as assistant to the president of the company he was general superintendent of the Dayton, Covington & Piqua Traction Company and before that was superintendent of the Newton & Boston Street Railway and the Wellesley & Boston Street Railway. He also for a time represented a syndicate of Dayton capitalists as operating manager of the electric railway, electric light and water properties in Lawrence and Parsons, Kan. He is a past president of the New England Street Railway Club and the Central Electric Railway Association.



E. C. SPRING

Mr. H. M. Ashenfelter, master mechanic of the Galesburg & Kewanee Electric Railway, Kewanee, Ill., for the last two and one-half years, has resigned and will retire in April from railway work to his fruit farm at Seville, Ohio. Mr. Ashenfelter started his career with the Westinghouse Electric & Manufacturing Company in 1897. Later he accepted the position of master mechanic of the South Bend Street Railway, now the Chicago, South Bend & Northern Indiana Railway, which position he held for ten years. The following four years he spent on his farm in Ohio, but took up railway work again in 1912 as master mechanic of the Vincennes (Ind.) Traction Company. He resigned from the company at Vincennes to become connected with the Galesburg & Kewanee Electric Railway.

Mr. Clark Verner Wood, who was elected president of the New England Street Railway Club on March 23, succeeded Mr. J. T. Harmer last year as president of the Springfield (Mass.) Street Railway. Mr. Wood was born in Woodstock, Vt., in 1863; was graduated from the local high school in 1881, and immediately entered railroad service as a telegraph operator on the Grand Trunk system. He was soon promoted to yardmaster and station agent. Later he entered the service of the Boston & Maine Railroad, after which he became a freight cashier on the New York, New Haven & Hartford Railroad. After officiating as agent at various points on the latter system, including Providence, R. I., Mr. Wood was offered the post of general passenger agent of the Pittsburgh & Lake Erie system, and went to Pittsburgh, where he later became private secretary to Mr. J. G. Odell, the vice-president. Mr. Wood next became superintendent of the West Side Belt Railroad and the Pittsburgh Terminal Railway & Coal Company, which owned about seventy-five mines in the Pittsburgh district. He was then called to the superintendency of the Wabash Railroad, and had charge of the operation of the entire system, including



C. V. WOOD

more than 400 miles of track, with extensive coal and iron docks at Cleveland and Toledo. In 1900 Mr. Wood entered the electric railway field at the request of Judge J. H. Reed, president of the Philadelphia Company, who required his services in the development of freight traffic on the Pittsburgh Railways. In 1906 Mr. Wood went to Boston to take charge of traffic problems on the electric railway lines owned and controlled by the New England Investment & Security Company, paying special attention to the building up of patronage on the systems centering around Worcester and Springfield. In 1908 he went to Springfield, his headquarters being transferred with other offices from Boston. Here he devoted his attention to all classes of traffic and their development, becoming vice-president in charge of operation in 1913. Besides being president of the Springfield company he is vice-president of the Worcester Consolidated Street Railway, the Milford, Attleboro & Woonsocket Street Railway, the Intersate Consolidated Street Railway, and the Attleboro Branch Railroad. The new president of the club has a host of friends and is deservedly appreciated as an executive by the local public.

Mr. W. B. Atwood, who, up to Feb. 1 was vice-president and general manager of the Geneva, Seneca Falls & Auburn Railway, Seneca Falls, N. Y., has been appointed general superintendent of the rail-



W. B. ATWOOD

work on Dam No. 5 on the Ohio River. He resigned from this work in 1906 to become connected with the Ohio Electric Railway as resident engineer of construction. In March, 1908, Mr. Atwood became superintendent for the Ashtabula Rapid Transit Company and the Pennsylvania & Ohio Railway. He was connected with these companies until November, 1910, when he resigned to accept the position of vice-president and general manager of the Geneva, Seneca Falls & Auburn Railway.

Mr. I. L. Oppenheimer, president Ohio River Electric Railway & Power Company, Pomeroy, Ohio, recently gave an interesting address on "Public Utilities, the Community and the Obligations of Both" before the Pomeroy Business Men's Club on the occasion of its second annual banquet. Mr. Oppenheimer's chief theme was that utilities are performing their obligations to the community by rendering the best service commensurate with the returns received, but that if the utilities are not prospering and yielding a fair profit on their investment and the risk involved, the community is not meeting its obligations. A utility was said to be of little value to a community unless it had a chance to prosper.

OBITUARY

George A. Gilfillian, formerly acting general manager and consulting engineer of the Morris County Traction Company, Morristown, N. J., and since November, 1912, in business as a consulting engineer with offices in Pittsburgh, died at Battle Creek, Mich., on March 19. Mr. Gilfillian was educated at the University of Pittsburgh. After a year as assistant engineer of the Pittsburgh & Western Railroad he entered electric railway work. He was engineer in charge of electrification of the lines of the Pittsburgh & Birmingham Street Railway, and he continued as chief engineer of the company until it was merged with the Pittsburgh Railways. In 1896 he opened up an office in Pittsburgh as consulting engineer. In the fall of 1909 he became connected with the Morris County Traction Company.

Construction News

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

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

RECENT INCORPORATIONS

*Akron & Youngstown Electric Railway, Pittsburgh, Pa.—Incorporated to construct a line between Akron and Youngstown. Capital stock, \$100,000. Officers: Thomas L. Childs, Akron, president; H. D. McCutcheon, Shannon Building, Pittsburgh, vice-president; H. A. Hausgen, Chicago, secretary, and Frederick G. Reigert, Pittsburgh, treasurer.

FRANCHISES

Riverside, Cal.—The Riverside, Rialto & Pacific Railroad has received a franchise from the Council to construct a single-track line on Colton Avenue between First Street and Allen Place, Riverside.

Peoria Heights, Ill.—The Council of Peoria Heights has refused the application of the Peoria & Chillicothe Electric Railway for a fifty-year franchise in Peoria Heights. [March 4, '16.]

Baltimore, Md.—The Board of Estimate on March 20 approved the ordinance authorizing the Maryland Electric Railway to extend the St. Paul Street line of the United Railways & Electric Company into and through the property of the Roland Park Company at Guilford.

Fredonia, N. Y.—The Town Board of Fredonia, after a conference with officials of the Buffalo & Lake Erie Traction Company, has refused to grant the company's request for modifications in the franchise through Fredonia. The company is endeavoring to obtain concessions from the towns between Erie and Fredonia and threatens to abandon the line unless the concessions are granted.

St. Thomas, Ont.—Decision was reserved by the Dominion Railway Commission on March 11 in the case of the application of the London & Port Stanley Railway for the right to lay additional tracks on the streets of St. Thomas to connect with the Michigan Central Railway.

Spring City, Pa.—The Pottstown & Phoenixville Railway has received from the Council a one-year's extension of time on its franchise to construct a line in Spring City.

State College, Pa.—The Lewiston & Reedsville Electric Railway has asked the Council for a franchise to construct and operate a line in State College.

Nashville, Tenn.—The franchise of the Nashville Traction Company is revoked and the bond of \$200,000 declared forfeited in an ordinance passed by the City Commission of Nashville, Tenn. It is alleged that the company has failed to keep to the terms of the franchise and particularly that a provision forbidding a merger with the Nashville Railway & Light Company has been violated. It is contended, on the other hand, that the so-called merger was a matter of sale of stock by stockholders of the Nashville Traction Company and not a corporate action.

Spokane, Wash.—The Spokane Traction Company has received a franchise from the Council to construct an extension on Madelia Street from Broadway to Boone Avenue. The Council has also granted the company the right to take up its tracks on Boone Avenue from Madelia Street to the west end of the approach of the present Boone Avenue bridge across the Spokane River.

TRACK AND ROADWAY

Lacombe & Blindman Valley Electric Railway, Lacombe, Alta.—It is reported that efforts are now being made to complete this company's line from Lacombe to Rimbey. J. C. Gibson, Toronto, president. [March 13, '15.]

Fort Smith Light & Traction Company, Fort Smith, Ark.—More than \$50,000 will be spent by this company during the next few months in improvements to its system, including the reconstruction of portions of the Eleventh Street

and Grand Avenue lines. New rails and 6-in. steel ties will be used. Tile drains will be placed underneath the tracks to prevent moisture troubles and the ties will be set in a concrete bed. The grounds at Electric Park, which is owned by the company, will be improved with new flower beds, shrubbery, etc., and arrangements are being made for several amusement features this summer.

Pacific Electric Company, Los Angeles, Cal.—Construction work on the Pacific Electric Railway elevated road, to extend from the rear of the Pacific Electric Building at Sixth and Main Streets to San Pedro Street, has been begun.

Bristol & Plainville Tramway, Bristol, Conn.—This company is completing preparations for placing its lighting and power wires underground in the center of the city as soon as the weather conditions are favorable. The necessary cables, connections, etc., have all been ordered and some of the material has been received. The conduits for this underground wiring were laid last season. When the work is completed all wires with the exception of the trolley wire will be removed.

New York, New Haven & Hartford Railroad, New Haven, Conn.—Work will be begun at once by this company on the construction of a new bridge over the Thames River between Groton and New London. The contract for building the abutments and piers for the bridge has been awarded to Holbrook, Cabot & Rollins, the lowest bidder.

Atlanta, Ga.—J. L. Murphy, Atlanta, representing the promoters of the proposed interurban electric railway from Atlanta to Anderson, S. C., states that no company has as yet been organized and no surveys made of the proposed line. The preliminary inquiries along the line were made with the idea of organizing a corporation should the responses be satisfactory. As yet the conclusion has not been determined.

Mississippi Valley Railway & Power Company, Rock Island, Ill.—A branch line from Aledo, Ill., to Muscatine, Iowa, is among the plans of the Mississippi Valley Railway & Power Company, which will take over the Rock Island Southern Railway and all its subsidiary companies.

Evansville (Ind.) Railways.—This company has begun the construction of an extension of its line down Washington Street, Rockport, from Fifth Street to the Ohio River. The construction of this line will enable passengers to reach cars with greater ease and dispatch from boats on the Ohio River.

Chicago, South Bend & Northern Indiana Traction Company, South Bend, Ind.—It is reported that plans are being made by this company to double-track its line between South Bend and Elkhart.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—This company reports that during the next eight weeks contracts will be placed for 26 miles of new track construction.

Boston, Mass.—Bids will be received by the Boston Transit Commission until noon, April 11, for the construction of Section J, Dorchester Tunnel, in and near Dorchester Avenue and Boston Street from about 80 ft. north of Dexter Street to about 30 ft. south of Ralston Street, South Boston. The section is about 1000 ft. long. The structure will be mainly of reinforced concrete and structural steel. The work includes the Andrew Square Station. [March 11, '16.]

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—This company reports that it expects to resume construction work next May on its proposed line from Minneapolis to St. Cloud, 65 miles. Contracts will soon be let for grading, ties, steel and poles. E. G. Potter, 318 Andrews Building, Minneapolis, president. [April 17, '15.]

Twin City Rapid Transit Company, Minneapolis, Minn.—Improvements involving an expenditure of approximately \$1,500,000 are planned in St. Paul this year by the Twin City Rapid Transit Company. Heavy 90-lb. rails with inter-rail paving will be laid on Selby Avenue from Milton to Fairview Avenue; Como Avenue from the Great Northern bridge to Dale Street; North Snelling Avenue from the Great Northern bridge to Como Avenue, and a single-rail extension of the Randolph Street line from Snelling to Cleveland Avenue, as authorized some time ago.

McComb & Magnolia Railway & Light Company, McComb, Miss.—It is reported that this company's line will be placed in operation within six months. Guy M. Walker, New York, president. [Nov. 13, '15.]

***Emma, Mo.**—The Emma Creamery Company is reported interested in the construction of an electric line from Sweet Springs to Emma.

United Railways, St. Louis, Mo.—The special committee appointed by Mayor Kiel to suggest plans for transportation service within Forest Park voted on March 11 to drop further consideration of a trolley line until the motor omnibus line authorized by a bill recently introduced in the Board of Aldermen has been tested. The trolley line is favored by the Municipal Art Commission and was suggested by the St. Louis Art League with a view to providing transportation facilities to the Art Museum. The route suggested by the Art League is not favored by Park Commissioner Cunliff. President Kinsey, of the Board of Public Service, suggested a trolley line to connect with the Laclede Avenue line of the United Railways and to reach all points of interest in the park, but suggested that the omnibus line first be given a test.

Fallon (Nev.) Electric Railroad.—This company reports that it is now ready to lay track on its proposed line from Fallon to Sand Springs and expects that the line will be ready for operation about Sept. 1.

City Electric Company, Albuquerque, N. Mex.—Work has been begun by this company on the reconstruction of track on its South Edith Street line.

Piedmont & Northern Railway, Charlotte, N. C.—Operation has been begun on this company's extension between Belmont Junction and Belmont.

Hillsboro, Cynthiana, Bainbridge & Chillicothe Traction Company, Hillsboro, Ohio.—The Ohio Public Utilities Commission has granted this company authority to issue and sell \$1,300,000 of its first mortgage bonds at 80, \$200,000 of its preferred stock at 80 and \$140,000 of its common stock at 75. When these securities have been sold and the funds are in hand for the construction of the road, then \$160,000 of common stock may be issued to the promoters to pay for promotion and other expenses. [Mar. 11, '16.]

London (Ont.) Street Railway.—This company plans to double track its line on Dundas Street East.

St. Marys, Ont.—Blanchard Township, one of the few municipalities that defeated the London-Toronto hydro-radial railway proposition in January last, indorsed it on March 13, the ratepayers carrying it at the polls by a majority of twenty-three.

***Klamath Falls, Oregon.**—Property owners and residents of the Malin section, 35 miles south of Klamath Falls, have under contemplation the proposition of constructing an electric railway line from Malin to Klamath Falls, via Poe Valley and Olene. Klamath Falls has been asked to cooperate in the enterprise. It is reported that farmers near Malin are willing to furnish the right-of-way free of charge and do all the necessary grading without cost, providing Poe Valley and Klamath Basin east to Olene and Klamath Falls will do likewise.

Johnstown & Somerset Street Railway, Johnstown, Pa.—Work on this company's proposed line between Johnstown and Somerset is progressing rapidly, and it is reported that the first section of the line between Holsopple and Jerome will be completed and ready for operation by July 1. When the first division of the road is in operation work on the second division will be conducted from both ends of the line. It is expected that the entire line will be completed by the first of next year. [Sept. 18, '15.]

Milford, Pa.—Surveys have been begun of the proposed line from Milford to Port Jervis. Construction will begin as soon as weather conditions permit. [Dec. 18, '15.]

South Fork-Portage Railway, Johnstown, Pa.—Work on this company's proposed line between South Fork and Portage is progressing rapidly. About 3 miles of ties and rails have been laid and it is expected that the road will be ready for operation about June 1. Robert Pearce, Portage, president. [Sept. 4, '15.]

***Philadelphia, Pa.**—An ordinance authorizing the Mayor to create a loan of \$1,500,000 for the construction of a

double-track street railway to connect Bustleton, Fox Chase, Somerton and Byberry was introduced in the Philadelphia Council on March 16. The ordinance was referred to the finance committee.

***Akron & Youngstown Electric Railway, Pittsburgh, Pa.**—This company, which has recently been incorporated, will construct a line between Akron and Youngstown, 50 miles. The contract for the construction of the line has been awarded to H. D. McCutcheon & Company, Shannon Building, Pittsburgh, and calls for the immediate beginning of the work and its completion before the end of this year. The proposed line will connect the systems of the Pittsburgh Railways, Pittsburgh, Harmony, Butler & Newcastle Railway, Northern Ohio Traction Company and the Mahoning Valley Traction Company. The improvement will cost about \$3,000,000, exclusive of terminal facilities. Direct trolley connection between Pittsburgh and Cleveland will be afforded by the construction of the line. Thomas L. Childs, Akron, president.

Rhode Island Company, Providence, R. I.—Several track changes, including the relocation of existing lines and the laying of new ones, are planned by the Rhode Island Company for the coming spring. Petitions for permission to make the improvements have been filed with the City Clerk, and will be acted upon shortly by the committee on railroads.

Citizens' Street Railway, Clarksville, Tenn.—This company has announced that it will be prepared to begin operations by April 1. Difficulties and delays in getting certain materials needed for reconstruction of tracks, etc., and for repairing wire systems have delayed resumption of service. When service does begin it will be on a practically reconstructed line and with thoroughly renovated rolling stock. This company recently took over the Clarksville & Dunbar Cave Railway.

Nashville Railway & Light Company, Nashville, Tenn.—It is reported that a contract has been signed by the Nashville, Chattanooga & St. Louis Railway, the City of Nashville and the Nashville Railway & Light Company for the construction of a reinforced concrete viaduct to replace the steel structure on Charlotte Pike. The cost is estimated at \$45,000.

***Jane Lew, W. Va.**—It is reported that plans are being made to construct a line from Jane Lew to Berlin, connecting with the Monongahela Valley Traction Company's line at Jane Lew. It is stated that the line would eventually be extended to Lorentz and Buckhannon. Dr. Collins, Jane Lew, is interested. Mayor Goodloe Jackson of Jane Lew may be able to give further information.

Janesville & Madison Traction Company, Madison, Wis.—A report from this company states that 3 miles of track have been laid between Madison and Blooming Grove on its proposed line from Madison to Janesville, 42 miles. Grading is in progress from Lake Waubesa to McFarland and on the rest of the line it will be begun in April. The overhead work has been completed from Town Hall to McFarland, catenary construction being used. Contracts for construction will be let by the company during April, May and June. G. Pickhardt, 1004 Majestic Building, Milwaukee, president. [May 1, '15.]

SHOPS AND BUILDINGS

Alton, Granite & St. Louis Traction Company, Alton, Ill.—This company will erect a new depot at Wood River, Ill.

Springfield (Mass.) Street Railway.—The Palmer car-house of the Springfield & Eastern Street Railway, which is operated by the Springfield Street Railway, was about two-thirds destroyed by fire on March 17. Nineteen cars, valued at \$50,000, were gutted and the damage to the building is estimated at \$10,000.

United Railways, St. Louis, Mo.—A building to provide offices for the line department and material yards and storerooms for the track department is being erected on this company's property at Spring and Park Avenues. The office building will be 50 ft. wide, extending back 100 ft., and will be two stories high. The structure will be of brick with concrete floors. The line department storerooms will be 50 ft. wide, extending back 200 ft., one story high. The walls of this building will be of corrugated iron. The

first floor of the brick building will be used as a storehouse for the line department, while the offices of the superintendent and his assistants will be in the front portion of the second story. Immediately back of these offices will be two large locker and assembly rooms for the employees, one for the white men and one for the colored men. On each side of the building will be a loading platform with tracks. A specially constructed switch will permit the narrower gage steam cars to be switched on to the electric tracks. The building will be surrounded by extensive switching yards, touching various parts of the material yards. It is expected the building will be ready for occupancy early in May.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has awarded the contract for station finish work on seven stations of the new Broadway subway to D. C. Serber, the lowest bidder, at \$344,716. The contract for completing station finish on the Hunter's Point Avenue station on the Queensboro subway was awarded to the Degnon Contracting Company, the lowest bidder, at \$32,219.

POWER HOUSES AND SUBSTATIONS

Iowa Railway & Light Company, Cedar Rapids, Iowa.—This company will begin the construction of a new power house just off North First Street on April 1. Material for the building and all the machinery have been purchased by the company.

Owensboro City Railway, Owensboro, Ky.—During a recent severe windstorm the smokestack of this company's power house was blown down. Another is being erected at a cost of \$800.

Boston (Mass.) Elevated Railway.—This company has awarded a contract to the General Electric Company for a 35,000-kw. turbo-generator to be installed in its South Boston power station by Dec. 1, 1916. The addition of this unit will increase the capacity of the station to 80,000 kw. Provision has been made in the contract for the temporary installation of a 10,000-kw. turbine to facilitate handling next winter's load, in case the manufacturer is unable to complete the specified delivery.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—A report from this company states that it has placed an order with the General Electric Company for one 500-kw. rotary converter and automatic substation apparatus to be installed at Spring Lake. An order has also been placed for ten No. 201-A railway motors and five P.C. control equipments.

Cleveland (Ohio) Railway.—This company has applied to the City Commissioners for permission to rebuild and enlarge its Cedar Avenue power station at a cost of \$345,000.

Oklahoma Railway, Oklahoma City, Okla.—The Westinghouse Electric & Manufacturing Company has recently sold to the Oklahoma Railway a 3750-kw. turbogenerator unit for its plant.

Toronto, Ont.—The provincial government has purchased the Seymour interests in Central Ontario for \$8,350,000. These interests comprise more than twenty companies and will give the hydroelectric commission complete control of power in the province.

Northwestern Electric Service Company, Erie, Pa.—This company, which has taken over the Northwestern Pennsylvania Railway, will construct a high-tension transmission line from Erie through Fairview, Girard, Albion, Springboro, Conneautville to Harmonsburg. The present high-tension line of the railway extending from Erie to Cambridge Springs will be extended through Venango and Saegertown to Meadville and Harmonsburg, thereby completing a loop service of approximately 95 miles, delivering power to all points in territory for railway, light and power use. Power will be purchased from the Erie County Electric Company, at Erie, with a reserve plant of the company at Meadville, Pa.

Virginia Railway & Power Company, Richmond, Va.—This company has contracted for the addition of a 12,500-kw. unit for its Reeves Avenue station at Norfolk, to be installed during the coming summer.

Manufactures and Supplies

ROLLING STOCK

New Jersey & Pennsylvania Traction Company, Trenton, N. J., is reported as rebuilding five cars.

Twin City Rapid Transit Company, Minneapolis, Minn., is planning to construct during the year at least 100 new cars.

Third Avenue Railway, New York, N. Y., has ordered one dump car from the Differential Car Company, Nashville, Tenn.

United Traction Company, Albany, N. Y., has ordered ten additional city cars from the Wason Manufacturing Company.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio, has ordered five suburban cars from the Cincinnati Car Company.

Tidewater Power Company, Wilmington, N. C., which recently lost three cars by fire, has awarded a contract to The J. G. Brill Company to replace this equipment.

Springfield (Mass.) Street Railway on March 17 lost nineteen cars in a fire which destroyed its Palmer carhouse. It is reported that ten new cars have been ordered from the Wason Manufacturing Company to replace this equipment.

Bay State Street Railway, Boston, Mass., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 5 as expecting to purchase 200 new cars, has ordered 200 double-truck, semi-convertible cars, also 200 pairs of trucks, from the Laconia Car Company.

Brooklyn (N. Y.) Rapid Transit Company is preparing specifications for 100 new surface cars of a type probably somewhat similar to that of the center-entrance cars which this company has now in service. The design has not yet been approved.

Schenectady (N. Y.) Railway will order sixteen new cars, to cost \$12,000,000, for delivery not later than Oct. 1. Six of the cars will be used for interurban service between Albany, Schenectady and Saratoga. Ten of the new cars will be of the low-step, prepayment type for use in Schenectady.

Kansas City (Mo.) Railways, noted in the ELECTRIC RAILWAY JOURNAL of March 11 as having asked for bids on new cars, have ordered fifty cars from the St. Louis Car Company. The cars will be of the same type as those put in service by the railway company seven months ago. Contracts for twenty-five additional cars will be awarded later. The new cars will cost close to \$6,000 each, or about \$500 more than the previous purchase cost.

Northern Ohio Traction & Light Company, Akron, Ohio, has ordered from the Jewett Car Company five additional interurban car bodies of the same type as the ten interurban car bodies ordered about a month ago. The first ten interurban car bodies were also ordered from this manufacturing company, and not from another car builder, as stated in the specifications previously published.

Public Service Railway, Newark, N. J., noted in the ELECTRIC RAILWAY JOURNAL of Feb. 5, 1916, as having ordered twenty interurban cars from The J. G. Brill Company, has specified the following details for this equipment:

| | | | |
|--------------------------|---------------------------|----------------------------------|---------------------------|
| Date of delivery, | 10 May 15, 10 June 15 | Curtain fixtures..... | Nat'l L. W. |
| Seating capacity..... | 52 | Curtain materials..... | Pantasote |
| Booster centers, length, | 23 ft. 11 in. | Destination signs..... | Hunter |
| Length of body..... | 35 ft. 11 in. | Gears and pinions..... | West. |
| Length over vestibule, | 45 ft. 11 in. | Gongs..... | Brill Dedenda |
| Width over sills..... | 8 ft. 4 in. | Hand brakes, | |
| Width over all..... | 8 ft. 7 in. | Sterling-Meaker "Giant" | |
| Height, rail to sills, | 2 ft. 11 11/16 in. | Heaters..... | Consol. |
| Sill to trolley base, | 8 ft. 5 13/16 in. | Headlights..... | Trolley Sup. Co. |
| Body..... | Semi-steel | Motors..... | West. 307 CV |
| Interior trim, | Cherry, stained mahogany | Paint, | Anglo-American Surfacers, |
| Headlining..... | Agasote | Mossers color | |
| Roof..... | Monitor | Push buttons..... | Brill |
| Underframe..... | Steel | Sanders..... | Haulon Sander Co., air |
| Car trimmings, | Brill, statuary bronze | Sash fixtures..... | Brill |
| Control..... | West. H. L. | Seats..... | Brill Winner |
| Couplers, | Tomlinson, type A, form 8 | Seating material, | |
| | | Cane in 10, Fabrikoid in 10 | |
| | | Step treads..Moulded lead, Brill | |
| | | Trolley catchers..Knutson No. 5 | |
| | | Trucks..... | Std. |
| | | Varnish..... | Anglo-American |
| | | Ventilators..... | Automatic |

TRADE NOTES

H. L. Brownell, public safety engineer of Chicago, formerly in charge of the safety work department of the Chicago Surface Lines, began a week's campaign at Youngstown, Ohio, on March 20.

Drake Railway Automotrice Company, Chicago, Ill., has changed its name to Drake & Drake. The new firm will be located in the Edison Building instead of in the Commercial National Bank Building, as formerly.

Curtain Supply Company, Chicago, Ill., has appointed George E. Fox, formerly Southeastern representative, as Western sales agent with headquarters in Chicago. T. P. O'Brien has been appointed Southeastern sales agent of The Curtain Supply Company, with headquarters at New York, the appointment becoming effective April 1. Mr. O'Brien was formerly connected with the O. M. Edwards Company, Syracuse, N. Y.

United States Cast Iron Pipe & Foundry Company, Burlington, N. J., announces the removal of its Southern sales and traffic offices from Chattanooga, Tenn., to 1002 American Trust & Savings Bank Building, Birmingham, Ala. This change becomes effective April 1.

Holden & White, Chicago, Ill., have taken over the entire sales of the Wasson air retrieving trolley bases made by the Wasson Engineering & Supply Company, Milwaukee, Wis. This product will be marketed through the affiliated representatives of Holden & White, who have just moved into new offices in the Fisher Building, 343 South Dearborn Street.

Franklin Railway Supply Company, New York, N. Y., has appointed Ralph G. Coburn sales manager of its electrical department. Mr. Coburn has been associated with this company for the past seven years, being formerly in charge of its Chicago office and for the last few years Eastern sales manager, with headquarters in New York, where he will continue in his new capacity.

Eclipse Railway Supply Company, Cleveland, Ohio, will equip with its automatic fenders, in the immediate future, all the cars of the Southern Pacific Railroad's street railway systems in Oregon. The company owns and operates street railway lines in Eugene, Albany and Salem. The Eugene City Council has passed an ordinance allowing the company to install fenders on the Eugene cars and the other cities named, according to T. L. Billingsley, general superintendent of the Southern Pacific Railroad system in Oregon, will have no objections to the innovation.

Graphite Lubricating Company, Bound Brook, N. J., manufacturer of "Bound Brook" graphite and bronze trolley-wheel bushings, owing to the great increase in its business, has enlarged both its office force and shop capacity. The company has erected a new office building and a new foundry. In addition to the changes made at the Bound Brook plant, the company has also built a new plant at Lincoln, N. J. It has on order at the present time more than 1,000,000 bushings. Both shops are being worked day and night in order to handle the increased production without any unnecessary delay to customers.

Sydney O. Swenson has become a member of the engineering offices of Putnam A. Bates. Mr. Swenson was electrical engineer of the Kansas City Terminal Railway for the past four years, having charge of all electrical work pertaining to the new Union Station and terminal facilities. From August, 1907, to July, 1911, Mr. Swenson was assistant electrical engineer of the Detroit River Tunnel Company and was engaged on all engineering work in connection with the electrification of the Michigan Central Railroad at Detroit, Mich., and Windsor, Ont. Previous to joining the Detroit River Tunnel Company Mr. Swenson was with the New York Central & Hudson River Railroad for two and one-half years on the electrification of the New York Central at New York. From June, 1899, to March, 1905, Mr. Swenson was in the engineering department of the Commonwealth Edison Company, Chicago, and was engaged on general engineering work in connection with the expansion of this large public utility company. Mr. Swenson was graduated from the University of Illinois in 1899.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 43,800, which illustrates and describes its incan-

descent headlights for electric railway service. The headlights referred to are of three classes, i. e., for low-speed city service, for moderate-speed city and suburban service, and for interurban service. All of these headlights are arranged to use focus-type Mazda lamps. The headlights can be furnished with reflectors made of aluminum, silver-plated brass, or with silvered-glass mirror. The bulletin describes headlights which may be mounted on the front car dash or recessed, or many be transferred from one end of the car to the other at the end of a run, in which case the connections are made by suitable plugs and receptacles. The publication contains information relative to the selection of not only the proper headlight but of the incandescent lamp used with it, contains connection diagrams, description of rheostats for use with the incandescent headlights, and also dimensions. This company has also issued Bulletin No. 46,023, which describes briefly its arc-circuit voltmeter, which is a special instrument designed for testing d.c. series arc circuits. The approximate dimensions and the connections, together with prices, are included.

U. T. Hungerford Brass & Copper Company, New York, N. Y., with branches in Philadelphia, Boston, Baltimore and San Francisco, has issued a 400-page catalog, handsomely bound, illustrating its complete line of brass and copper sold under its trademark, "Star Brand." The contents are classified in separate departments, thereby providing the trade with a concise price list, together with lists showing material aggregating more than 5,000,000 lb. carried in stock ready for prompt shipment of such standard articles as: copper and brass in sheets, rolls, rod and wire; seamless brass and copper tubes, condenser tubes; Tobin bronze and yellow metal (Muntz) rods; brazed brass and bronzed tubes; German silver, phosphor bronze and commercial bronze; copper rivets and burs, braziers' rivets, copper nails and tacks; soldering coppers, solder, brass and iron chain; brass and iron escutcheon pins, wood and machine screws; brass and copper wire cloth; copper leaders and gutters; brass and bronze railings and fittings, and numerous other brass and copper articles. The company calls attention to the fact that the unusual delays in deliveries, largely owing to the European situation, make this immediately available supply of obvious advantage.

Hubbard & Company, Pittsburgh, Pa., have issued a complete catalog of their standard pole line hardware and specialties. This book, in its completeness and thorough method of treatment, well constitutes an encyclopedia of buying materials. In listing the articles a photograph of the article has been furnished, together with an adequate description and table of sizes and dimensions. Wherever needed, use has been made of photographs and detailed drawings showing the way the materials are used in actual practice. The book contains 616 illustrations and 260 pages, 8½ in. x 10 in., and is printed on a suede finish offset paper which is particularly agreeable to the reader's eyes. It has a dark green, flexible paper cover and can be conveniently rolled up and carried about in one's pocket, thus making it useful for practical purposes. The book is divided into sixteen sections, in each of which material is grouped according to the purpose for which it is used, as follows: pole work material, guying material; cross-arms, pins and fittings; high-tension arms and fixtures; pole top pins and fixtures; secondary distribution fixtures; Universal lightning arresters; transformer mounting material; Peirce service wire brackets; hammer drills and expansion bolts; street lamp suspension devices; electric railway overhead and third-rail material; cable suspension material, underground cable material, telephone and telegraph wiring, line and track construction tools and Bates expanded steel poles.

NEW PUBLICATION

Business Psychology. By Hugo Münsterberg. La Salle Extension University, Chicago, Ill. Leather.

Most books on the subject of psychology in business are full of either technical subtleties or else vacuous popular gossip about the "mysteries of the mind," but Professor Münsterberg's work is a sensible discussion, intelligible to the layman, of the basic psychological principles which must be known before the real worth of the application of psychology to business can be appreciated. The practical services of psychology in business are ably described.